



Rice Cultivation Technology at the Farmers' Level in North Bolaang Mongondow District, Indonesia

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Abstract

The increase in Indonesia's population every year is accompanied by an increase in rice consumption. To balance the increase in rice demand, it must be balanced with an increase in national rice production. Paddy fields are the mainstay for producing paddy (rice), the main commodity supporting food security. An effective and efficient way to increase national rice production sustainably is to increase productivity through accurate selection of technological components by taking into account the conditions of the biotic environment, abiotic environment, and optimal land management by farmers. Lowland rice farmers generally use conventional systems by using chemical fertilizer and pesticide inputs as often as possible, thus affecting land quality and grain yield. A farmer's maturity in farming will influence the characteristics of the farmer. The characteristics of farmers and their competencies are an illustration of the farmer's ability to manage farming based on effective and efficient planning by plant cultivation techniques to realize food security and independence. The research aims to study the characteristics of farmers in applying cultivation techniques to increase lowland rice production. Survey research and data collection were carried out on groups of farmers who own paddy fields in North Bolaang Mongondow Regency (Sangkub District, Bintauna District, and Bolangitang District). The data taken in this research were age, education level, rice cultivation techniques, and farming experience. The research results showed that the production per hectare obtained according to farmers' cultivation techniques was 1-2 tonnes/ hectare by 45% of farmers and 3-4 tonnes/ hectare by 55% of farmers. Financial conditions influence the application of rice cultivation techniques in North Bolaang Mongondow Regency, Indonesia.

Keywords: *Lowland Rice Cultivation Technology; Farmer Characteristics; Rice Production*

Introduction

Rice has a basic role in fulfilling domestic food, feed, and industrial needs which tend to increase every year along with population growth. Rice dominates the diet of the Indonesian people because rice is the staple food of the people and main source of income for farmers, so dependency arises which results in higher levels of demand for rice (Mahananto, Sutrisno, S., & Ananda, 2009; Wahyuni et al., 2019; Bakari et al., 2021).

Regency is one of the largest rice-producing districts in North Sulawesi Province so rice cultivation techniques to support rice production need attention. One strategy to maintain rice self-sufficiency is to implement programs aimed at targets, namely farmers as actors in implementing rice cultivation technology. The application of rice cultivation technology determines rice productivity. Farmers have diverse characteristics so the way they receive technology packages varies. These characteristics are what differentiate each farmer's behavior in certain situations. One of the important characteristics that influence the communication process in disseminating information on the adoption of technological innovation is the characteristics of farmers (Bancin et al., 2019). Farmer characteristics are an important factor in the level of farmer innovation adoption (Managanta et al., 2021).

Sangkub District, Bintauna District and Bolangitang District, North Bolaang Mongondow Regency, and North Sulawesi Province are among the rice suppliers in the provincial capital, namely Manado, and other areas. Rice production needs special attention to avoid large amounts of imported rice. Production factors concern the application of plant cultivation techniques including selection of varieties, fertilization, irrigation, and control of plant pest organisms affecting lowland rice production. It is suspected that lowland rice farmers have not been able to utilize resources or production factors optimally.

The results of the research show that the model used simultaneously factors the area of arable land, the number of effective workers, the amount of fertilizer, the amount of pesticide, the farmer's experience in farming, the distance between the farmer's house and the arable land, and the irrigation system have a very significant effect on increasing lowland rice production. The innovative application of environmentally friendly plant cultivation technology to increase the organic material content of rice fields to realize sustainable agriculture is determined by the characteristics of farmers who adopt it. Environmentally friendly agricultural businesses are an alternative to sustainable farming. Implementation of environmentally friendly farming results in innovation in cultivation techniques oriented towards yield quality, optimal production, and maintaining environmental sustainability (Ridayanti, 2019). Soil processing activities, selection of superior seed varieties. The varieties planted, application of appropriate planting systems, control of weeds, pests, and diseases as well as balanced fertilization determine the success of rice production (Surajit, 1981).

Characteristics are natural traits or characteristics inherent in a person which include age, level of education, land area, and experience in farming (Paulina et al., 2020; Pratiwi et al., 2009). The research aims to obtain data on the application of plant cultivation technology by rice farmers in North Bolaang Mongondow Regency and the amount of rice production achieved.

Method

The study was implemented in North Bolaang Mongondow Regency (Sangkub District, Bintauna District, and Bolangitang District) in 2023 for 6 months. The method used is a survey method. The data taken is primary and secondary. Primary data is data obtained directly through observation and interviews with Respondents who were farmers with a questionnaire guide. Secondary data analyzed the paddy fields used by farmers for cultivating rice. Data was analyzed tabularly. The materials and tools used are questionnaires, equipment for taking soil samples, scales, ovens, soil processing tools, stationery, and other materials and tools needed.

Results and Discussion

Respondents aged between 30 and 55 years were male. The land ownership status is 90% owned by yourself and 10% as sharecroppers. Farming experience ranges from 10 years to 35 years. Hartati et al., (2017) state that the farming experience that farmers have will support their success in farming, the higher the farming results, the better the farmer's welfare. The education level of farmers is in Figure 1.

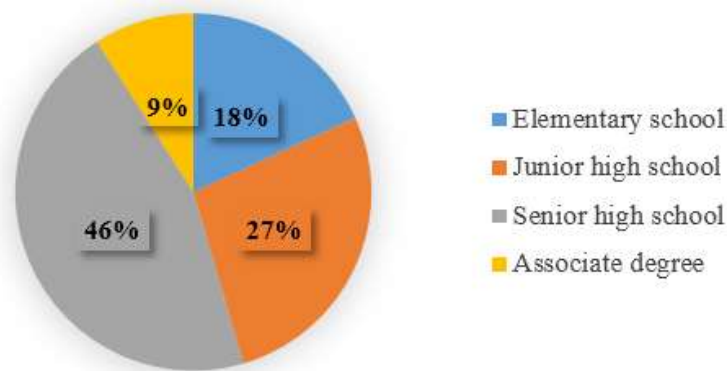


Figure 1. Farmers' education

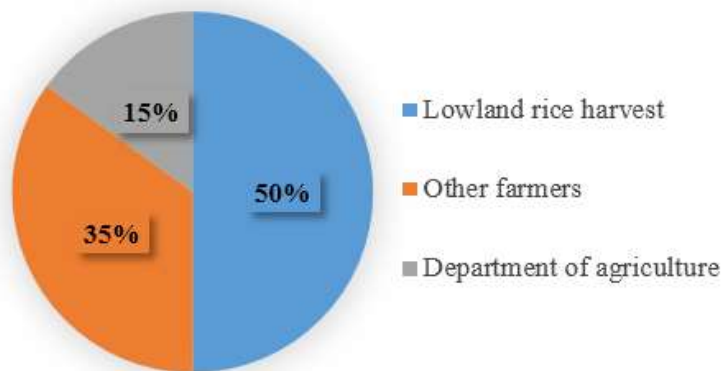


Figure 2. Source of seeds farmers

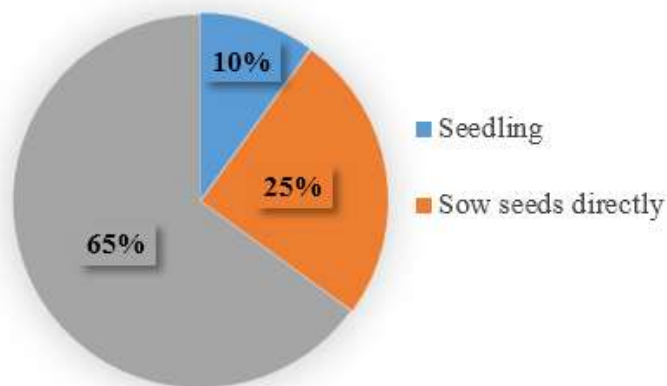


Figure 3. Planting system

Sample farmers in Bolmut Regency (Sangkub Village, Busisingo, Kopi, Batulintik, Binjeita) have land areas of 1 Hectare to 5 Hectare. In theory, it is also proven that land area influences agricultural production results. If the land area is small, the amount of production produced is small. Conversely, if the land area is large, the amount of production produced will also be large. The size of the production output will affect the farmer's income. If the production quantity is large, the income generated is large. And conversely, if production is small then the amount of income will also be relatively small (Usman et al., 2022). The results of the Koruwu et al., (2022) research show that increasing rice production is determined by farmers' behavior in farming, including knowledge, attitudes, and skills. Using seeds of the Serayu, Superwin, and Lolombi varieties. Seeds are sourced from their harvest and seeds from neighboring farmers. Tabula planting system (direct sowing of seeds) and through seeding. Figure 2 explains the use of cropping systems by farmers.

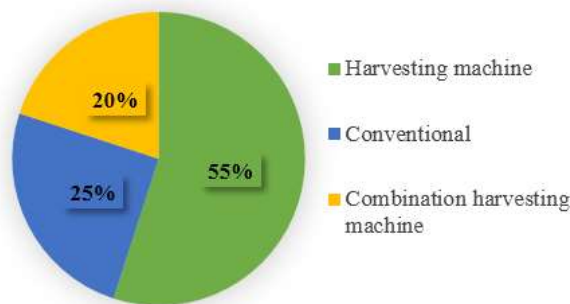


Figure 4. How to harvest

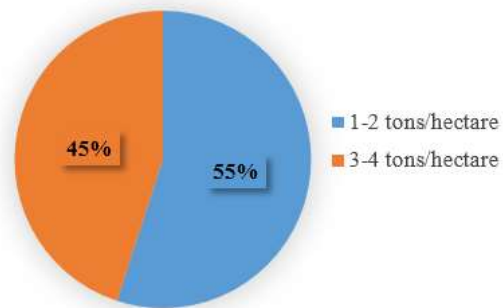


Figure 5. Paddy production (rice)

The production obtained by farmers according to the lowland rice cultivation techniques applied is presented in Figure 5. Production per hectare obtained according to farmers' cultivation techniques is 1-2 tons/ hectare for 45% of farmers and 3-4 tons/hectare for 55% of farmers. Obtaining rice yields in the form of rice depends on financial conditions to apply cultivation techniques, especially in purchasing fertilizer. Inadequate financial conditions make farmers cultivate rice crops as little as possible. Irrigation affects rice production because farmers generally rely on rainwater (rain-fed). After all, pump machines and irrigation water have limitations in terms of water sources that are far from farmers' land, especially during the dry season. Farmers who are of productive age will more easily understand new things in farming so that they can increase the production of rice in the cultivated fields (Novita et a., 2016). Besides that, farmers' economic factors greatly determine the application of cultivation techniques, especially fertilization. Likewise, land area and small capital as well as labor from within the family greatly influence production (Andrias et al., 2017).

Conclusion

Financial conditions influence the cultivation techniques applied by farmers. Production of 1-2 tons/ha was obtained by 45% of farmers and 3-4 tons/ha was obtained by 55% of farmers.

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