Analysis of social and economic factors that affect rice farmers in Tincep Village, Sonder District, Minahasa Regency, North Sulawesi Province

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Abstract. Rice productivity in Minahasa Regency in 2018, especially in Sonder Subdistrict, reaches 61.12 tons/ha. In addition to the highest productivity, Sonder sub-district, especially Tincep Village, is an area of lowland rice cultivation which has remained to this day. This condition is unusual to study and analyze in-depth how social and economic factors, as well as the local wisdom behind the rice farmers in Tincep Village, to continue farming and identify local knowledge that influences farmers to continue farming. Respondents were randomly selected as many as 50 smallholders. Analysis of the data used is a descriptive analysis that is analyzed using a Likert Scale. The results showed that in managing rice farming, the respondent farmers did not use local wisdom, but followed their desires based on their experience in agriculture.

1. Introduction

Food security does not only depend on the production of food commodities themselves but also farmers' interest in these commodities [1]. Farmers are not only oriented towards meeting their own food needs but are expected to be able to meet their household needs through farming [2]. Rice farming, especially lowland rice, requires irrigated land, a sufficient supply of irrigation water, and the availability of farmers' capital to purchase production facilities [3–5]. Rice farming not only involves working capital but also the desire of farmers.

The productivity of lowland rice in Minahasa Regency in 2018 varies, from 55.53 tons/ha in Tombulu District to 61.12 tons/ha in Sonder District (BPS Kabupaten Minahasa, 2018). Technical factors greatly influence productivity in farming; social factors are also economic factors from farmers. In addition to the highest productivity in North Minahasa Regency, Sonder Subdistrict, especially Tincep Village, is an area of paddy rice cultivation that has remained to this day. This condition is unusual to study and analyze in-depth how the social and economic factors of paddy farmers in Tincep Village encourage farmers to continue to work on rice.

The results of this study describe the factors that influence farmers in deciding to plant a commodity. The purpose of this study is to identify and analyze the social factors that influence farmers to continue their rice farming, identify and analyze economic factors that influence farmers to continue their rice farming, and analyze local wisdom that influences farmers to keep their rice farming.
2. Method

2.1. Place and time of research
This research was conducted in Tincep Village, Sonder District, Minahasa Regency. The study was conducted from April 2019 to September 2019.

2.2. Sampling method
The method of sampling was done by simple random sampling, wherein from 126 rice farmers in Tincep Village, 50 farmers randomly drawn. The tiller farmers choose because the cultivators did most of the rice fields in Tincep Village [6].

2.3. Analysis methods
The analysis method used in this research is to answer objectives 1, 2, and 3 using descriptive analysis using a Likert scale, a modified Likert Scale correctly to see the effect of local wisdom where the scores give are only 1 and 2. Data analysis used is Descriptive analysis analyzed using a Likert Scale, according to Riduwan (2007) as follows [7]:

\[
\text{Total score from data collection \times 100\%} \over \text{Ideal total score}
\]

Table 1. Interpretation of scores on the Likert scale.

| Answer choices                  | Score | Presentation (%) | Criteria |
|---------------------------------|-------|------------------|----------|
| Hereditary habits               | 3     | 61 - 100         | High     |
| Own desire                      | 2     | 41 - 60          | Fair     |
| Instructor extension / group / government | 1     | 0 - 40           | Low      |

While the method of calculating the score:

\[
\text{Number of Scores for Each Criteria = Score Achievements x Number of Respondents}
\]

where:

\[
S3 = 3 \times 50 = 150 \\
S2 = 2 \times 50 = 100 \\
S1 = 1 \times 50 = 50
\]

Data analysis for answer objective 3\textsuperscript{th} using farm bussines analysis [2]

\[
\text{FI = TR – TC}
\]

where \( \text{FI} = \text{farmer’s Income} \)
\( \text{TR} = \text{Total Revenue} \)
\( \text{TC} = \text{Total Cost} \)

3. Results and discussion

3.1. Characteristics of farmers and rice farming performance
Almost all paddy farmers in Tincep Village are cultivating farmers, where farmers are the decision-makers in their farming without the consideration of the landowner, from processing the land to marketing. Plant maintenance, including fertilization, pest control, and disease, are all carried out by the tiller farmers. Whereas the maintenance of waterways and their utilization regulate by special officers who manage water, and even these officers are appointed and receive compensation in the
form of rice they produce. The respondents were 50 farmers under the age of 50 years one respondent or 2%, aged 51 to 60 years 25 respondents were around 50% and aged more than 60 years 24 respondents or 48%.

**Table 2. Age of respondent farmers.**

| Age category (years) | Number (respondent) | Percentage (%) |
|---------------------|---------------------|----------------|
| < 50 years          | 1                   | 2.00           |
| 51 - 60 years       | 25                  | 50.00          |
| > 60 years          | 24                  | 48.00          |
| Total               | 50                  | 100.00         |

Most of the respondents' farmers aged over 50 years and 60 years. This shows that rice farming in Tincep Village was less in demand by farmers under 50 years. If this continues and without any effort to invite young farmers, it is feared that there will no longer be farmers working on rice. There are 30 farmers or 60% having a high school education, followed by those who graduated from junior high school by 15 farmers or 30% and having an elementary school education of 2 farmers or 10%, as listed in Table 3.

**Table 3. The education level of respondent farmers.**

| School              | Number (respondent) | Percentage (%) |
|---------------------|---------------------|----------------|
| Elementary          | 2                   | 10.00          |
| Junior High         | 15                  | 30.00          |
| Senior High         | 30                  | 60.00          |
| Total               | 50                  | 100.00         |

The level of education of farmers is crucial in the adoption of technology. The higher education, the easier it is to adopt an innovation and vice versa. This is evidenced by the application of technology in farming, where most farmers are able and willing to apply any new technology. Also, their ability to manage is outstanding by what is taught from the agricultural instructor and related institutions.

Most of the respondents' arable area is under 0.6 hectares (Ha) or 2 tektek (local area units where 1 tektek is equivalent to 0.3 Ha), as many as 35 farmers or about 70%, with an arable area between 0.6 to 1 hectare As many as 5 respondents or around 10%, and the remaining 10 respondents work on rice fields more than 1 Ha, as listed in Table 4.

**Table 4. Extent of respondents' farmers.**

| Arable Area (Ha) | Number (respondent) | Percentage (%) |
|------------------|---------------------|----------------|
| < 0.6            | 35                  | 70.00          |
| 0.6 - 1.00       | 5                   | 10.00          |
| > 1.0            | 10                  | 20.00          |
| Total            | 50                  | 100.00         |

This arable area has implications for the cost of managing rice farming, starting from the number of seeds needed, the cost of processing land, fertilizing, controlling pests and diseases, and post-harvest management. The tiller farmers and owners bear all costs, but these costs will calculate after the harvest. Respondent farmers need capital to finance all of their farming activities. Respondent farmers who manage rice fields less than 1 Ha using their capital, while those more than 1 Ha rice fields, the capital comes from loans, including rice mill owners and staple food stalls. Most of the farmers who worked on less than 1 hectare were dependent on local food stall owners, where even the stall owners
were rice traders. The calculation of the loan amount is equal to rice, where 1 kg of rice is valued at Rp. 7,000.00.

### Table 5. Duration of rice cultivation.

| Duration of rice farming (years) | Number (respondent) | Percentage (%) |
|----------------------------------|---------------------|----------------|
| < 10                             | 5                   | 10.00          |
| 10 - 15                          | 15                  | 30.00          |
| 16 - 20                          | 20                  | 40.00          |
| >20                             | 10                  | 20.00          |
| Total                           | 50                  | 100.00         |

The experience of farming also underlies the reason that respondents were always working on rice plants. They never tried other commodities but failed because farmers don't have skilled in farming other than rice. On the other hand, knowledge and skills in rice farming also limit respondents not to work on other food crops.

All respondents have used agricultural machinery in the management of rice farming, namely tractors for land management, rice thresher machinery, and rice milling machines. This is also due to the difficulty of getting agricultural management workers in Tincep Village. The scarcity of workers who manage rice farming is following the age level of the respondents in the previous description, where there is no young generation involved in rice farming. In addition to the scarcity of labor, the working time is faster than when done manually, and the costs are less. The reduced amount of costs incurred by the respondent results in more significant benefits compared to when using labor.

The use of technology in the management of rice farming shows that respondents are willing and able to absorb the available technology. This is due to the level of education of respondents, where most respondents have a high school education of 60% (Table 2). The higher a person's knowledge, the easier it is to absorb, understand, and accept an innovation, conversely the lower the person's education, the more difficult it is.

### 3.2. Social factor analysis

Social factors in this study consisted of 6 elements, farmer's empowerment of farmers, the attitude of farmers, knowledge of farmers, farmers' skills and participation of farmers, and the development of rice farming. Each of these factors is divided into sub-factors, namely: the empowerment of farmers there are 10 sub-factors, the attitude of farmers is 8 sub-factors, the knowledge of farmers are 6 sub-factors, the skills of farmers are 6 sub-factors, the factor of farmer participation is 4 sub-factors there are 3 factors as well as farming development factors.

Each answer choice has a score. There are five categories in each subfactor with the following scores: 1 for very low, 2 low, 3 neutral, 4 high and 5 very high. The scores are added for respondents according to subfactors and factors, so the categories of each element are obtained. Overall social factors that underlie farmers in managing rice farming can be seen in Table 6, with a total score of 6,720.

### Table 6. Social factors that influence farmers in rice farming in the village.

| Variable                        | Total Score | Criterion |
|---------------------------------|-------------|-----------|
| Farmer's empowerment            | 1.701       | High      |
| Farmer’s attitude               | 1.602       | Very High |
| Farmer’s knowledge              | 1.131       | Very High |
| Farmer’s skill                  | 969         | High      |
| Farmer’s participation          | 821         | Very High |
| Development of rice farming     | 496         | High      |
| Total                           | 6.720       | High      |
Table 7. Interpretations.

| Total Score | Criterion   |
|-------------|-------------|
| 1850-3699   | Very Low    |
| 3700-5549   | Low         |
| 5550        | Neutral     |
| 5551-7400   | High        |
| 7401-9250   | Very High   |

The total score obtained is included in the high category. This shows that rice farmers in Tincep Village have knowledge, skills and actively participate in developing their farming. This is social capital for the development of rice farming in the region. Almost all paddy farmers are cultivating farmers. The results of this study indicate they have the potential to be developed. Social factors are important things that can use for the development of rice farming. The availability of irrigated rice fields and the available water sources throughout the season encourages them to continue to grow rice. Sometimes when the pest attack with a large enough intensity cannot be controlled, so the yields are not optimal, and also the returns cannot cover their debts in the staple food stalls, but this does not become an obstacle for them to continue to cultivate rice.

3.3. Economic factor analysis
Economic factors in this study include agricultural land, water resources, labor, capital, and management.

3.3.1. Farm land. The agricultural land in Tincep Village is in the form of irrigated fields, with a total area of about 80 hectares. The average size of rice fields per respondent is 0.38 hectares, where local measurements are called 1 tektek. All respondents are cultivating farmers, which in determining the size of the areas to be planted depends on the farmers themselves. The landowner only receives the harvest after deducting the total cost during the harvest, or in other words, as payment for the rice field rent. Farming is the responsibility of the sharecroppers.

3.3.2. Water resources. Water sources are available throughout the year with a discharge that can irrigate all rice fields in Tincep Village. The local P3A manages this water resource with an administrator tasked with providing water and scheduling water flow. Even these officers are paid with farmers’ yields with the provision of 50 kg of unhusked rice harvested per hectare of rice fields, equivalent to 30 liters of rice. In this study, the average rice field managed by a farmer was 0.38 hectares or 1 tektek (local area unit), with the cost for P3A officers being 10 liters of rice.

3.3.3. Labor. The labor used in rice farming in Tincep Village comes from within the family and outside the family. Workers outside the family need to transplant activities because they are carried out at the same time, or move simultaneously. The number of workers outside the family used is at least two people, depending on the area of rice fields planted. Labor costs per working day (HOK) range between Rp. 125,000.00 up to Rp.150,000.00. The age of respondent farmers for more than 50 years shows that there is no regeneration of paddy rice farmers. Advances in technology in agriculture have helped rice farmers, especially in land management, threshing rice, with tractor rental costs of Rp. 700,000.00 / tektek or around Rp. 2,100,000.00 per hectare. The cost of threshing rice depends on the amount of rice, and the agreement ranges from Rp. 1,950,000.00 / tektek.

3.3.4. Capital. The results of this study indicate the working capital comes from their money and the owner of the rice mill. Most farmers use their capital as many as 40 respondents or 80% of the total respondents, and others borrow capital to the rice mill owner as many as 10 respondents or 20% of the total respondents.
Table 8. Sources of capital for rice farming in Tincep Village, Sonder District.

| Source of Capital      | Number (respondent) | Percentage (%) |
|------------------------|---------------------|-----------------|
| Private                | 40                  | 80              |
| Rice mill owner        | 10                  | 20              |
| Total                  | 50                  | 100             |

Source: Processed Data

Working capital borrowed from the owner of the rice mill provides a condition that the harvest will be sold to the owner of the mill at the current price. All rice harvested is cut with some borrowed capital, in the form of rice. Work capital loan payments are converted into rice.

Farmers receive the results of the sale of rice following prices prevailing at the farm level. In this study, the price applicable for the last planting season is Rp. 7,000.00 per kilogram of rice. The total farmer acceptance is as much as the yield multiplied by the current price, then deducted by the loan during the planting to harvest process. Working capital which needs of farmers can borrow from existing food stalls, with an agreement to sell their crops in the form of rice to the owner of the stall. Farmers receive the results of the sale of rice by prices prevailing at the farm level. In this study, the applicable price.

3.3.5. Management. Management of lowland rice farming is carried out by the respondent's farmers, both capital needs, seeds, medicines, agricultural machinery, time of planting to harvest. Several respondents have more than ten years of experience in paddy farming, so they have the knowledge, skills, and also the courage to manage their farming. Analysis of lowland rice farming in Tincep Village shows that the total income per farmer is Rp. 25,167,687.50 while per hectare of rice fields is Rp. 66,230,756.58.

Table 9. Analysis of rice farming in Tincep Village, Sonder District, Minahasa Regency.

|                          | All Respondent (Rp) | Per Respondent (Rp) | Per hectare (Rp) |
|--------------------------|---------------------|---------------------|------------------|
| Total Revenue            | 503,353,750.00      | 25,167,687.50       | 66,230,756.58    |
| Cost                     |                     |                     |                  |
| Seedling                 | 5,427,500.00        | 271,375.00          | 714,144.74       |
| Land Tilage              | 22,000,000.00       | 1,100,000.00        | 2,894,736.84     |
| Transplanting            | 10,900,000.00       | 545,000.00          | 1,434,210.53     |
| Pest controlling         | 5,540,000.00        | 277,000.00          | 728,947.37       |
| Harvesting               | 18,425,000.00       | 921,250.00          | 2,424,342.11     |
| Threshing                | 38,600,000.00       | 1,930,000.00        | 5,078,947.37     |
| Drying                   | 9,850,000.00        | 492,500.00          | 1,296,052.63     |
| Milling                  | 17,834,250.00       | 891,712.50          | 2,346,611.84     |
| Total Cost               | 128,576,750.00      | 6,428,837.50        | 16,917,993.42    |
| Farmer’s Income          | 374,777,000.00      | 18,738,850.00       | 49,312,763.16    |

Source: Processed Data (2019)

The total costs incurred by farmers range from Rp. 6,428,837.50 or Rp. 49,312,763.16 per hectare. The total income received by farmers amounted to Rp. 18,738,850.00 or Rp. 49,312,763.16 per hectare. This income has not been reduced by land rental fees of 0.5 from the income received by
farmers. Net income received by farmers amounting to Rp. 9,639,425.00 per farmer with an area of land of 0.385 hectares.

If farmers meet their daily needs at the local food stalls, assuming around Rp. 1,500,000.00 per month, during the 100-day growing season or equivalent to 4 months, the remaining income is Rp. 3,639,425.00. This income includes wages for crop maintenance in one growing season. The wage that applies per HOK is Rp. 100,000.00 up to Rp. 125,000.00, depending on the type of work. This shows that the farmer loses money because the income he receives is actually his wage working in paddy farming.

3.4. Local culture

The results of interviews with 50 respondents about local wisdom in the application of rice farming in Tincep Village, the calculation of scores for each decision in all stages of management of rice farming and arranged in the following table:

**Table 10. Recapitulation of Local Wisdom Factors in Rice Farming in Tincep Village, Sonder District, Minahasa Regency.**

| Subvariable                                | Total Score | Information |
|--------------------------------------------|-------------|-------------|
| Determination of rice fields to be planted | 83          | Low         |
| Cleaning the fields                        | 89          | Low         |
| Land management                            | 83          | Low         |
| Selection of rice varieties                | 60          | Low         |
| Seedbed nursery                            | 65          | Low         |
| Time of planting seeds in the fields       | 77          | Low         |
| Fertilizer selection                       | 68          | Low         |
| Time and Frequency of Fertilization        | 92          | Low         |
| Time and Frequency and Weeding Rice Fields | 70          | Low         |
| Choice of pest and disease control drugs   | 59          | Low         |
| Time and Frequency of Spraying             | 69          | Low         |
| Timing and Irrigation Water Discharge      | 91          | Low         |
| Time, Harvesting and Drying Technology     | 94          | Low         |
| Marketing                                  | 105         | Low         |
| **Total**                                  | **1,105**   | Low         |

Source: Summarized from tables compiled from Primary Data (2019)

According to Riduwan (2007), the calculation of scores for local wisdom is as follows [7]:

\[
\text{Local Wisdom} = \frac{\text{Total score of Colect Data}}{\text{Total Ideal Score}} \times 100\% \\
\text{Local Wisdom} = \frac{1.105}{2.100} \times 100\% = 52.62 \%
\]
The results of this study indicate that the respondent farmers did not use local wisdom for managing their business, but they follow desires based on their experience in farming.

4. Conclusion
Social factors, both in empowerment, knowledge, skills, attitudes, and participation as well as farmers’ perceptions, are very dominant in the management of lowland rice farming in Tincep Village, Sonder District, Minahasa Regency. Lowland rice farming provides economic benefits and can meet the basic needs of farm families. Local wisdom does not affect farmers in managing lowland rice farming but based on their knowledge, skills, and desires.

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