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The Role Of Small Hand Tractors In Increasing Rice Productivity In Enrekang Regency, South Sulawesi

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Abstract

Agricultural development requires dynamic agriculture or agriculture that incorporates new technologies. The development of technology can take the form of methods, changes in crop types, changes in inputs, as well as changes in the agricultural tools used in the agricultural production process. The sources of data used are primary data and secondary data. The data collection methods used are observation, interviews, and documentation with a sample size of 10 people. The data analysis method employed is descriptive data analysis techniques. The results of this study indicate that based on the Likert scale test on the utilization of small hand tractor mechanization in agriculture, with an average score of 94.2%, this shows it is very beneficial for farmers in Enrekang Regency, South Sulawesi. The role of mechanization tools such as hand tractors in the agricultural cultivation process in Sanglepongan village demonstrates that they are very important and bring various significant benefits to farmers and the agricultural community. Here are some key roles of small hand tractors in agriculture in South Sulawesi, namely in land preparation, reducing physical workload, increasing crop productivity, saving time and costs, modernizing agriculture, reducing dependence on labor, and facing weather and seasonal challenges. The impact of using small hand tractors on increasing farmers' production in Enreknag Regency shows that this positive effect is evident not only in the

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increase in the quantity of harvests but also in the improvement of quality and sustainability of farming practices, timely planting, and a reduction in manual labor.

Keywords: Small Hand Tractor, Rice Productivity, Agricultural Mechanization

INTRODUCTION

The development of agricultural technology is progressing rapidly in an effort to enhance production quality in line with advancements in science and technology to meet food needs, which is one of the essential requirements for human life that must increase. The application of agricultural technology, both in pre-harvest and post-harvest activities, is crucial for ensuring food sufficiency in terms of both quantity and quality of production. Agricultural technology has played a role in improving the efficiency and productivity of food commodity farming in developing countries, including Indonesia. The population of agricultural tools and machinery usage is rapidly growing among farmers, especially in farming activities related to land management. One of the regions in Indonesia, particularly in the province of South Sulawesi, where agricultural technology is beginning to develop is Enrekang Regency, as agriculture remains a mainstay sector supporting the local economy. Agricultural development requires dynamic agriculture or agriculture that incorporates new technologies. The development of technology can take the form of methods, changes in crop types, changes in inputs, as well as changes in the agricultural tools used in the agricultural production process. With the advent of new technology that can then be applied by farmers, it is hoped that optimal production can be achieved, leading to maximum income as well (Wijayanti, T. 2009).

Sanglepongan Village, Curio District, Enrekang Regency is one of the areas dominated by the agricultural sector, with almost the entire population engaged in agriculture, primarily as rice farmers. The condition of technology use in Sanglepongan Village shows that farmers are very responsive to new technologies in agriculture, with the hope of being able to increase production in terms of quantity, quality, and income. Before the introduction of agricultural technology in Sanglepongan Village, farming was still reliant on animal power (buffalo) for land management, which required a relatively long time to carry out agricultural activities due to the use of traditional tools in land management. Result of research discussing the application of appropriate technology in tidal swamp land state that the use of technology in agricultural practices, specifically rice farming, to achieve sustainability in the management of less-than-optimal land must consider the potential impacts on the environment, alignment with the social and cultural

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values of the local community, while still providing significant economic benefits for farmers as the main subjects. The management of tidal land requires more intensive technological intervention in order to be transformed into productive agricultural land.

Agricultural mechanization is an effort to optimize land processing and replace human labor in order to increase the productivity of farming activities (Gwadabe et al., 2022; Persley, 2002). By using modern tools or machines, the work process can be carried out more efficiently, both in terms of time and the amount of labor required, compared to traditional farming systems that tend to require more labor and take longer to complete tasks (Nurmala,2012). Technology or science and technology (S&T) is an important part of human culture, designed to facilitate human activities. S&T has the ability to significantly change the culture within society. The presence of technology brings positive impacts to society, such as the invention of agricultural production tools that can increase rice production. The benefits of science and technology that are advantageous to the community will be maintained, and may undergo modifications or innovations to significantly enhance their functional value. (Irmayani, 2024).

The development of new technology in agriculture initially progressed slowly, but began to show significant impacts since the 1930s. During the period from 1880 to 1920, there was a remarkable increase in production in the United States, largely due to increased investment in land financing and labor. However, in the following years, expenditures on both aspects declined rapidly. The replacement of animal power with machines in the 1920s was a major milestone in the technological revolution of 20th-century agriculture. In addition, the utilization of Mendel's discoveries in plant breeding has resulted in new superior varieties with high productivity. In the 1940s, the discovery of agrochemicals such as herbicides, fungicides, and organic insecticides brought significant commercial success in the field of agriculture. This innovation not only increases production per unit area but also enhances efficiency by reducing reliance on labor (Irmayani, 2024). In Indonesia, hand tractors are the most popular type of tractor used by farmers. This is due to the smaller size of the hand tractor, allowing it to access farmers' fields that often have narrow access roads and can only be traversed by two-wheeled tractors. In addition, hand tractors were chosen because they are more affordable compared to dual-axle tractors (Haini et al., 2021)

In this era of advanced technology, the use of agricultural tools and modern machinery can accelerate the production and processing of agricultural products. One of the tools that is often used is the hand tractor, which serves to till the soil (Liu et al., 2024). Hand tractors have replaced the role of animals such as cows and buffaloes in land

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cultivation. Compared to traditional plowing, the use of hand tractors is more effective and efficient. The agricultural technology applied facilitates the production process, which in turn affects the quality and quantity of agricultural yields. The purpose of using tools and machines in production is to enhance efficiency, effectiveness, productivity, quality of results, and to reduce the workload of farmers.

METHODOLOGY

This research uses qualitative descriptive data, which is one of the approaches in qualitative research methods. The purpose of this research is to provide an in-depth description of the events, facts, phenomena, variables, and conditions that occur during the research process, as well as to offer an accurate understanding in accordance with the existing reality. In this study, data is interpreted and analyzed to understand the ongoing situation, the attitudes and perspectives that are developing in society, the conflicts occurring between two or more states, the relationships between variables, the differences in existing facts, and their influence on certain conditions. This research was conducted in Sanglepongan Village, Curio District, Enrekang Regency, South Sulawesi. The population in this study consists of all rice farmers in Sanglepongan village who use agricultural mechanization, specifically small hand tractors, in their farming activities. In this context, the sample consists of 10 rice farmers. Researchers obtained sources from informants, and the selection of informants in this study was done intentionally (purposive sampling), meaning that key informants were considered to have extensive knowledge and the ability to communicate effectively.

According to Moleong (2010), informants are individuals who truly understand or are directly involved with the issues, allowing researchers to summarize important information within the focus of the study, while subsequent informants were determined using snowball sampling until a saturation point of information was reached. The criteria for determining key informants are as follows:1. They must have farming experience for a minimum of 10 years. 2. They should have sufficient time; key informants not only need to be willing but also able to provide information whenever needed. 3. They should convey information in their own words (natural).

RESULTS AND DISCUSSION

This research involves 10 informants. The identities of the respondents in this study are as follows:

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Table 1. Research Respondents of the Role Small Hand Tractors to Increasing Rice Productivity in Enrekang Regency, South Sulawesi.

Number	Quistions Item	Percentage	Category
1	Small Hand tractor helps save time in land processing	**100 %**	**Very good**
2	The use of Small Hand tractor increases work efficiency in agricultural land	**100 %**	**Very good**
3	Small Hand tractor plays an important role in increasing rice productivity	**96 %**	**Very good**
4	The operational costs of Small Hand tractor are comparable to traditional costs	**80 %**	**good**
5	I prefer using Small Hand tractor over traditional tools.	**100 %**	**Very good**
6	Small Hand tractor is easy to use and operate by farmers	**88 %**	**Very good**
7	Small Hand tractor helps improve soil quality for rice planting.	**98 %**	**Very good**
8	The use of Small Hand tractor reduces the physical workload of farmers.	**100 %**	**Very good**
9	Rice production yields increased after using Small Hand tractor.	**80 %**	**Good**
10	I am satisfied with the performance of Small Hand tractor in my agricultural activities.	**100 %**	**Very good**
	Total	**94,2 %**	**Very good**

Source: Processed Data, (2024)

Based on the results of the Likert scale test on the utilization of mechanization tools (Small Hand Tractor) in agriculture, with an average score of 94.2%, this indicates a very good outcome for farmers in the village of Sanglepongan. This is because agricultural equipment, which is very important, is present in the achievement of agricultural development. Agricultural Material is expected to attract the younger

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generation to the agricultural sector by improving output, efficiency, and quality, alongside other factors. As a result, maximizing the use of agricultural instruments will benefit the agricultural industry. The role of agricultural tools in the village of Sanglepongan is highly needed by farmers during the harvest season. The Small Hand Tractor is very beneficial in farming activities, and by using agricultural tools, farmers can work more efficiently during the planting season and in maintaining rice crops until the harvest, allowing them to operate optimally. This also reduces working time, making it faster and increasing the capacity for larger planting areas. One strategy to enhance productivity and efficiency in farming, improve the quality and added value of agricultural products, and provide more support to farmers is through the use of mechanization tools (Small Hand Tractors), as they can be utilized at every stage of the production process. The use of agricultural mechanization essentially increases the amount of labor that can be contributed by humans to agriculture.

Data Description of Interview Results

The interview results conducted in the village of Sanglepongan with farmers regarding the question of when they started using the Small Hand Tractor revealed that: "Farmers here have been using the small hand tractor for 10 years" (Tahir, 61 years old). The interviews were conducted to describe the differences felt by farmers in the land cultivation process before and after using the small hand tractor in the village of Sanglepongan. The following are the results of the interviews with respondents explaining that: "Before using the small hand tractor, farmers here used to cultivate the land manually with traditional tools such as animals (buffalo) and hoes." This process is very slow and time-consuming. (Muhammad Saad, 53 years old) "After using a small hand tractor, land cultivation has become much faster and more efficient; with the help of the hand tractor, farmers can cultivate larger areas in a shorter amount of time."(Ambar, 46 Years Old) The results of the interview were conducted to describe the impact of small hand tractors on the amount of labor needed in the land processing process in Sanglepongan village. Here are the results of the interview with respondents explaining that: "Before using small hand tractors, the physical effort exerted by farmers was much greater. The manual land processing requires a significant amount of physical strength." (Nasir, 45 Years Old) "After small hand tractors were introduced to Sanglepongan village, the use of physical labor decreased. The small hand tractor replaced animal power (buffalo), so farmers only need to operate the Small Hand Tractor." (Adding, 75 Years Old) The interview results indicate that the ease of using small hand tractors compared to traditional methods is:

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"The results of manual soil cultivation are often inconsistent." Soil that is not well compacted, especially in relatively large and hard areas. After using a Small Hand Tractor, the soil can be processed better and more deeply. "A small hand tractor helps to till the soil to a more optimal depth, which ultimately can improve agricultural quality" (Sudirman, 48 years old).

The results of the interview describe the operational costs of using a small hand tractor compared to traditional methods. The respondent explained that: "Before using the small hand tractor, the costs were lower in terms of fuel (because it uses a machine), but the time and labor required were much greater. After using the small hand tractor, there are additional costs for fuel and machine maintenance, but this is offset by the savings in time and labor."(Sainuddin,51 tahun). The Role of Mechanization Tools (Small Hand Tractor) in the Agricultural Cultivation Process in Sanglepongan Village. The efficiency, quality, and productivity of rice farming in Sanglepongan village can significantly improve with the application of appropriate technology through the use of agricultural machinery. One of the widely used tools is the small hand tractor, which is a two-wheeled tractor-powered agricultural machine. This type of tractor is popular among village farmers, especially for relatively small plots of land, due to its low operational costs. With the rapid increase in its usage in various villages, it can be estimated that it will continue to grow. This small hand tractor is what drives the machine for soil processing. Currently, small hand tractors have become an important part of agricultural and rural development. The use of small hand tractors in rural areas is rapidly growing, and it is rare for locals to switch from using small hand tractors back to traditional methods such as employing animals (buffalo) or using human labor for land preparation. This shows that they can compare the effectiveness of using small hand tractors for tilling the soil. Based on the field observations I gathered, the small hand tractors used by farmers in the village of Sanglepongan are generally privately owned, and not all farmers in the village possess a hand tractor. From interviews with several farmers who do not own a small hand tractor, it was found that the cost to rent a hand tractor is Rp. 500,000 per processing, which includes fuel costs and the wages for the operator who plows the land. Soil processing with this Small Hand Tractor is carried out after 25 days of manual seed distribution, and after the soil processing, the farmers continue with manual planting as well. (Fujiarta et al., 2019)The role of mechanization tools such as small hand tractors in the agricultural cultivation process in the village of Sanglepongan is very important and brings various significant benefits to farmers and the agricultural community.

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(Santosa et al., 2024) determined that here are some key roles of small hand tractors in agriculture in Sanglepongan village: 1. Land Preparation : Small hand tractors make land preparation in agriculture faster and more efficient compared to traditional methods that use hoes or buffalo plows. The process of plowing, loosening the soil, and creating planting beds can be done in a shorter time, allowing farmers to plant more crops in one season. 2. Reducing Physical Workload By using a small hand tractor, farmers no longer need to exert significant physical effort to cultivate the land. This is very important, especially for older farmers or those with physical limitations. The use of small hand tractors also allows farming families to allocate labor to other agricultural activities that require more attention. 3. Increasing Crop Productivity Small hand tractors allow for more even and deeper soil cultivation, which can enhance soil quality and maximize water and nutrient absorption by plants. The result is healthier plants and higher productivity. 4. Saving Time and Costs The use of small hand tractors can save time in the cultivation process, allowing farmers to plant earlier and harvest faster. Although the initial investment to purchase a small hand tractor may be quite high, in the long run, this tool can reduce labor costs and increase crop yields, ultimately boosting farmers' income. 5. Encouraging Agricultural Modernization The introduction of small hand tractors in villages helps to promote the modernization of the agricultural sector. This tool has become a symbol of the shift from traditional practices to more modern and efficient agriculture, which is crucial for enhancing the competitiveness of farming in the era of globalization (Knickel et al., 2017). 6. Reducing Dependence on Labor Many villages, the migration of young people to big cities has reduced the available workforce for agriculture. A small hand tractor helps address this issue by reducing dependence on human labor for land cultivation, allowing farmers to remain productive even with fewer workers. 7. Facing Weather and Seasonal Challenges With faster and more efficient land processing, farmers can more easily adjust their planting schedules according to increasingly unpredictable weather and seasonal conditions. This is very important in facing climate change that can affect planting and harvesting times. Small hand tractors play a crucial role in enhancing efficiency, productivity, and sustainability in agriculture in the village of Sanglepongan. This tool not only helps farmers improve their crop yields but also contributes to the economic and social well-being of the agricultural community as a whole (Rahbiah et al., 2019)

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The Impact of Using Small Hand Tractors on Increasing Farmers' Productivity

The use of mechanization tools such as Small Hand Tractors has a significant impact on enhancing farmers' production yields. Here are some of the main impacts: 1. Increased Land Processing Efficiency Small Hand Tractors allow land processing to be done more quickly and efficiently compared to manual methods. Well-prepared and quickly processed land allows farmers to plant promptly, thereby optimizing the available time and planting season. 2. Better Soil Processing A Small Hand Tractor can till the soil more deeply and evenly, which improves aeration and allows plant roots to grow stronger (Liao et al., 2023) . Well-tilled soil also aids in the absorption of water and nutrients, which are essential for optimal plant growth. 3. Expansion of Cultivation Area With the convenience offered by the Small Hand Tractor, farmers can cultivate a larger area of land in a shorter amount of time. This allows for an increase in the cultivated area, which directly impacts the increase in production yields. 4. Timely Planting : Efficiency in land processing allows farmers to plant at the optimal time, in accordance with the planting calendar. Timely planting reduces the risk of crops being affected by adverse weather conditions and increases the chances of achieving a better harvest. 5. Decrease in Manual Labor The use of Small Hand Tractors reduces reliance on human labor, which often becomes a constraint, especially in areas experiencing the migration of young people to cities. With the decrease in labor demand, operational costs can be allocated to other areas that can enhance productivity, such as fertilizers. 6. Increase in Income Although it requires an initial investment, the use of Small Hand Tractors can reduce long-term costs for labor and working time. Lower costs and higher yields will increase farmers' profit margins, thereby boosting their income. 7.Improving the Quality of Harvests With better soil management and more timely planting processes, the quality of the harvests also improves. Plants that grow in optimal conditions tend to produce larger, healthier fruits or seeds that have a higher market value. 8. Enhancing Agricultural Sustainability By improving efficiency and productivity, Small Hand Tractors help farmers better adapt to increasingly complex economic and environmental challenges. Higher production sustainability ensures that farmers can continue to cultivate their land productively from season to season. The impact of using Small Hand Tractors on increasing farmers' production yields is very positive (Dominici et al., 2022; Irmayani et al., 2024). This tool not only helps improve the quantity of harvests but also the quality, which ultimately enhances the well-being of farmers and the sustainability of agriculture in rural areas like those in the village of Sanglepongan.

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CONCLUSIONS AND RECOMMENDATIONS

CONCLUSION

1. The role of mechanization tools such as small hand tractors in the agricultural cultivation process in Enrekang Regency in demonstrates that they are very important and bring various significant benefits to farmers and the agricultural community. Here are some key roles of small hand tractors in agriculture in Sanglepongan village: land processing, reducing physical workload, increasing crop productivity, saving time and costs, modernizing agriculture, reducing dependence on labor, and addressing weather and seasonal challenges.
2. The impact of using small hand tractors on increasing farmers' production yields in Sanglepongan village shows that this positive impact is evident not only in the increase in the quantity of harvests but also in the improvement of quality and sustainability of farming practices, timely planting, and a reduction in manual labor.

RECOMMENDATIONS

Based on the results of the research conducted by the researcher, there are suggestions that need to be considered for the improvement of future research, namely:

1. Farmers are encouraged to enhance their motivation and involvement in farmer groups, as this is crucial for significantly increasing production. There is a need for improvement in facilitating and developing the skills and expertise of farmers.
2. For future researchers, it is recommended that if they are interested in conducting research in the same field, they should focus on agricultural extension regarding mechanization tools and their impact on increasing rice productivity.

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