

STRENGTHENING FARMERS' CAPACITIES THROUGH OUTREACH: ENHANCING HYBRID CORN PRODUCTIVITY DURING THE RAINY SEASON IN PADUKUHAN NGELO

Reshinta Ayu Herawati*¹, Anggita Haniffitriyana¹, Tri Sutrisno¹, Muhammad Rasyidin¹,
Ummu Salamah S Wutun¹, Akhmad Arifin², Agustin², Nadia Nurkhalidza Yusuf²,
Nehaya Faza Saniya²

¹UIN Sunan Kalijaga Yogyakarta, ²UIN Sunan Gunung Djati Bandung

*20106030047@student.uin-suka.ac.id

Abstract - *Agricultural extension is one of the efforts to increase agricultural productivity and quality. An agricultural extension program through socialization in Padukuhan Ngelo has been carried out as an effort to increase farmers' knowledge about hybrid corn cultivation techniques. Through the presentation of clear and relevant material in the socialization, farmers now have a better understanding of the selection of superior varieties, water management, and pest control. This increase in knowledge will encourage changes in farmers' attitudes towards agricultural practices, so that they are more open to innovation and motivated to apply the knowledge they have gained. In addition, the socialization not only increases farmers' knowledge theoretically, but also motivates farmers to apply better cultivation practices, thus having a positive impact on the productivity and quality of corn yields. Thus, it shows that agricultural extension is an effective step in increasing farmers' productivity and welfare.*

Keyword: *Agricultural Extension, Hybrid Corn, Farmer Education.*

1. INTRODUCTION

Agricultural extension has long been recognized as a cornerstone in enhancing agricultural productivity and product quality. Through the transfer of knowledge and technology from experts to farmers, it is expected that there will be a change in behavior and better agricultural practices (Sadono, 2008). As the spearhead of agricultural development, agricultural extension workers play a highly strategic role. They not only need to master agricultural science but also understand the socio-cultural context of farmers. With their multidisciplinary capabilities, extension workers can provide comprehensive solutions to various problems faced by farmers, both technically and non-technically (Krisnawati, et al., 2013). This statement is in line with Van Den Ban and Hawkins (1999), who argue that agricultural extension workers do not only provide information but also assist farmers in developing their businesses. In other words, extension workers act as facilitators who help farmers make informed decisions and increase agricultural productivity.

One commodity that has become a focus of development in agriculture is hybrid corn. Hybrid corn is one of the superior varietal innovations created to increase corn productivity. Hybrid corn offers the potential for much higher yields, better resistance to various environmental conditions, and more uniform product quality compared to other corn varieties, making it an attractive option for farmers (Sain, 2006). Improving the quality of hybrid corn seeds is a crucial strategy in efforts to increase national corn productivity. The use of high-quality seeds is not only cost-effective but also contributes to increasing the quantity and quality of harvests (Margaretha et al., 2015).

The rainy season often presents a unique challenge for farmers, especially in cultivating hybrid corn. Unpredictable weather conditions, as well as an increased risk of pests and diseases, can hinder productivity (Dewi et al., 2024). Like other cultivated plants, corn productivity is often hampered by pests and diseases (Purnomo et al., 2023). A study conducted by Mustikawati and Murni (2004) on the resistance of several hybrid corn genotypes to pest attacks showed that low corn production is closely related to problems of pest and disease attacks and low varietal quality.

Padukuhan Ngelo, located in alurahan Monggol, Kapanewon Saptosari, Gunungkidul, has a dry climate and rarely experiences rain. This is supported by Wahyuni's statement (2020), who stated in her research that based on the Regional Soil Map of DIY in 2012, Padukuhan Ngelo has the characteristics of Mediterranean soil and a dry climate that is highly dependent on rainfall. The main economic activity of the residents is agriculture, supplemented by cattle farming. Livestock feed is obtained from local agricultural products. Mediterranean soil is a type of soil formed from the weathering of limestone. Its characteristics include red or brown color, high lime content, and good drainage. However, this soil often lacks organic matter and water, especially during the dry season. For agriculture, Mediterranean soil requires special

management such as the addition of organic fertilizer, terracing, and a good irrigation system (Saktiono, 2021).

Therefore, efforts to increase farmers' capacity by agricultural extension workers are crucial in providing information and guidance to farmers, so that they can overcome these various obstacles and maximize the potential of hybrid corn with the dry soil and climate conditions in Padukuhan Ngelo. This article will discuss how the socialization program in Padukuhan Ngelo is able to overcome these challenges and efforts to increase hybrid corn productivity to welcome the rainy season.

2. METHOD

This research employed a qualitative approach with a descriptive method to illustrate the implementation of socialization, farmers' characteristics, and the achieved outcomes as an evaluation of the effectiveness of agricultural extension programs in enhancing the adoption of hybrid corn cultivation techniques in Padukuhan Ngelo, Gunungkidul. The socialization process was conducted by the Kuliah Kerja Nyata (KKN) Kolaborasi 147 UIN Sunan Kalijaga and UIN Sunan Gunung Djati on Wednesday, August 7, 2024, at the Padukuhan Ngelo Village Hall, and on Thursday, August 8, 2024, at the Kenongo Meeting Hall, in collaboration with the Badan Penyuluhan Pertanian (BPP) of Kapanewon Saptosari.

3. RESULTS AND DISCUSSION

The objective of this study is to present research findings that identify the challenges and obstacles faced by farmers in applying new knowledge acquired from socialization programs. Additionally, this study will discuss potential efforts to overcome these obstacles and enhance the success of future socialization programs through a qualitative descriptive approach.

The State of Land and Society in Padukuhan Ngelo

Padukuhan Ngelo is a hamlet located in Kalurahan Monggol, Kapanewon Saptosari, Gunungkidul, Special Region of Yogyakarta. As one of the nine hamlets in Kalurahan Monggol, Ngelo is divided into two main areas: Kenongo-Ngelo and Selang Ngelo, with a distance of about 3-4 kilometers between the two areas. Geographically, Padukuhan Ngelo has an area of approximately 66.694 hectares and is located at an altitude with an average temperature between 21 and 30°C. Wahyuni (2020) also stated that Geographically, Padukuhan Ngelo consists of low hills with slopes ranging from 0 to 25%. The land conditions in Padukuhan Ngelo are classified as dry land with water sources from rainwater, and the majority of community activities in Padukuhan Ngelo are in the agricultural and livestock sectors. Dry land conditions and limited water have become the main challenges in agriculture in Padukuhan Ngelo. Farmers here cultivate various commodities such as cassava, rice, corn, and peanuts. However,

cropping patterns that are highly dependent on the rainy season and the lack of irrigation infrastructure limit agricultural productivity (Wahyuni et al., 2020).

Agricultural Productivity

Agricultural productivity is the ratio of the expected output at harvest time (income) to the area of land or cost incurred (Siringo, 2014). Schultz (1964) argued that smallholder farm families, although efficient in managing limited resources, still live in poverty. To increase their productivity, fundamental changes are needed, such as the adoption of new technologies, investment in research, and increased access to knowledge through extension services. The motivation to maximize profits drives smallholder farmers to make careful decisions regarding crop types, land area, planting time, production methods, and marketing of harvested products. Based on this statement, productivity is important and fundamental to farmers' welfare, so it is necessary to make efforts to ensure that productivity is achieved and realized well. One effort is agricultural extension through socialization to the community, especially farmers.

Agricultural Extension for Farmers' Capacity Building

An agricultural extension program was conducted in Padukuhan Ngelo on August 7 and 8, 2024, coordinated by KKN 147 in collaboration with Badan Penyuluhan Pertanian Kapanewon Saptosari. The program focused on the theme of "Hybrid Corn Cultivation Techniques". This theme was selected and delivered by Badan Penyuluhan Pertanian Kapanewon Saptosari as a timely reminder and educational tool for the community regarding preparations for the rainy season planting. The socialization was conducted through material delivery and a question-and-answer session. The high attendance rate and enthusiasm of the participants during the extension activities indicated a positive response from the community towards the agricultural extension program through this socialization

The extension activities were conducted to educate farmers about hybrid corn, covering the use of quality seeds, land preparation, planting spacing, balanced fertilization, and pest and disease management. The material began with an initial technical presentation on seed preparation. The resource person from the Badan Penyuluhan Pertanian Kapanewon Saptosari explained the differences between hybrid and composite corn. Hybrid corn (F1) is a direct descendant of the cross between two superior corn varieties. This cross produces corn plants with better characteristics than their parents, such as high productivity and pest resistance. Unlike hybrid corn, composite (local) corn is a corn variety produced by natural pollination without human intervention. Hybrid corn has a higher production level (8-12 tons/ha) compared to composite corn (3-5 tons/ha). However, hybrid corn cannot be used as a

seed itself, so farmers are dependent on factories and seed prices tend to be expensive. The resource person also mentioned that seed treatment is necessary to prevent pest and disease attacks at the beginning of planting by mixing corn seeds with fungicides and insecticides. For seed requirements, the resource person stated that 15 kg/ha of hybrid seeds are needed. Afterward, the discussion moved on to land preparation. Land preparation before planting is generally done in two main ways. First, complete tillage involving thorough soil loosening using hoes or tractors, and the creation of planting holes. This method aims to improve soil structure, facilitate root growth, and control weeds. Second, zero tillage (ZT) which is more minimalist. In this method, the land is only cleared of weeds and planting holes are made directly. ZT has advantages in maintaining soil structure, reducing erosion, and saving labor costs. The choice of method depends on various factors, such as crop type, soil conditions, and resource availability. In short, complete tillage is more intensive and suitable for hard or compacted soil, while ZT is more environmentally friendly and cost-effective, but requires more careful management.

Following land preparation, the discussion turned to planting spacing. Planting spacing refers to the arrangement of the distance between plants during planting. The objective is to ensure that each plant receives adequate nutrients, water, and sunlight for optimal growth. For instance, a planting spacing of 20 x 70 cm means that the distance between plant rows is 20 cm, while the distance between plants within a row is 70 cm. In this planting pattern, typically only one seed is planted in each planting hole. However, there is also a planting pattern with a spacing of 20 x 80 cm, where the distance between rows remains 20 cm but the distance between plants within a row increases to 80 cm. In the second planting pattern, two seeds are usually planted in each planting hole. Subsequently, the proper planting technique for hybrid corn was discussed. The planting technique begins with the creation of planting holes using a dibble or hoe. Once the holes are ready, the seeds are then placed into the holes. To increase the chances of germination, some farmers choose to plant more than one seed in a hole and place them in a row. After planting, the hole is covered again with soil that has been previously mixed with organic fertilizer to enrich the soil and provide initial nutrients for the plants. As an additional protective measure, insecticides such as carbofuran are often added to prevent soil pest attacks on the seeds. Next, fertilization techniques were discussed. Fertilization is the activity of providing additional nutrients to plants for optimal growth. For effective fertilization, five important aspects must be considered: timing, meaning applying fertilizer at the growth stage of the plant that requires certain nutrients; type, selecting the type of fertilizer that suits the plant's needs; dosage, providing the amount of fertilizer that is appropriate for the plant's needs to avoid deficiency or excess; application method, using the correct method of fertilizer application, such as soil or foliar application; and

quality, selecting high-quality fertilizer so that the nutrients provided can be optimally absorbed by the plants. By applying these five principles, it is expected that fertilization can increase agricultural production."

The resource person also emphasized the importance of crop maintenance, particularly for hybrid corn, which includes weed control and earthing up. Weed control aims to reduce the number of weeds around the main crop. Weeds are wild plants that grow alongside cultivated plants and can hinder the growth of the main crop by competing for nutrients, water, and sunlight. Weed control can be done mechanically using a tool called a gathul. A gathul is used to manually uproot weeds. Next is earthing up, which aims to strengthen the plants and stimulate new root growth. Earthing up is done by mounding soil around the plant stem, making the plant more sturdy. Afterward, the resource person provided information on pest control in plants, especially the corn borer, earworm, fall armyworm, and seedling worms. Corn pests are a serious threat to agricultural productivity. Some common pests that attack corn include the corn borer, which damages the inner part of the stem, causing the plant to wilt and die; the earworm, which damages corn kernels, making them unfit for consumption; the fall armyworm, which eats leaves and hinders plant growth; and the seedling worm, which attacks plants while they are still seedlings and causes death. Attacks from these pests can cause significant losses for farmers if not controlled immediately.

Pest control in corn crops can be done in various ways. Commonly used methods are technical cultural control, such as proper tillage, environmental sanitation, crop rotation, and simultaneous planting. Furthermore, mechanical control such as collecting eggs and larvae and using light traps can also be an option. Biological control utilizes living organisms such as natural predators or microorganisms to control pest populations. This method is considered more environmentally friendly as it leaves no chemical residue. Meanwhile, chemical control uses synthetic pesticides to kill pests directly. The use of pesticides must be done carefully and in accordance with the recommended dosage. For optimal results, these two methods are often combined. Corn plants are susceptible to various diseases. The resource person also presents some of the main diseases that often affect corn, namely downy mildew, leaf spot, leaf blight and rust. The signs of these diseases can vary, ranging from the appearance of spots on the leaves, yellowing of the leaves, to the appearance of pustules on the stems and cobs. If not addressed immediately, these diseases can lead to a decrease in the quality and quantity of corn yields.

The agricultural socialization activities conducted in Padukuhan Ngelo have successfully increased farmers' knowledge of hybrid corn cultivation techniques. This increased knowledge has had a positive impact on changes in farmers' attitudes and behaviors, so they are more motivated to implement better cultivation practices. With

a better understanding of hybrid corn cultivation techniques, farmers can now make more informed decisions in managing their land, resulting in more optimal yields. The success of this program indicates the important role of agricultural extension in promoting innovation and sustainable agricultural development.

4. CONCLUSION

The results of this study showed clearly that agricultural socialization activities in Padukuhan Ngelo have succeeded in increasing farmers' knowledge of hybrid corn cultivation techniques. Through the presentation of relevant and interactive materials, farmers now have a more comprehensive understanding. It is expected that with this increased knowledge, farmers can pay more attention to the application of proper cultivation techniques so that corn productivity can continue to increase. Further research is needed to uncover other factors that may influence farmers' capacity, as well as the implications for agricultural productivity, especially hybrid corn cultivation techniques.

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