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Analysis of farmers satisfaction with the use of combine harvester for rice harvesting in farming in Ujong Tanah Village, Setia District, Aceh Barat Daya Regency

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Abstract. The development of agricultural machinery has a big role in agriculture to increase farmers' income. Harvest handling with machine aid is significantly more productive than manual harvesting in a sustainable agricultural system. The combine harvester is an example of a piece of agricultural equipment utilized in contemporary agriculture. The purpose of this study was to see how the level of farming community satisfaction with the use of the Combine Harvester machine in Ujong Tanah Village, Setia District, Aceh Barat Daya Regency. The method used in this study is the Customer Satisfaction Index (CSI) to obtain valid (direct) data so that the level of satisfaction of the farming community with the use of the Combine Harvester can be determined. Based on the results of the study, it was found that the CSI for the confirmation of expectation indicators is 0.6126 or 61.26%. The CSI of the indicator of interest in reuse is 0.6477 or 64.78%. The CSI of the indicator of willingness to recommend is 0.6429 or 64.29%. The requirements for Quite Satisfied are met by the average CSI for agricultural community satisfaction with the usage of a combine harvester, which is 0.6344 or 63.44%.

1. Introduction

1.1. Background

Along with the development of agricultural science and technology, rice harvesting equipment continues to be developed in accordance with the demands of rice farmers' needs. Rice is a crop with a simultaneous cropping pattern, and when it is harvested it requires a lot of labor so that the harvest can be done on time and saves the operational costs of rice farmers. Thus, the need for this workforce becomes a problem that needs to be solved among farmers, especially in Ujung Tanah Village, Setia District. Due to the reduced workforce, it will result in delays in the rice harvest. Another problem is the high loss of harvest due to the scattered and fallen grain, as well as the wasted rice paddy rice.

Agricultural technology aims to increase agricultural productivity by replacing old farming methods with more efficient modern techniques [1]. Harvesting today can use technology, where the availability of labor is decreasing and wages are getting more expensive. The development of agricultural machinery has a major role in agriculture to increase farmers' income, especially to overcome labour shortages.

Many variables, including incorrect handling and use of harvesting instruments, contribute to the degree of yield loss during and after harvest. Harvesting with machine aid is significantly more efficient in a sustainable agricultural system than manual harvesting with a sickle. Utilizing machinery to assist in the harvest can quicken the operation and minimize rice yield loss.



The combine harvester is one kind of farm equipment utilized in contemporary agriculture. The impact of using machineries can be analyzed from the results of mechanization of harvest and post-harvest production, reducing grain losses by 2 to 4% by using Combine Harvester, as well as reducing the use of human labor [2].

Aceh Barat Daya Regency is one of the regencies in Aceh Province which is dominated by lowland rice farmers. Ujong Tanah Village, Setia District, is a village located in Setia District, Aceh Barat Daya Regency, which has an area of 530 Ha consisting of technical and rainfed rice fields and has 5 rice farmer groups with 3 rice fields. In this case, the potential to increase rice production is very possible, but it is necessary to use modern agricultural tools in a sustainable manner.

The use of combine harvester technology should be carried out by the Ujong Tanah Village farming community to facilitate the community in harvesting rice. The advantage of using this combine harvester farming tool is that the system works quickly, cost-effective and the rice yields are not much reduced/lost. Based on this description, the formulation of the problem in this study is how the level of community satisfaction with the use of the Combine Harvester machine in Ujong Tanah Village, Setia District, Aceh Barat Daya Regency.

1.2. Literature review

The term "satisfaction" refers to how one feels about a good or service. The consumer is not happy if the expected product is substandard. The customer will be happy if the product lives up to expectations. The consumer will be extremely happy if the product performs above expectations. Consumer expectations and results are compared to determine whether the customer was satisfied. Furthermore, Customers are said to be satisfied when their requirements and wants can be satisfactorily met and are as expected [3-5].

Service is a deficiency or effort that cannot be assessed by a person before being purchased for use. When buying a service, consumers can only use or rent it. Currently the main key to win business competition is to provide quality services that create customer satisfaction. Service quality is a quality standard that must be understood in providing actual services. A high-quality agricultural-extension service is described as useful, well-managed, and accountable to farmers [6-9].

Agricultural mechanization is a technological change through the adoption of non-human resources to do work in agriculture. Intensive agricultural mechanization such as land preparation, harvesting, threshing, and milling, is characterized by non-human energy input sources to replace human and animal energy sources needed in agricultural activities. Agricultural mechanization leads to increased inputs because it can increase cropping intensity to be higher and increase productivity of agricultural labor and increase agricultural production due to timeliness of operations, better quality of work and efficient use of inputs [2].

Community satisfaction with the combine harvester machine is one of the things that must be considered, both the level of performance of the machine and the results expected by the farmer group. The use of the Combine Harvester machine at the harvest stage is more efficient, namely the harvesting process is faster, the machine rental price is cheaper and the need for harvesting labor is minimized [10].

The Customer Satisfaction Index (CSI) can be applied to understand the desires of all customers for products and services by looking at the level of perception and service expectations desired by customers. CSI is an instrument that can be used to decide and investigate consumer loyalty by considering and focusing on the importance of assistance or the estimated quality of the goods. The application of CSI method is due to its advantages, namely efficiency and being able to determine the level of perception and expectation of each attribute obtained by customers [11,12].

2. Methods

This research was conducted in Ujong Tanah Village, Setia District, Aceh Barat Daya Regency from July to August 2020. The sampling technique used in this study was Simple Random Sampling. Simple Random Sampling is a sampling technique for taking sample randomly, where each element or member

of the population has an equal chance of being selected into the sample. The number of samples obtained is 66.32 or 66 samples. The total number of research samples is determined by the Slovin formula:

$$n = \frac{N}{1+N(d^2)} \quad (1)$$

Description:

n = sample size

N = population size

d = level of confidence/ desired precision

1 = Constant

Based on the above formula, it is determined the number of samples with the error tool set at 10%. Based on the Slovin formula above, the sample calculation is as follows:

$$n = \frac{N}{1+N(d^2)} \quad (2)$$

$$n = \frac{195}{1+195(0,1^2)} \quad (3)$$

$$n = \frac{195}{1+(1.95)} \quad (4)$$

$$n = \frac{195}{2.94} = 66.32 \quad (5)$$

The analytical method used is the Customer Satisfaction Index (CSI) method to obtain valid (direct) data so that the level of satisfaction of the farming community in Ujong Tanoh Village, Setia District, Aceh Barat Daya Regency can be determined. This satisfaction indicator is seen from Tjiptono's theory, in 2000, there are four core concepts of satisfaction measuring tools, namely (Overall Customer Satisfaction, Confirmation of Expectations, Interest in Reusing, Willingness to Recommend) will be analyzed using an analytical tool, namely, the Customer Satisfaction Index (CSI) method, to measure the level of satisfaction of the farming community in the village of Ujong Tanoh Village, Setia District, Aceh Barat Daya Regency. The stages of CSI measurement are:

- a. Determining the Mean Importance Score (MIS). This value is derived from the average interest of each consumer/farmer.

$$MIS = \frac{\sum_{i=1}^n Y_i}{n} \quad (6)$$

Description:

MIS = Mean Importance Score

n = Number of respondents

Y_i = Importance value Y to i attribute

- b. Making weight factors (WF) this weight is the percentage of the MIS value per attribute to the total MIS of all attributes.

$$WF = \frac{MIS_i}{\sum_{i=1}^p MIS_i} \times 100\% \quad (7)$$

Description:

P: importance attribute to -p

- c. Making the Weight Score (WS) this weight is the multiplication between WF and the average level of importance (mean satisfaction score = MSS). The MSS value is obtained from the average performance value in the IPA analysis.

$$WSI = WFI \times MSS \quad (8)$$

- d. Determine the Customer Satisfaction Index (CSI), which is the weight score divided by the maximum scale used, then multiplied by 100%.

Table 1. Customer Satisfaction Index (CSI) criteria.

CSI Value	CSI Criteria
0.81 – 1.00	Very Satisfied
0.66 – 0.80	Satisfied
0.51 – 0.65	Quite Satisfied
0.35 – 0.50	Less Satisfied
0.00 – 0.34	Unsatisfied

3. Results and discussion

A combine harvester may boost a farmer's productivity and revenue when used as a harvesting instrument. Farmers may utilize a combine harvester to harvest rice more quickly, more cheaply, and with less work. Utilizing a combine harvester helps prevent rice loss brought on by late harvests. By minimizing grain loss from loss, the use of a combine harvester may help sustainable agriculture.

An evaluation of a product or service by a customer that makes them happy to utilize it is called satisfaction. The value offered and the quality of the products or services may both contribute to customer satisfaction. The results of the level of satisfaction with the use of a combine harvester

Table 2. Customer Satisfaction Index (CSI) on expectation confirmation indicators.

No	Item/Inquiry	Average Interest Score (MISi)	Weighted Factor (WF)	Average Performance Score (MSSi)	Weighted Score (WS)
1	Expectations on the number of available combine harvester machines	3.42	20.89	3.17	66.22
2	Expectations for the continuity of using combine harvester machine	3.33	20.33	3.42	69.52
3	Expectations shifts from using traditional harvesting services to combine harvester machines	3.09	18.85	3.3	62.2
4	Expectations of satisfaction with combine harvester machine services	3.2	19.5	2.53	49.34
5	Expectations for government support in providing combine harvester rice harvesting machines	3.35	20.43	2.89	59.04
Total		16.39	16.39	100	15.32

<i>Weighted Total</i>	306.32
<i>Customer Satisfaction Index</i>	0.6126
<i>Percentage</i>	61.26
<i>Description</i>	Quite satisfied

Source: Primary Data July 2020

It can be seen at Table 2, that the level of satisfaction of farmers using the Combine Harvester machine against the expectation confirmation indicator is quite satisfied 0.6126 (61.26%) farmers are quite satisfied with the Combine Harvester machine, farmers feel 61.26 in accordance with farmers' expectations. The Combine Harvester machine can help with problems among farmers in terms of harvesting rice when the harvest occurs. The use of the Combine Harvester Machine can ease the burden on farmers, but at this time the availability of machines is still limited. so that many machines are imported from outside the region such as Pidie and Aceh Timur.

Table 3. Customer Satisfaction Index (CSI) on repeat user interest indicators.

No	Item/Inquiry	Average Interest Score (MISi)	Weighted Factor (WF)	Average Performance Score (MSSi)	Weighted Score (WS)
1	Satisfaction after using the Combine Harvester service	3.42	20.89	3.23	67.47
2	Desire to reuse Combine Harvester services	3.33	20.33	3.24	65.86
3	Satisfaction with Combine Harvester's performance results	3.09	18.85	3.29	62.01
4	Satisfaction with the quality of the harvest using the services of Combine Harvester	3.2	19.5	3.23	62.98
5	Affordability Costs incurred for the use of combine harvester machine	3.35	20.43	3.21	65.58
Total		16.39	16.39	100	16.2
<i>Weighted Total</i>					323.9
<i>Customer Satisfaction Index</i>					0.6478
<i>Percentage</i>					64.78
<i>Description</i>					Quite satisfied

Source: Primary Data July 2020

It can be seen at Table 3, that the level of satisfaction of farmers using the Combine Harvester machine on the indicator of interest in repeat users is quite satisfied with the value (CSI) of 0.6477 (64.78%) farmers who want to use this tool every time they harvest rice. Because farmers feel confident that they want to reuse this machine because this machine can provide benefits for farmers by saving labor and can save costs incurred by farmers to pay for labor (people) to harvest rice. With this machine they feel quite satisfied in harvesting rice.

It can be seen at Table 4, that the increase in farmer satisfaction using the Combine Harvester machine on the willingness to recommend indicator is quite satisfied with the value (CSI) of 0.6429 (64.29%) farmers, because farmers want to promote the Combine Harvester machine to the surrounding

community can use the Combine Harvester machine tool when harvesting occurs. This Combine Harvester machine is very effective in helping the community in Ujong Tanoh Village, Setia District, Aceh Barat Daya Regency. In addition, farmers responded very well and accepted the Combine Harvester machine as a tool for rice harvesting farmers, with the arrival of this machine, farmers can save costs and labor to pay for other people's costs.

Table 4. Customer Satisfaction Index (CSI) on the willingness to recommend indicator.

No	Item/Inquiry	Average Interest Score (MISi)	Weighted Factor (WF)	Average Performance Score (MSSi)	Weighted Score (WS)
1	Willingness to recommend the use of combine harvester	3.42	20.89	3.21	67.05
2	Willingness to promote the results of the combine harvester machine performance directly to other farmers	3.33	20.33	3.15	64.03
3	Willingness to recommend a combine harvester because of the good quality of the harvest	3.09	18.85	3.08	58.05
4	Willingness to recommend combine harvester as a quick alternative tool in rice harvesting	3.2	19.5	3.36	65.52
5	Promotional assistance from local government for combine harvester	3.35	20.43	3.27	66.8
Total		16.39	16.39	100	16.07
<i>Weighted Total</i>					321.45
<i>Customer Satisfaction Index</i>					0.6429
<i>Percentage</i>					64.29
<i>Description</i>					Quite satisfied

Source: Primary Data July 2020

Table 5. Customer Satisfaction Index (CSI) on overall indicator.

No	Item	Customer Satisfaction Index (CSI)	Percentage (%)	Description
1	CSI on expectation confirmation	0.6126	61.26%	Quite Satisfied
2	CSI on repeat user interest	0.6478	64.78%	Quite Satisfied
3	CSI on the Willingness to Recommend	0.6429	64.29%	Quite Satisfied
Average		0.6344	0.6344	63.44%

Source: Primary Data July 2020

Table 5 show the average Customer Satisfaction Index of the 3 items studied. The average CSI of the 3 items is 0.6344 which is included in the Quite Satisfied criteria. These results are closely related

to the expectations of the community towards increasing the number of available combine harvester machines and the hope of government support in providing combine harvester as rice harvesting machines. The Customer Satisfaction Index (CSI) criteria can be seen in Table 6.

Table 6. Customer Satisfaction Index (CSI) criteria.

CSI Value	CSI Criteria
0.81 – 1.00	Very satisfied
0.66 – 0.80	Satisfied
0.51 - 0.65	Quite satisfied
0.35 – 0.50	Less Satisfied
0.00 – 0.34	Unsatisfied

4. Conclusion

Based on the results of the discussion, the CSI of the expectation confirmation indicator is 0.6126 or 61.26%. The CSI of the indicator of interest in reuse is 0.6477 or 64.78%. The CSI of the indicator of willingness to recommend is 0.6429 or 64.29%. The typical CSI for community satisfaction with the use of a combine harvester is 0.6344 or 63.44% and it is in the criteria of Quite Satisfied. To increase community satisfaction, it is necessary to increase the number of combine harvester machines availability. It is expected that the inclusion of the combine harvester would enhance farmer revenue and assist sustainable agriculture.

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