Rural Digital System for Optimizing Yellow Corn Product Results

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Abstract

Polongbangkeng Utara, a region in Takalar Regency, is known for its agricultural production, particularly rice and yellow corn. However, despite its potential, corn has traditionally been sold only in its raw kernel form, limiting the economic benefits for local farmers. To address this issue, there is a pressing need to educate the community on processing and marketing corn-based products through Micro, Small, and Medium Enterprises (MSMEs) by leveraging digital social media platforms. This community service initiative aims to enhance local knowledge on optimizing yellow corn utilization to increase income, develop applications to support yellow corn production, assist start-ups in yellow corn agribusiness, and provide training on utilizing marketplaces and e-marketing strategies through Android-based applications. Additionally, it seeks to diversify corn-based products, introduce innovative product designs, and offer interactive media and training modules for corn processing. The initiative received a highly positive response from the Biralle Kunyi farmer group and State Junior High School (SMP) Negeri 4 Polongbangkeng Utara, the program's target groups. Implemented in two phases, the program successfully improved the knowledge and technical skills of participants in processing yellow corn into value-added food products and effectively marketing them via social media. As a result, the digitalization process was optimized, significantly supporting the promotion and commercialization of processed yellow corn products, thereby contributing to the region's economic growth.

Keywords: Digital system; Rural; Optimization; Yellow corn.

Introduction

The agricultural sector in rural Indonesia plays an important role in food security and the national economy (Sadono, 2008; Rahmayani et al., 2023; Syahputri et al., 2024; Wibowo, 2020). Digitalization of agriculture opens up significant opportunities to increase productivity and address food security challenges but requires collaboration between governments, technology companies, and agricultural organizations (Bahn et al., 2021; Carmela Annosi et al., 2020; Klerkx et al., 2019; Supraptha & Prabandari, 2023; Azis & Suryana, 2023). Yellow corn, as a strategic agricultural commodity, has high economic potential and is the main ingredient for food, feed, and industry (Bantacut et al., 2015; Mawaddah et al., 2021; Yaqin et al., 2021). However, rural farmers often face barriers in accessing up-to-date information, technology, and efficient agricultural practices (Husein, 2021; Kuntariningsih & Mariyono, 2014; Subejo, 2019).

Takalar is a productive area for yellow corn farming (Mukhlishah et al., 2022). Takalar Regency is located between 5°031' to 5°0381' South Latitude and between 199°0221' to 199°0391' East Longitude with an area of 566.51 km2, consisting of a forest area of 8,254. Ha (14.57%), rice fields of 16,436. 22 Ha (29.01%), sugarcane plantations of PT. XXXII of 5,333.45 Ha (9.41%), ponds of 4,233.20 Ha (7.47%), dry fields of 3,639.90 Ha (6.47%), mixed gardens of 8,932.11 Ha (15.77%), yards of 1,929.90 Ha (3.41%) and others of 7,892.22 Ha (13.93%). Takalar Regency is a regency that borders Jeneponto Regency and Gowa Regency to the east. To the north is Makassar City and Gowa Regency. To the south is bordered by the Flores Sea and to the west is bordered by the Makassar Strait (Admin, 2024; DPMPTSP, 2020; Wikipedia, 2024).

Residents in Takalar Regency cultivate Yellow Corn. Yellow Corn is a type of plant that contains protein, carbohydrates, minerals and vitamins that can grow well according to the climate and type of soil in Takalar Regency (Dickson, 2024; Doktersehat, 2022; Gyori, 2017; Lihiang & Lumingkewas, 2020). One of the sub-districts whose entire area is rice fields and plantations is the Polongbangkeng Utara Sub-district, so it is possible to plant yellow corn in addition to rice

(French, 2019). This sub-district has 8 villages, namely: Balangtanaya, Barugaya, Kale Ko'Mara, Kampung Beru, Ko'Mara, Massamaturu, Parang Baddo, and Timbuseng.

Corn cultivation requires basic steps that must be carried out carefully to ensure optimal results. The first step is the selection of quality seeds, which are an important factor in determining the growth rate, resistance to pests, and productivity of the plant (Azhar, 2020; Agus Suprapto et al., 2024). Quality seeds can be seen from their uniform size, shape, and color, and come from superior varieties that are adaptive to climate and soil conditions in the planting area (Yasin & Nur, 2014). In addition, the land that will be planted with corn needs to be properly cultivated, which includes cleaning weeds or wild plants that have the potential to inhibit the growth of corn (Latif et al., 2023; Bayyinah et al., 2022). Soil cultivation also includes plowing and loosening, so that the soil is more fertile and ready to receive seeds (Latif et al., 2023; Ramadhan, 2024). Furthermore, planting techniques are an important aspect that must be considered to ensure that corn seeds can grow optimally (Parawansa, 2024). Corn planting should be done in soil with ideal humidity, not too wet or dry, to avoid problems with the germination process (Hanum, 2008; Source: 2019). Planting distance also needs to be considered to provide enough space for root and stem growth, with a recommended distance of 100 cm x 40 cm between each planting hole. Each hole is filled with two corn seeds at a depth of 3-5 cm to maximize growth power and minimize competition between plants (Probowati et al., 2015; Aisyah & Herlina, 2018). This technique allows good air circulation between plants, facilitates sunlight access, and supports healthy and productive plant growth (Yulisma, 2011; Dewi et al., 2024). The next step is to provide fertilizer periodically, starting from basic fertilizers such as manure, compost, and organic, as well as additional phosphorus, nitrogen, and potassium as needed during the growth and fruiting period (Idaryani & Fadwiwati, 2022; Kriswantoro et al., 2016; Syafruddin, 2016). Furthermore, corn plant maintenance includes replanting, thinning, fertilizing, irrigation, and initial and follow-up fertilization. Finally, harvesting is carried out based on the age of the plant (Cultivation, 2022; Corteva, 2020; Academy, 2024).

According to Zafirah (2010), increasing corn production should be accompanied by increasing productivity to increase farmers' income. Therefore, the focus of devotion is directed at corn plants, because the results are abundant and corn is known as one of the healthy substitutes for rice. In addition to being processed into delicious menus, corn is rich in protein, fiber, minerals, antioxidants, and higher amylose than rice. This is in accordance with the results of the study Care (2024) which mentions the health benefits of corn: safe for diabetics because of its high amylose content, suitable for diets because it has a low glycemic index and is rich in fiber so it keeps you full longer, and has important nutrients such as vitamin B6, vitamin C, phosphorus, magnesium, and antioxidants that are beneficial for the body. Consuming corn also helps prevent anemia because it contains iron, vitamin B12, and folic acid which are important for the formation of red blood cells, and is good for pregnant women because folic acid supports fetal brain development and reduces the risk of birth defects.

Corn harvest production in the Polongbangkeng Utara sub-district is quite a lot. However, until now, corn plants have only been dried and sold in the form of shelled seeds while in fact they can be sold in the form of processed foods. For this reason, the community needs to be taught how to process it and then they are taught how to market it in UMKM activities through various digital social media and not just by word of mouth. Smart digital-based villages are not just about bringing technology to the village, but also involving active community participation in the process of developing and utilizing the technology. In smart villages, technology is used as a tool to improve the quality of life of the community and improve the local economy.

Method

The implementation of the Community Partnership Program (PKM) in Polongbangkeng Utara District, Takalar Regency, South Sulawesi, which focuses on the development of biscuit, cracker, and emping products from yellow corn, is carried out systematically and structured. This activity involves various stages designed to provide long-term benefits for the local community, especially in terms of processing agricultural products into value-added products through product digitalization.

This activity funded by DRTPM is carried out through five main stages. The first stage is an initial observation with the aim of seeing the potential of the area, and the obstacles faced by the community, especially in developing yellow corn businesses and marketing them. The activity begins with the socialization of the program to the community. In this

stage, the community service team explains the objectives and benefits of the yellow corn processing program, and invites the community to actively participate in training and mentoring. Participants involved in this activity consist of farmer groups, housewives, and SMP Negeri 4 Polongbangkeng Utara as partners and Coordinators who have the potential to process agricultural products. After the socialization, initial data collection was carried out to identify the level of knowledge and skills of the community related to corn processing. This data collection was carried out through direct interviews and simple surveys to determine the specific needs of the community in terms of processing technology, marketing, and available resources. The second stage is conducting stage I training where participants practice making yellow corn-based products, such as biscuits, crackers, and chips. In the biscuit-making session, participants are taught techniques for processing corn into flour, mixing ingredients, and baking techniques that produce quality biscuits. Next, when they make crackers using corn flour processing techniques, frying, and drying. Participants learn how to make crispy and long-lasting crackers. Then continued with making corn chips, which are traditional foods, made using manual and modern techniques. Participants are given an understanding of the process of selecting quality ingredients, pounding, and frying techniques to maintain the taste. Continued with how to package properly so that it is in good condition to be marketed. The third stage is to conduct stage II training, this training is carried out to equip participants with digital marketing knowledge using social media such as WhatsApp, Tik Tok, Instagram, Facebook and YouTube, as well as the use of websites in the process of increasing sales of yellow corn. This is done through the market place. This activity involves mothers of farmer groups, teachers and children of SMP Negeri 4 Polongbangkeng Utara, Takalar Regency. The next stage is mentoring stage I, which aims to assess the continuity of this activity as part of the UMKM business, while the last one is monitoring II to ensure that social media is actively used in marketing yellow corn products.

Results and Discussion

The implementation of the Community Partnership Program (PKM) activities in Polongbangkeng Utara District, Takalar Regency, South Sulawesi, as stated in the method section, began with initial observations to see all forms of problems and potential that could be developed.

Based on the results of initial observations, it was found that in general, people still sell their yellow corn products directly. In addition to selling after being picked, they also sell it in the form of kernels that have been shelled and then dried. After that, it is sold per sack or per kilo. After that, socialization was carried out on the benefits of the yellow corn processing program, as well as inviting the community to actively participate in training and mentoring. Participants involved in this activity consisted of farmer groups, housewives, and SMP Negeri 4 Polongbangkeng Utara as partners and Coordinators who have the potential to process agricultural products. After socialization, initial data collection was carried out to identify the level of knowledge and skills of the community related to corn processing. direct interviews and simple surveys to determine the specific needs of the community in terms of processing technology, marketing, and available resources.

Figure 1. Initial observation activities

Figure 2 Counseling on the importance of entrepreneurship

Figure 3. Stage I training in making emping, biscuits and crackers

In Figure 3, the first stage of training is carried out by providing training on Yellow Corn processing. The training is divided into several sessions based on the type of product to be developed, namely biscuits, crackers, and emping. Each training session is guided by a food technology expert who is experienced in the field of corn processing.

Figure 4. Phase II training on using social media to increase sales

In the second stage of training, 2 speakers were involved, namely Mr. Ahmad Risal S.Pd., M.Pd, Muh. Mahdi Hanif SM Since for some partners it was something new, there were quite a lot of questions asked by partners. Especially to dig up information on how to use media correctly and effectively in marketing. Then to get maximum results, the first monitoring was carried out for the first stage of monitoring to see the sustainability of whether production activities were carried out for making emping, chips and biscuits and it turned out that they had done it. For these three types of processed products, they were given packaging with the name Biralleta chips. The form of Biralleta product packaging can be seen in Figure 5.

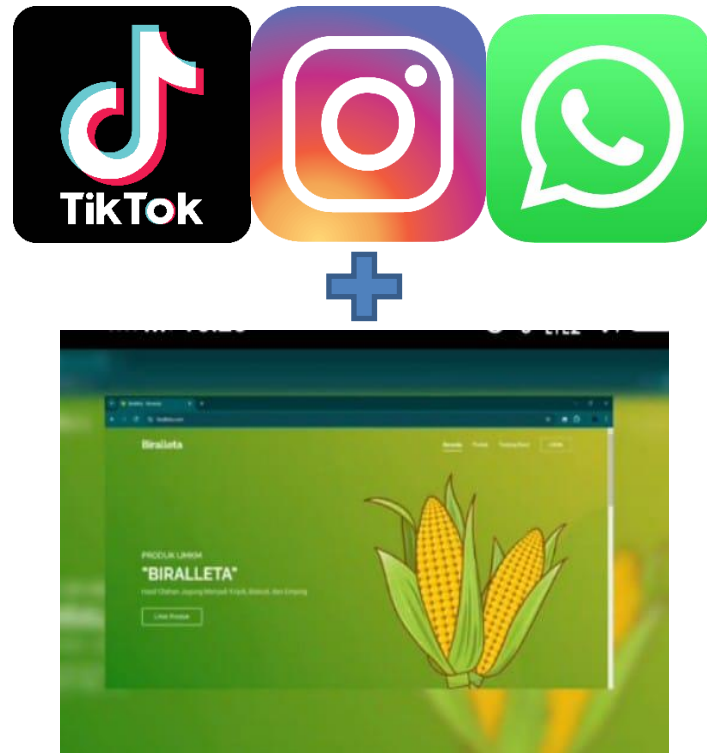Figure 5. Packaging of chips, biscuits and emping products

Figure 6. Social media used to market yellow corn products

In Figure 6, social media or applications used to market yellow corn products are WhatsApp, TikTok, Instagram, and using a website. By conducting monitoring stage II to ensure whether there are already social media applications used in marketing products. For this digitalization program, YouTube is also used to collect videos used to learn how to make emping, biscuits and crackers.

The results of this study are consistent with the findings Abidin et al. (2023), which examines training programs to process agricultural products, especially corn, into value-added food products. These programs are aimed at improving community skills, expanding the variety of local food products, and creating new income opportunities. In general, training sessions cover technical aspects such as production techniques, marketing strategies, bookkeeping, and small business management. The methods used include demonstrations, lectures, discussions, and hands-on practice. Various products produced in this program include biscuits, crackers, cakes, and popcorn. Based on the evaluation, there was an increase in participants' knowledge and skills, with a success rate of between 65-98%. This program not only develops technical skills, but also fosters entrepreneurship and accelerates economic development in rural areas (Sentosa et al., 2021).

The study is also in line with recent research that emphasizes the importance of digital marketing training for small and medium enterprises (SMEs) in Indonesia in an effort to expand their market and increase sales. Several programs have successfully taught SME owners to use social media platforms such as Facebook and Instagram, as well as online marketplaces to promote and sell their products (Amalia et al., 2023). These initiatives have been proven to improve participants' knowledge and skills in digital marketing, resulting in increased production, wider consumer reach, and increased sales volume (Maharani et al., 2022). In addition, training covers product innovation, packaging, and labeling to increase product appeal in the market. Some programs also provide technical support in the form of creating a simple e-commerce website for participants (Ika et al., 2023). Overall, this digital marketing training has a positive impact, helping SMEs adapt to the digital economy and maintain their business continuity, especially in challenging times.

Conclusions

Based on the results of this activity, it can be concluded that the objectives have been achieved, namely increasing public knowledge in utilizing yellow corn to increase their income; creating an application that helps increase yellow corn production, as well as mentoring start-up businesses in the field of yellow corn cultivation; mentoring the use of marketplaces for marketing yellow corn through Android applications and e-marketing; diversification of processed yellow corn products into other processed products and new designs; creating an application to market processed yellow corn products; and compiling interactive media and training modules for processing yellow corn. Based on the results of the implementation in two stages, this activity succeeded in increasing the knowledge and skills of partner groups in processing yellow corn into ready-to-eat foods and marketing products through social media, so that the digitalization process can run optimally to support the marketing of processed yellow corn products. It is hoped that this activity can improve the economy of partners and develop into successful MSMEs, empowering communities and working together with the government at the sub-district level to a wider audience.

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