

Farmers' Motivation to Practice Rice-Fish Farming in Candibinangun Village, Sleman

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Abstract. Rice-Fish is a combined agricultural and fishery practice with the potential to enhance the productivity of paddy fields. The implementation of this farming technique aims to improve the welfare of farmers in Candibinangun Village. The purpose of this study is to investigate the farmers' motivation to practice rice-fish and identify the factors influencing their motivation towards this practice. The research was conducted using a descriptive method and a census technique, collecting data from 35 rice-fish farmers in Candibinangun Village. Spearman's rank correlation was used to analyze the data. The study's results indicate that the primary motivation for farmers to practice rice-fish is to increase their income and enhance their standard of living. Overall, farmers' motivation towards rice-fish farming is categorized as "very high." The study also reveals that government assistance benefits have a strong relationship with farmer motivation. Formal education and land area show a very weak relationship, while non-formal education, income, benefits of extension services, farmers' activity in counselling, and the availability of credit facilities have a low relationship with farmer motivation.

1 Introduction

In sustainable national development, one of the prioritized sectors is agriculture, especially in agrarian countries like Indonesia [1, 2]. The agricultural sector plays a crucial role in providing national food security and contributes significantly to strengthening food resilience [3]. Over the past decade, agricultural development has been closely associated with commodity-focused approaches, with primary attention on meeting domestic food needs [4, 5].

The long-term national food policy aims to diversify food consumption towards more nutritious, diverse, and balanced diets [6]. The increasing population growth presents a challenge for the agricultural sector, particularly concerning food crops [7]. The growing population directly relates to food supply and influences the demand for food commodities, especially rice [8]. Rice remains a staple food and a primary commodity supporting the people's sustenance [9]. The rice consumption is increasing time by time [10]. Therefore,

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there is a need to develop rice cultivation technologies that can positively contribute to food security and farmer welfare [11, 12].

One alternative to enhance rice productivity is through the integrated rice-fish farming system [13]. Integrated rice-fish farming is a cultivation method that combines agriculture and fishery practices to improve the productivity of rice fields [14]. It can increase farmers' income, diversify agricultural and fishery products, improve soil and water fertility, and reduce pests and diseases in rice crops [15].

Candibinangun Village is one of the selected locations for piloting integrated rice-fish farming in Sleman Regency. Some farmers in the area have already adopted this innovation since 2010, as it started gaining recognition among farmers. According to data from the Department of Agriculture, Food, and Fisheries of Sleman Regency, the total area of harvested rice crops is 477.21 hectares, while the area under integrated rice-fish farming is only 3.72 hectares.

From the above background, it is evident that the majority of land has not yet adopted integrated rice-fish farming, despite its potential for higher profits. It is essential to understand the motivations of farmers and the factors related to their inclination towards integrated rice-fish farming in Candibinangun Village, Pakem District, Sleman Regency.

2 Research Method

This research used a descriptive method. The location was intentionally chosen in Candibinangun Village, Pakem District, Sleman Regency. The selection of respondents was done using a census technique, which involved including all farmers who practiced integrated rice-fish farming. The total number of respondents in this study was 35 farmers, comprising 20 rice-fish farmers from Samberembe Hamlet and 15 rice-fish farmers from Kemput Hamlet.

The data collected consisted of primary data obtained through structured interviews with farmers using questionnaires, as well as secondary data obtained from relevant institutions in the research location, including the Central Bureau of Statistics of Sleman Regency, the Agricultural Extension Agency, the Sleman District Office, and the Candibinangun Village Office.

For data analysis, a descriptive analysis was used to provide a detailed overview of farmers' motivation and factors related to their motivation in practicing rice-fish in Candibinangun Village. Additionally, the Rank Spearman correlation analysis was utilized to examine the relationship between independent variables (related factors) and the dependent variable (farmers' motivation). The Rank Spearman coefficient was used to measure the existence and strength of the relationship between the level of motivation and influencing factors.

3 Results and Discussion

3.1 Rice-Fish Farming Practice

Rice-fish farming began to be introduced since 2010 through demplot or demonstration plot in *Pokdakan* (fish farming group) by agricultural extension workers. Large-scale implementation since Sleman District was designated as a pilot area for rice mining by FAO and received assistance. Candibinangun Village has sufficient water sources for rice mina maintenance and is free from pathogenic contamination and chemicals, the location of flood-free rice fields and close to settlements that have road access makes it easier for supervision, distribution of seeds, feed and harvesting processes and has muddy and sandy

soil types that support rice mina farming. The following are the techniques for rice mina cultivation in Candibinangun Village starting from seed preparation to harvesting (as seen in figure 1)



Fig 1. Rice-fish farming practice

3.2 Farmers Characteristic

3.2.1 Age

The age of rice-fish farming farmers in Candibinangun Village ranges from 28-75 years, most rice-fish farming farmers are classified as productive age with an age range of 28-63 years of which there are 30 farmers with a percentage of 85.72%. These results show that rice-fish farming in Candibinangun Village is carried out by farmers who are classified as productive age so that they have good physical abilities and high enthusiasm in running rice-fish farming.

3.2.2 Gender

The gender of rice-fish farming farmers in Candibinangun Village is mostly male, indicated by the number of 34 rice-fish farming farmers and the percentage is 97.14%. As for the female sex, there is only 1 farmer with a percentage of 2.86%. The data shows that rice-fish farming is mostly done by men, in addition to being the head of the household who is responsible for making a living but in running a rice-fish farming business also requires a large amount of energy, especially in land preparation.

3.2.3 Job

The main occupation of rice-fish farming farmers in Candibinangun Village is the most dominant farmer with 20 farmers and the percentage is 57.14%. This is supported by the largest land area in Candibinangun Village used for agricultural land so that many people depend on agricultural products to meet their daily needs.

3.3 Internal Factor

3.3.1 Formal Education

The level of formal education of rice-fish farming farmers in Candibinangun Village is the most dominant at the high school / high school level with 20 farmers and a percentage of 57.14%. For lower education levels, namely elementary and junior high school levels, there are 5 and 4 farmers respectively with percentages of 14.29% and 11.43% and there are no

rice-fish farming farmers who have not graduated or did not take formal education. From these data, it shows that rice-fish farming farmers in Candibinangun Village have a high awareness regarding the importance of education. The results of research by Dewi et al (2016), stated that the level of formal education of farmers in the low category can affect the weak ability of farmers to accept new things.

3.3.2 Non Formal Education

Rice-fish farming farmers in Candibinangun Village have attended non-formal education 2 times on average with 23 farmers and a percentage of 65.71%. In this study, non-formal education attended by farmers was in the form of discussions with groups, trainings, and communication with extension workers. The number of frequency of non-formal education of farmers is different which is influenced by the length of experience of farmers in rice-fish farming.

3.3.3 Farming Experience

The time span of farmers' experience in rice-fish farming in Candibinangun Village is 1-10 years. Most of the rice-fish farming farmers in Candibinangun Village have 9-10 years of experience with 21 farmers and a percentage of 60%. The data shows that the experience of farmers in rice-fish farming has not been long enough, this is because rice-fish farming is a new innovation in the world of farming.

3.3.3 Land Size

The area of land used by farmers for rice-fish farming in Candibinangun Village is on average 800-1000 m² which has a percentage of 68.57%. The average area of land used by farmers in rice-fish farming in Candibinangun Village is 1,063 m². From the results of research by Restutiningsih et al (2016), it is stated that farmers with a narrow land area must be able to use their land intensively in order to provide optimal results.

3.3.4 Own Capital

Most rice-fish farming farmers in Candibinangun Village always use their own capital in running rice-fish farming business, which is as many as 21 farmers with a percentage of 60%. This is supported by the existence of farmer group facilities in Kemput hamlet that provide capital storage for rice-fish farming. The storage of capital is from fish harvests, most farmers sell fish products through farmer groups, then farmers only take net profits from fish income for daily needs.

3.3.5 Income

Most of the income of farmers in rice-fish farming in Candibinangun Village is below Rp 3,400,000 in one harvest season, with a percentage of 94.29%. Meanwhile, the average income of rice-fish farming in one harvest season is Rp 2,590,000. The most dominant income obtained by rice-fish farming farmers in the range of Rp 2,200,000 - Rp 2,800,000 is shown by the number of 17 farmers and the percentage is 48.57%. The income obtained is net income that has been reduced by the costs needed for one growing season in rice-fish farming.

3.4 External Factor

3.4.1 Farmers' Group Role

The role of farmer groups in rice-fish farming activities in Candibinangun Village can help and greatly help farmers which is shown by 23 farmers mentioning helping and 7 farmers with a percentage of 20% mentioning very helpful. From these data, it shows that rice-fish farming farmers can benefit from the roles and facilities provided by farmer groups in the form of technical guidance, capital management, credit loans, sales of rice-fish farming products, provision of seeds, fish feed and fertilizer, provision of farm equipment such as tractors, and help overcome obstacles that occur in the field.

3.4.2 Easy to Sell

Rice-fish farming farmers in Candibinangun Village have no difficulty in selling rice-fish farming products as shown by the statement of farmers who say it is easy to sell as many as 15 farmers with a percentage of 42.86% and farmers who say it is very easy to sell as many as 20 people with a percentage of 57.14%. From these data, it shows that farmers feel easy in selling rice-fish farming products, due to the role of farmer groups that help in the sales process by collaborating with traders who are ready to buy.

3.4.3 Extension Benefit

The benefits of counseling provided to rice-fish farming farmers in Candibinangun Village can be useful, shown by the statement of farmers who say it is always useful as many as 18 farmers with a percentage of 51.43% and farmers who say it is often useful as much as 31.43%. For farmers who mention sometimes useful, there are only 2 farmers, namely with a percentage of 5.71%. From these data, it shows that the benefits of extension services can increase the success of farmers in running rice-fish farming as evidenced by increased production results and can overcome problems that occur.

3.4.4 Farmers Active in Extension

Almost all rice-fish farming farmers in Candibinangun Village have participated in extension activities as shown by the statement of farmers who said that they often followed as many as 22 farmers with a percentage of 62.86% and who said they always followed as many as 10 farmers with a percentage of 28.57%. From these data, it shows that farmers have a high awareness of the importance of extension activities so they are enthusiastic to participate in extension activities in the hope of obtaining new information about rice-fish farming and finding solutions related to obstacles experienced in the field by discussing with other farmers and extension workers who are experts in their fields.

3.4.5 Government Support

Government assistance to rice-fish farming farmers in Candibinangun Village is very useful, shown by the statement of farmers who say that it is often beneficial as many as 22 farmers with a percentage of 62.86% and farmers who say it is always useful as much as 37.14%. The data shows that the assistance provided by the government can help farmers to run rice-fish farming businesses. The cultivation package assistance provided by the Government in the form of fish seeds, feed, mulch, and top nets is very helpful for farmers.

3.4.6 Credit Facility

The benefits of the credit facility for rice-fish farming farmers in Candibinangun Village with the statement that the credit facility is always useful there are 6 farmers with a percentage of 17.14%. The data shows that there are also some farmers who feel the benefits of this credit facility, because farmers feel they need capital assistance to run rice-fish farming businesses.

3.4.7 Credit Easiness

For farmers who said it was easy to get credit loans, there were 11 farmers with a percentage of 31.43%. There are no special conditions for obtaining a credit loan, but farmers are required to return it within 4 eight or within 140 days. Returns can be made in instalments every 1 eight or can be cashed in eight to 4, every eight there are social gathering activities. Loans are subject to a credit interest of 1% every year.

3.5 Farmers' Motivation

In this study, farmer motivation was measured based on Abraham Harold Maslow's hierarchy of needs theory. Maslow's hierarchy of needs includes five categories of motives arranged based on the lowest needs must first before meeting the next higher needs (Andjarwati, 2015).

3.5.1 Physiological Needs

The motivation for the physiological needs of rice-fish farming farmers in Candibinangun Village is included in the "very high" category with a total average score of 4.63, this means the motivation in physiological needs is high, or the farmers are practicing rice-firm farming because they want to ful fill their physiological need through this practice. The highest indicator of motivation of rice-fish farming farmers in meeting physiological needs is to meet food needs with a score of 4.77. Food needs are the main human needs for survival that must be met every day. Farmers say that rice-fish farming has high prospects for farmers' income and land optimization.

3.5.2 The Need for Security

Motivation based on the need for a sense of security of rice-fish farming farmers in Candibinangun Village is included in the "very high" category with an average score of 4.74. These results show that in running a rice-fish farming business, farmers in Candibinangun Village hope to meet the needs of old age not only meet their daily needs. The high level of motivation based on the need for a sense of security in rice-fish farming farmers is influenced by the availability of sufficient capital to run a rice-fish farming business.

3.5.3 Social Needs

Motivation based on the social needs of rice-fish farming farmers in Candibinangun Village received an average score of 4.50 and was included in the "very high" category. These results show that rice-fish farming farmers in Candibinangun Village are good farmers in building social relationships in the community. The highest indicator obtained in

motivation based on social needs is "interacting with others" with a score of 4.63 so it can be said that rice-fish farming farmers in running their farms often interact with others.

3.5.4. The Need for Awards

Motivation based on the need for appreciation for rice-fish farming farmers in Candibinangun Village is included in the "High" category with an average score of 3.93. These results show that in running a rice-fish farming business, it gets recognition and awards. The highest indicator of motivation for the need for rewards was "improving skills" with a score of 4.60. This shows that by doing rice-fish farming, farmers can improve their skills because they are required to produce two harvests at once with the expectation of optimal results.

3.5.5 Self-Actualization Needs

The motivation for self-actualization needs in rice-fish farming farmers in Candibinangun Village received an average score of 4.47 and was included in the "very high" category. These results show that rice-fish farming farmers in Candibinangun Village have a high enthusiasm for learning to run rice-fish farming by actively participating in extension activities from both farmer groups and related agricultural institutions so that farmers become more creative and innovative which has an impact on good farmer self-actualization.

The results of the average score regarding the motivation of rice-fish farming farmers in Candibinangun Village showed the "very high" category, which was in the range of $105 \geq x < 125$ with a score of 111 or a percentage of 88.8% of the total score, meaning that farmers have very high motivation in doing rice-fish farming

3.6 Factors Related to Farmers' Motivation

3.6.1 Education

Education factor has a "significant enough" relationship to self-actualization needs with the acquisition of a value of rs 0.510. These results show that the level of formal education can influence the mindset of farmers in accepting new things and having the desire to innovate by farming rice-fish farming. For the relationship of formal education factors to physiological needs has a "low" relationship with a negative direction, namely because physiological needs are basic needs that must be met by every human being to survive without being influenced by formal education. As for motivation, the need for security, social needs, and the need for appreciation have very weak strength.

3.6.2 Non formal education

Non-formal education has a "low" relationship to physiological needs, social needs, and the need for rewards. It can be said that formal education has little effect on farmers in meeting basic needs and interacting needs. The relationship between the need for appreciation and non-formal education can affect the running of rice-fish farming so that it affects farmer motivation even though it is in a low relationship.

3.6.3 Farming Experience

The results of the spearman rank correlation test show that farming experience has a "significant enough" relationship to physiological needs, social needs, and self-actualization needs. With farming experience, farmers have the ability to face the obstacles that occur, so as to minimize losses and can make appropriate decisions to overcome problems so that farmers can maintain production results that are used to meet basic needs. The influence of farmers' experiences on social needs can be seen by farmer interaction, both to seek information and provide solutions to other farmers in various rice-fish farming problems. Farming experience has a "strong" influence on the need for rewards.

3.6.4 Land Size

The relationship of the influence of land area on physiological needs, security needs, social needs, appreciation needs, and actualization needs is "very low or weak" as indicated by a Total Y correlation value of -0.160. From these results, it can be said that land area almost does not affect the motivation of farmers in running rice-fish farming and runs in a negative direction, which means that the wider the land owned by farmers does not affect the motivation of farmers. Regardless of land area, all farmers want to meet basic needs, the need to live in old age, the need to interact with fellow farmers and the surrounding environment, the need to be accepted and appreciated by others and the need to maximize potential with their abilities.

3.6.5 Own Capital

The results of the spearman rank coefficient test show that the capital availability factor has a "significant enough" relationship with farmers' motivation in rice-fish farming. This can be seen from the acquisition of a value of r_s of 0.659 which goes in a positive direction so that it can be said that the more often farmers use their own capital to do rice-fish farming, the more motivating farmers to continue running rice-fish farming. These results are influenced by the relationship of the availability of own capital with physiological needs, social needs and the need for rewards that have a "moderately meaningful" relationship.

3.6.6 Income

The income factor has a negative relationship with the motivation of farmers in rice-fish farming in Candibinangun Village. The results of the coefficient test obtained a value of -0.248 and were included in the "low" relationship category. This is in line with the situation in the field that some farmers have other income from the main job owned by farmers and the amount is higher than the results obtained from rice-fish farming. On average, farmers get a net income from rice-fish farming as much as Rp 2,200,000 - Rp 2,800,000 per planting season. Income has a "low" relationship to physiological needs, social needs, the need for rewards, and the need for self-actualization. As for the need for security, the income factor has a "very weak" relationship.

3.6.7 Farmers' Group Role

The role of farmer groups has a "significant relationship" with farmers' motivation in rice-fish farming with a value of r_s 0.531. These results show that with the help of farmer groups, farmers are more motivated to run rice-fish farming because farmers will feel safe if problems occur in the field by finding solutions and discussing with farmer groups. The

role of farmer groups on social needs and the need for appreciation has a relationship "quite meaningful" so that it can be said that with the role of farmer groups, farmers find it easy to interact related to rice-fish farming and feel accepted and considered with the assistance provided.

3.6.8 Easy to Sell

The factor of ease of selling rice-fish farming products has a "significant enough" relationship with farmers' motivation in rice-fish farming. This is shown by the relationship between ease of selling to physiological needs, social needs, the need for rewards, and the need for self-actualization which gets a value of "quite meaningful". The ease of selling can affect the fulfillment of farmers' basic needs that are immediately met, farmers do not find it difficult to meet their daily needs because the results of rice-fish farming that are carried out are easy to sell so that farmers can quickly use the profits. Relationship to self-actualization needs with the ease of selling, farmers become more eager to maximize yields and continue rice-fish farming.

3.6.9 Extension Benefit

The benefits of counseling on the level of farmer motivation in rice-fish farming have a "low" relationship with a value of rs 0.284 and run in a positive direction. This can be interpreted that the benefits of extension services provided to farmers are low and have not been able to affect farmers' motivation in rice-fish farming. This positive direction shows that the more helpful the counseling provided, it can affect the motivation of farmers in rice-fish farming. The relationship of extension benefits to physiological needs, social needs, and self-actualization needs is "very low or very weak". Meanwhile, the need for security and the need for appreciation have a "low" relationship.

3.6.10 Farmers' Active in Extension

Farmer activeness in extension services has a "low" relationship with the level of farmer motivation in rice-fish farming which is indicated by a value of rs -0.353 and goes in a negative direction which means that farmer activity in extension services only has a slight effect on farmer motivation in rice-fish farming and the more frequency of farmers' presence does not affect farmers' motivation to do rice-fish farming. The results of low motivation levels are influenced by the relationship of farmers' activeness in extension services to physiological needs, security needs, the need for appreciation and the need for self-actualization. Meanwhile, social needs have a "quite meaningful" relationship because the presence of farmers in extension services can meet the needs of farmers in interacting.

3.6.11 Government Support

The benefits of government assistance have a "strong" relationship with farmers' motivation in rice-fish farming as shown by the results of obtaining a Spearman Rank correlation value of 0.736. From these results, it can be said that the assistance provided by the government is very useful and can affect the motivation of farmers in rice-fish farming. The benefits of government assistance have a strong relationship influenced by the fulfillment of physiological needs, security needs, and self-actualization needs that have a "meaningful enough" relationship while social needs and the need for appreciation have a "strong" relationship. Government assistance provided to rice-fish farming farmers in the form of

aquaculture packages can reduce the inputs spent to do rice-fish farming so that it can affect the level of farmer motivation.

3.6.12 Credit Facility

The benefits of credit facilities have a "low" relationship with the level of farmer motivation in rice-fish farming as shown by the result of a correlation value of -0.370. These results show that the benefits of credit facilities have not been able to affect farmers' motivation in rice-fish farming because some farmers are able to provide their own capital to run rice-fish farming businesses. With the credit facility, farmers can run rice-fish farming and farmers' daily needs can be fulfilled which is shown by the relationship to physiological needs "quite meaningful". But the benefits of credit facilities cannot meet the needs of security, social needs, the need for appreciation and the need for self-actualization of farmers as shown by the "low and very weak" relationship.

3.6.13 Credit Easiness

The ease of credit loans has a "significant enough" relationship with farmers' motivation in running rice-fish farming as indicated by obtaining a value of rs -0.535. The ease of credit lending to physiological needs, the need for security, social needs, and the need for appreciation have a "meaningful enough" relationship, while the need for self-actualization has a "low" relationship. From the correlation results, it can be interpreted that the ease of credit loans is enough to affect farmers' motivation in doing rice-fish farming because farmers can get loans easily.

4 Conclusion

Farmers' motivation in practicing integrated rice-fish farming is to meet their livelihood needs by increasing income through the cultivation of rice and fish within the same land. Overall, farmers' motivation in rice-fish farming is categorized as very high. The factors related to farmers' motivation in rice-fish farming consist of external and internal factors. Factors strongly associated with farmers' motivation are government assistance benefits. On the other hand, factors with very low or very weak relationships include formal education and land area. Additionally, factors with low relationships include non-formal education, income, the benefits of agricultural extension services, farmers' involvement in counselling, and the availability of credit facilities. Furthermore, factors with a significant relationship are farming experience, access to personal capital, the role of farmer groups, ease of selling produce, and ease of obtaining credit loans.

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