The Farmers' Perception of The Natural Farming System in Bulukumba, East Indonesia

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Abstract. Salassae Village, Bulukumba district is an organic village by the application of agriculture organic farming since 2011. The application of organic and conventional farming system is closely related to each farmers' perceptions. This research aims to determine the perception on farmers on the application of natural farming system, analyze the factors that related to farmers 'perception on natural farming system, and analyze the farmers' effort in Salassae Village. This research was carried out by interview and questionnaire method to 67 farmers, divided by 25 organic farmers and 42 conventional farmers. This research uses descriptive analysis techniques, and spearman rank correlation test. The results of the analysis show that the farmers' perception on natural farming system has different perception. Perception of natural farmers is categorized good, while perception of conventional farmers is categorized good enough. Overall, farmers' perception of the application of the natural farming system shows a good category with a score of 75%. The factor of farmers' perception on the application of natural farming system is social interaction. Farmers need a convincing understanding that organic rice farming is not difficult. Thus, social interaction needs to be improved in shaping the perception of rice farmers towards organic rice farming.

1 Introduction

Agriculture is an important sector in sustainable development in Indonesia. One of the agricultural subsectors that plays an important role is food crops. Therefore, the availability of food is important and necessary, especially in rice commodities [1]. Rice plants are one of the mainstay commodities, especially in the fulfillment of national food in Indonesia. Indonesian people have a habit of consuming rice which is processed into rice as a staple food. The high needs of the community for rice, thus gave rise to hopes of high rice productivity and farmers' incomes. Healthy agricultural products and environmental conditions free from chemical pollution, the hope of which can be obtained only by the application of natural agricultural systems. The current challenge is that most actors in the agricultural sector are still implementing conventional farming systems that are less friendly to the environment due to excessive chemiqua use [2].

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Natural and conventional farming systems are still being debated as profitable agricultural systems to implement. The application of natural farming systems is not as popular as conventional farming, so most farmers still maintain the old farming pattern, which is conventional. This also happens in eastern Indonesia, especially Bulukumba Regency, South Sulawesi.

Salassae village in Bulukumba Regency, South Sulawesi is referred to as "organic village". The designation was obtained from the pattern of agricultural application carried out by farmers who originally farmed conventionally now switched to natural agriculture. Although it bears the title as an organic village, not all farmers in the village carry out a natural farming system. The number of rice farmers who have not implemented is more than the farmers who have implemented. Farmers who apply natural farming, consider that natural agriculture in addition to producing a healthy food, is also more profitable than conventional farming.

Various studies have been conducted to determine the benefits and advantages of organic farming. Studies show that the impact per area of farmland is usually less in organic systems, but related to the quantity of impact produced is often higher [3]. Organic farming characteristics of applying commercial compost as a single fertilizer in planting show the lowest antibiotic residue in the soil as a whole [4].

Sustainability in agricultural production has emerged as one of the most significant concerns of the present. Commensurate with the current reluctance to the use of chemical fertilizers and pesticides; there is an open emphasis on the use of organic inputs and microbial inoclants that play an important role in sustainable agriculture [5]. However, worldwide surveys have documented the contamination and impact of agrochemical residues on soils, and terrestrial and aquatic ecosystems including coastal marine systems, and their toxic effects on humans and non-human biota. Although persistent organic chemicals have been removed and replaced by more biodegradable chemicals, contamination by legacy residues and recent residues still has an impact on the quality of human food, water, and the environment [6].

Organic farming systems produce lower yields compared to conventional farming. However, they are more profitable and environmentally friendly, and provide the same or more nutritious food that contains less (or no) pesticide residues, compared to conventional agriculture. In addition, preliminary evidence suggests that organic farming systems provide ecosystem services and greater social benefits [7]. In addition, organic management reduces plant emissions by 36-65%, with the exception of rice showing an 8% increase due to methane generation. Emissions based on organic plant products are also on average lower by 30%, except for rice [8]. Meanwhile, the identification of heavy metal sources in agricultural soils may be beneficial for local soil protection and soil quality improvemen [9]. Hence the potential of Nature-based solutions as a cost-effective long-term solution to the risks of hydrology and land degradation [10].

The overall results of the field experiments show the potential of biochar to improve plant nutrition, crop productivity and soil quality in nutrient-poor alkaline calcareous soils under the corn wheat growing system. However, long-term farmer participatory field experiments are needed to extrapolate the potential integration of biochar into current cereal-based cropping systems [11]. In summary, this study shows that organic farming as a whole increases the total microbial abundance and activity in agricultural land on a global scale [12].

Systems that receive organic fertilizers are characterized by certain microbial unions that are known to be involved in the degradation of complex organic compounds such as manure and compost [13]. Soil microorganisms respond differently to inorganic and organic fertilizer inputs in paddy soils, which offer new insights into the potential of soil microbiome management for sustainable agricultural productivity [14]. In addition, the supply of compost

produced in agriculture, can improve the biological and biochemical properties of the soil, without a shortage of municipal compost, representing a promising alternative to the latter and an important way to reuse the waste produced by the cultivation and processing of vegetables [15].

When impacts are expressed per hectare of cultivated area, almost half the categories of impacts are beneficial to organic farming [16]. It therefore creates a large scope for the development of organic farming in rural areas to improve the rural economy. But organic farming is not very developed in the state due to the lack of adequate transport services and other socioeconomic reasons [17]. Whereas organic farming contributes to multi-functional farming by improving the provision of ecosystem services, or reducing the negative externalities associated with agriculture, while maintaining or increasing crop yields [18]. Therefore organic farming can continue to develop even if premiums decrease. In addition, with its various sustainability benefits, organic farming systems can contribute more in feeding the world [19].

Based on the issues described above, this study aims to (1) determine the perception of rice farmers towards the natural agricultural system, (2) analyze factors related to the perception of rice farmers towards the application of the natural agricultural system.

2 Research Method

The research that will be carried out is related to the perception of rice farmers towards the natural agricultural system. The location of the study was conducted in Salassae Village, Bulukumpa District, Bulukumba Regency, South Sulawesi. The determination of the location is carried out by purposive sampling technique (intentionally). The determination of Salassae Village as the location of the study has been based on various consideration factors, including the following: (i) Salassae Village is a village known as "Organic Village" due to the application of natural agriculture by farmers and (ii) there are still many rice farmers who have not switched to natural agriculture in Salassae Village.

In Salassae Village, it is known that the population of rice farmers is as many as 200 farmers. In this study, rice farmers were categorized into 2 categories, namely rice farmers who applied natural agriculture as many as 76 farmers and rice farmers who applied conventional agriculture as many as 124 farmers. The determination of the number of samples using the slovin formula with an error tolerance limit (e) of 10%, then a large number of research samples of 67 respondents was obtained. Then, the 67 respondents will be divided into two, based on predetermined categories.

The sampling technique used from these two categories, namely proportional random sampling. Proportional random sampling technique is a sampling method by determining the number of samples by finding the characteristics of each sample proportionally. The number of selected samples, namely 25 natural farmers and 42 conventional farmers.

Data collection techniques in this study, namely using the interview method with questionnaire guidelines and documentation methods. Research on rice farmers' perceptions of the application of natural agricultural systems using technical descriptive analysis and spearman rank correlation. Therefore, this study used skala likert to measure the perception of rice farmers towards the application of natural farming systems by giving indicator scores into 5 scales. The answer to the statement "strongly disagree" is scored 1, the answer "disagree" is scored 2, the answer "neutral (N)" is scored 3, the answer "agree" is scored 4, and the answer "strongly agree" is scored 5. The measure of farmers' perceptions is described as technical and economic indicators as presented in Table 1.

Table 1. Measurement of indicators of rice farmers' perceptions of natural farming systems1

Technical Indicators
1. Natural rice cultivation is easy to apply
2. The provision of seeds, fertilizers and tillage in natural farming systems is easier than conventional farming
3. Planting and maintenance activities are easier to carry out with natural farming systems
4. Organic rice farming can improve soil fertility
5. Rice farming by natural farming can improve the quality of crops
6. The application of natural agricultural systems is able to improve soil quality
7. Low risk of crop failure with natural farming systems
8. The risk of developing pests and diseases is lower by farming naturally
9. No anxiety natural farming
10. Natural farming methods sometimes manage to meet expectations
Economic Indicators
1. Organic farming gives high yields
2. Organic farming will increase revenue
3. Organic farming provides high profits
4. Overall, organic farming reduces production costs
5. Higher price of organic rice products
6. Low cost of fertilizers and seeds in organic farming
7. Organic farming requires a small amount of capital
8. Input means for implementing organic farming are easy to obtain
9. The selling price of organic rice will be better

Table 2. Measurement of indicators of social interaction2

Indicators
1. Farmers use social media in running rice farming
2. Farmers are active in the activities of farmer groups
3. Farmers often discuss with fellow farmers about rice farming
4. Farmers often discuss with fellow farmers about the natural farming system
5. Farmers feel very enthusiastic when discussing natural farming systems
6. The farmer feels that he has received good support and response from neighbors if he farms rice naturally
7. Farmers often give and teach natural farming practices to fellow farmers
8. Farmers can follow well the counseling activities provided regarding natural agriculture

Table 3. Measurement of government support indicators 3

Indicators
1. The government strongly supports farmers in cultivating natural rice
2. The extension agency strongly supports natural rice farming activities
3. Provision of Irrigation infrastructure facilities
4. Provision of infrastructure facilities for market provision
5. Provision of transportation facilities
6. The existence of irrigation improvements
7. Road repairs

In descriptive analysis, perceptions are classified according to three categories, namely bad, sufficient, and good. The average score and score achievement are used to determine the

perception of rice farmers towards the natural farming system. Perceptual categories are determined using the interval formula.

Table 4. Classification of the category of the score of the level of perception of rice farmers4

Score	Score range	Average Score	Score Achievement (%)
Bad	20.00 – 46.66	1.00 – 2.32	00.00 – 33.33
Enough	46.67 – 73.32	2.33 – 3.66	33.34 – 66.67
Good	73.33 – 100.00	3.67 – 5.00	66.68 – 100.00
Min – Max	20.00 – 100.00	1.00 – 5.00	00.00 – 100.00

Meanwhile, the categories of indicators of social interaction and government supports are presented in Tables 5 and 6.

Table 5. Classification of score categories from social interaction

Score	Score Range	Score Achievement (%)
Bad	8.00 – 18.66	00.00 – 33.31
Enough	18.67 – 29.33	33.32 – 66.63
Good	29.34 – 40.00	66.64 – 100.00
Min – Max	8.00 – 40.00	00.00 – 100.00

Table 6. Classification of score categories from government supports

Score	Score Range	Score Achievement (%)
Bad	7.00 – 16.34	00.00 – 33.36
Enough	16.33 – 25.65	33.37 – 66.73
Good	25.66 – 35.00	66.74 – 100.00
Min – Max	7.00 – 35.00	00.00 – 100.00

Rank Spearman correlation analysis was used to determine the relationship between farmers' perceptions and farmer characteristics, social interaction, and government support. Rank Spearman correlation is used to find out the direction of the relationship, the closeness of the relationship between variables, and test the significance of the hypothesis [20]. The spearman rank correlation formula is as follows:

$$r_s = 1 - \frac{6\sum d_i^2}{n(n^2-1)} \quad (1)$$

Information:
d= Difference between two levels for the same indicator
n= many levels
rs = Rank spearman correlation coefficient

The use of spearman rank correlation analysis has several stages.
The formulation of the hypothesis in this study is as follows:
H0: It is suspected that there is no real relationship between the dependent variable and the independent variable.
Ha: It is suspected that there is a real relationship between the dependent variable and the independent variable.

In this study, variable Y is the perception of rice farmers towards natural farming systems related to the technical and economic aspects of natural rice farming. Meanwhile, variable X is a factor related to the perception of rice farmers, including age, level of education, number of family members, land area, length of farming, social interaction, government supports.

3 Results and Discussion

3.1 Characteristics of farmers

The age of farmers is the main factor in running a farming business because age can affect performance in managing a farming business. Farmers with a productive age usually have excellent physique so that they can manage a farming business well. In addition, age has an influence on the way farmers think, especially on farmers' thinking about the application of natural farming systems in their farming businesses. In Salassae Village, rice farmers who implement and do not implement a natural farming system are dominated in the age range of 34-46 years, amounting to 47.76% of rice farmers. Based on these results, it is known that most farmers who apply and do not implement natural agricultural systems are in the productive age range.

Education is a learning process activity that has been taken by respondent rice farmers. The level of education is considered to be one of the factors for the farmer to analyze and understand an agricultural system that is considered good for his life. In Salassae Village, as many as natural rice farmers, their last level of education, namely elementary school (SD), as many as 15 people with a percentage of 60%. In conventional farmers, most of them took the final level of education, namely high school, as many as 16 farmers with a percentage of 38.10%. Based on these results, it shows that although the level of education is low, it does not affect farmers in making decisions to implement a natural farming system that benefits the environment and the surrounding community.

The number of family members is the large number of members who are still dependent on farmers in one house. The number of family members will affect the expenditure of the farmer. Natural farmers in Salassae Village have a dependent number of 2-4 family members of 76%. This percentage is greater than conventional farmers, which is 64.29%. Meanwhile, the number of dependents of 5-7 family members is borne by 24% of natural farmers, while conventional farmers are 35.71% of conventional farmers. Based on these data, it is concluded that the majority of natural farmers and conventional farmers are borne by families of 2-4 people.

Land area is the amount of land managed by farmers who cultivate rice. Rice farmers in Salassae Village work more on medium land, namely with an area of 0.5-1 ha, there are 47 rice farmers or 70.15%. Medium land (0.5-1 ha) used by rice farmers to implement natural farming systems has a percentage of 56% greater than rice farmers' land that does not implement a natural farming system, which is 78.57%. Natural rice farmers who have a medium land area tend to be more serious in implementing a natural-based farming system to improve their farming skills.

The length of time to farm is the period of time for farmers to manage their rice farming which is calculated in units of years. In Salassae Village, farmers who implement a natural farming system are classified as farming for quite a long time and have been for a long time. Each percentage is 44%. Farmers who do not implement a natural farming system are categorized as having been trying to farm for quite some time with a percentage of 61.90%. For natural farmers, the natural farming system has made them aware that natural farming has a good impact on the fertility of farmland, a healthy environment, and high profits. Meanwhile, for conventional farmers, they still think that if they switch to natural farming, they still find it difficult, especially in labor, and are still worried about yields that do not increase. This means that conventional farmers are still taking into account the achievement of losses from crop yields and have not seen the positive impact of natural agriculture in the future.

3.2 Farmers' Perceptions of the Application of Natural Farming Systems

The perception of rice farmers is a view, response, or assessment given by rice farmers in the form of a mindset towards the application of natural agricultural systems. Thus, the perception of rice farmers in Salassae Village towards the implementation of the natural agricultural system is a form of assessment from the point of view of each farmer. In this study, the perception of rice farmers was measured based on technical and economic. Technical is the view or assessment of rice farmers on cultivation activities, benefits, and risks of trying to farm rice naturally. While economical is the view or assessment of rice farmers on costs, receipts, income, and profits. The following is a table showing the level of perception of rice farmers towards the implementation of natural farming systems in Salassae Village.

Table 7. Rice farmers' perceptions of natural farming systems

No.	Indicators	Score Range	Score Generation	Average Score	Score Achievement (%)
	Natural/organic Farmers				
1.	Technical	10.00 – 50.00	47.04	4.70	94.08%
2.	Economical	10.00 – 50.00	48.72	4.87	97.00%
	Total	20.00 –100.00	95.76		96.00%
	Category				Good
	Conventional Farmers				
1.	Technical	10.00 – 50.00	26.14	2.61	52.00%
2.	Economical	10.00 – 50.00	35.86	3.59	72.00%
	Total	20.00 –100.00	62.00		62.00%
	Category				Enough
	All rice farmers				
1.	Technical	10.00 – 50.00	33.94	3.39	68.00%
2.	Economical	10.00 – 50.00	40.66	4.07	81.00%
Total farmer perception score		20.00 –100.00	74.60		75.00%
Category					Good

Based on Table 7, it can be seen that overall, the perception of rice farmers towards the application of the natural farming system is well categorized with a score of 75%. Based on the results of the perception of the natural farming system, it shows that economic indicators are more widely perceived both by natural farmers and conventional farmers. The implementation of a natural farming system based on economic aspects will reduce production costs, the price of natural rice product is higher, natural farming only requires a little capital, and the selling price of natural rice products will be better.

Rice farmers' perception of economic indicators, namely reducing production costs, is said to be good, because farmers expressed agreement that by farming naturally, it will reduce production costs, especially on the cost of production facilities, such as seeds, fertilizers, and pesticides. The materials used in natural agriculture are local materials that are available around the farmer's environment, so that farmers can take advantage of, as well as reduce production costs.

Related to being able to reduce production costs with natural agriculture, this is also in line with Rope [21] that the next step it can be taken by farmers is to understand the law of the principle of substitution, namely teaching farmers to try to farm to achieve certain goals using methods that require the least cost in obtaining the same results.

Rice farmers' perceptions of natural rice harvest price indicators are higher, well perceived. This is because people also know that the price of natural rice harvests, both sold in grain and rice, will be higher than natural agricultural products. Most of the rice farmers in Salassae Village, if they sell their crops, they are sold in the form of rice. The price of

natural rice is priced at IDR 12,000/kg to collectors. Meanwhile, if sold directly to the final consumer, the price is IDR 15,000 / kg.

Rice farmers' perception of indicators requires little capital, well perceived. This is because the implementation of a natural agricultural system only requires a small amount of money for the capital of production facilities, while the capital of land ownership, most of the land farmers come from family inheritance, and there are also cultivators who try to farm with a profit-sharing system.

Rice farmers' perception of natural product selling price indicators will be better perceived well. This shows that natural farmers and conventional farmers already know the selling price of natural rice is better than not from the natural farming system. Even so, for conventional farmers, even though they know the high selling price, they have not been able or have not been able to implement natural agriculture. This is because the application of natural agriculture requires great energy in managing it, and assumes that consumers usually still choose non-natural rice at affordable prices.

3.3 Factors Related to Rice Farmers' Perceptions of the Application of Natural Farming Systems

The perception of rice farmers can be influenced by various factors. In this study, factors related to rice farmers' perceptions of the application of natural farming systems include age, level of education, number of family members, land area, length of farming, social interaction, and government support. The following is a table of the results of the spearman rank correlation test analysis.

Table 8. The results of the spearman rank correlation test analysis to factors related to the perception of rice farmers

Determinants of perception	Rice Farmers' Perceptions of the Application of Natural Farm Systems					
	Technical (Y1)		Economical (Y2)		Total Y	
	Rs	Sig.	Rs	Sig.	Rs	Sig.
Age	0.253	0.039*	0.154	0.213	0.227	0.065
Education	-0.161	0.193	-0.191	0.121	-0.154	0.212
Family Members	-0.079	0.525	-0.136	0.272	-0.110	0.376
Land	-0.121	0.331	-0.057	0.649	-0.089	0.472
Experience	0.119	0.338	0.075	0.545	0.119	0.338
Social Interactions	0.785	0.000**	0.780	0.000**	0.799	0.000**
Government Support	0.181	0.142	0.217	0.078	0.227	0.065

Information:
**Significant at α = 1%
*Significant at α = 5%

The perception of rice farmers, based on the results of Table 8, can be seen, that the overall social interaction is related to the perception of rice farmers towards the application of natural agricultural systems. Social interaction factors have a strong degree of closeness of relationship with rice farmers' perceptions of the technicalities of natural agricultural systems, this is indicated by the coefficient of social interaction variables being at intervals of 0.60 – 0.79 based on the interpretation of strong correlation relationships according to Sugiyono (2018). In addition, social interaction has a significance level of 0.000. The significance level of 0.000 is less than 0.01, so it shows that there is a very significant (very meaningful) relationship between social interaction and rice farmers' perceptions of the application of natural farming systems at a confidence level of 99%. That is, the more often farmers interact with social interactions, the better their perception of the application of natural agricultural systems. Base on the previous research, there is a significant relationship

between the social environment and the perceptions of farmers. The more social interactions farmers have with their social environment, the better the perception of farmers [22].

Meanwhile, other factors, such as age, level of education, number of family members, land area, length of farming, and government support, were not significantly related. This is because the significance level is greater than 0.05. Thus, there is no significant relationship between these factors and rice farmers' perception of the economy of natural farming systems with a confidence level of 95%.

4 Conclusions and recommendations

Overall, the perception of rice farmers in Salassae Village towards the application of the natural farming system, has been included in the good category with a score of 75%. Based on the results of the spearman rank test analysis, it is known that overall, the factors are very significantly related to the perception of rice farmers towards the application of natural agricultural systems, namely social interaction. Therefore, theinteraction of farmers must always be improved, both interactions with farmer groups, fellow farmers, and between neighbors. This is done as an effort to provide information, encouragement, and motivation, especially to farmers who have not implemented natural agriculture. Most farmers who have not implemented natural farming, are constrained by the amount of energy expended on natural farming while farmers' activities are not only farming. Farmers who have not implemented natural farming need encouragement so that they can be sure that natural farming is not difficult. Thus, social interaction should be further enhanced. Because so far social interaction has had a good influence in shaping rice farmers' perceptions of natural agricultural systems.

References

1. 1. W. A. Haris, M. Sarma, and A. F. Falatehan, J. Reg. Rural Dev. Plan. **1**, 231 (2018).
2. 2. Yayasan Bina Desa, *Natural Farming: Rahasia Sukses Bertani Di Masa Krisis* (Yayasan Bina Desa, Jakarta, 2011).
3. 3. M. S. Meier, F. Stoessel, N. Jungbluth, R. Juraske, C. Schader, and M. Stolze, J. Environ. Manage. **149**, 193 (2015).
4. 4. H. Zhang, Y. Zhou, Y. Huang, L. Wu, X. Liu, and Y. Luo, Chemosphere **152**, 229 (2016).
5. 5. H. Chauhan, D. J. Bagyaraj, G. Selvakumar, and S. P. Sundaram, Appl. Soil Ecol. **95**, 38 (2015).
6. 6. F. P. Carvalho, Food Energy Secur. **6**, 48 (2017).
7. 7. J. P. Reganold and J. M. Wachter, Nat. Plants **2**, 15221 (2016).
8. 8. E. Aguilera, G. Guzmán, and A. Alonso, Agron. Sustain. Dev. **35**, 725 (2015).
9. 9. J. Lü, W. Bin Jiao, H. Y. Qiu, B. Chen, X. X. Huang, and B. Kang, Geoderma **310**, 99 (2018).
10. 10. S. Keesstra, J. Nunes, A. Novara, D. Finger, D. Avelar, Z. Kalantari, and A. Cerdà, Sci. Total Environ. **610**–**611**, 997 (2018).
11. 11. M. Arif, M. Ilyas, M. Riaz, K. Ali, K. Shah, I. Ul Haq, and S. Fahad, F. Crop. Res. **214**, 25 (2017).
12. 12. M. Lori, S. Symnaczik, P. Mäder, G. De Deyn, and A. Gattinger, PLoS One **12**, (2017).

13. 13. M. Hartmann, B. Frey, J. Mayer, P. Mäder, and F. Widmer, ISME J. **9**, 1177 (2015).
14. 14. J. Wang, Y. Song, T. Ma, W. Raza, J. Li, J. G. Howland, Q. Huang, and Q. Shen, Appl. Soil Ecol. **112**, 42 (2017).
15. 15. R. Scotti, C. Pane, R. Spaccini, A. M. Palese, A. Piccolo, G. Celano, and M. Zaccardelli, Appl. Soil Ecol. **107**, 13 (2016).
16. 16. A. L. Tasca, S. Nessi, and L. Rigamonti, J. Clean. Prod. **140**, 725 (2017).
17. 17. A. K. Mishra, S. Deep, and A. Choudhary, Egypt. J. Remote Sens. Sp. Sci. **18**, 181 (2015).
18. 18. K. Garbach, J. C. Milder, F. A. J. DeClerck, M. Montenegro de Wit, L. Driscoll, and B. Gemmill-Herren, Int. J. Agric. Sustain. **15**, 11 (2017).
19. 19. D. W. Crowder and J. P. Reganold, Proc. Natl. Acad. Sci. U. S. A. **112**, 7611 (2015).
20. 20. Sugiyono, *Metode Penelitian Bisnis: Pendekatan Kuantitatif, Kualitatif, Kombinasi, Dan R&D*, Ketiga (CV Alfabeta, Bandung, 2018).
21. 21. R. Rope, Agrikan J. Agribisnis Perikan. **6**, 37 (2013).
22. 22. Widiyastuti, E. Widiyanto, and Sutarto, Agrista **4**, 2071 (2016).