

The Empowerment of The Joho Village Farmers Groups Through Corn Grit Production

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ABSTRACT

Most of the Joho Village people depend on rice as a staple, which triggers limited economic growth in the agricultural sector. The area has abundant corn yields and is potentially processed as corn grits (rice alternative). Corn processing has solely in dry-shelled corn form, a drop in corn-shelled prices, the stagnant of the Farmers Groups Association (FGA) activity, and the lack of knowledge (food products processing, entrepreneurship, and digital marketing) underlie these community service activities. The service activities aim to optimize the program for implementing science, technology, and FGA empowerment in Joho Village to discover corn grit production potential and ensure the sustainability of FGA community activities. Therefore, the service team agreed with Joho Village FGA to organize programs: (1) Corn grit and production methods socialization (Zoom meetings and direct discussion); (2) Production equipment introduction (direct discussion); (3) Corn grits production training (hands-on practice method); (4) Entrepreneurship and digital marketing socialization (direct discussion). The questionnaire was selected as a socialization evaluation method. Joho Village FGA has high enthusiasm for activity participation (90% of attendance). The service activities succeeded in increasing corn grit production expertise (86% of yield) and improved the knowledge of corn grits (80% of increased knowledge), entrepreneurship (81.25% of increased knowledge), and digital marketing (70% of increased knowledge) of Joho Village FGA. These achievements indicated corn grit production potential as the forecast of their business opportunities in the future and embarked on the beginning of Joho Village FGA's empowerment sustainability.

Keywords: Corn, Corn Grits, Production, Socialization, Training

INTRODUCTION

Society depends a lot on agricultural production, especially agricultural food products as a staple food, which triggers low economic growth in the target areas, and there is almost no left value for the farmers. The problem in agricultural development in the southern part of Pracimantoro District, Wonogiri Regency, is the community's dependence on rice. Actually, there are other potential agricultural food products in this community, such as corn, which potentially be an alternative to rice. As a staple food, rice contains \pm 80% carbohydrates (18.9-28.5% amylose and 53.4-63.5% amylopectin), 7-8 % protein, 3% fat, and 3% fiber, generally. Meanwhile, corn has a similar nutritional characteristic such as \pm 77-85% carbohydrates: starch (72-74% amylopectin and 26-28% amylose), 19-24% protein, 1-4% fat, and other micronutrients (sodium, calcium, phosphorus, magnesium, iron, zinc, copper, and manganese).

Therefore, based on these nutritional characteristics, corn is potentially used as a rice substitute through corn rice (grits) production made from local corn. Corn grits can be applied in the processing or the mixture of corn rice according to people's preferences. People in several regions of Indonesia often consume corn rice. Due to the long procedure and tricky preparation of corn rice, a lot of technology developed and produced corn grits as a ready-to-eat food product or partially cooked corn grits ([Chaudhari et al., 2018](#); [Hamaisa, 2016](#); [Hidayah et al., 2019](#); [Luthfi et al., 2021](#); [Sari et al., 2019](#); [Sari et al., 2020](#); [Sharma et al., 2022](#); [Wahjuningsih et al., 2023](#); [Zhang et al., 2021](#)).

Corn grit demand is increasing along with its application in many different food products such as corn rice, corn flour, extrudate snacks, cornbread, etc. The price of shelled corn at the producer level in 2021 is Rp. 5,132 and has increased in value every year since 2017 with an average price growth of 5% since 2020. Corn

product derivatives that are in high demand on the export market in 2021 are corn flour and corn grit (1.75-1.76% of all corn derivative products). Corn grit has promising economic potential in the future based on the usage diversity, the increase in corn-shelled price (the raw material of corn grit production), and the export value. Moreover, further processing generates an increase in production costs and also the selling price of the final product. Thus, corn grit production will increase the product's economic value compared to the raw material ([Anandito et al., 2022](#); [Hamaisa, 2016](#); [Jannah, 2018](#); [Kementerian Pertanian, 2022a, 2022b](#)).

The Joho Village, Pracimantoro District, Wonogiri Regency, is known to have abundant corn yields. The people in this area plant corn once a year, only during the rainy seasons. Corn crops are intercropped with cassava, peanuts, or sorghum. Recently, sorghum has rarely been planted because its market value declined. Cassava plants have a fairly long harvest period (± 10 months). Corn cultivation is relatively easy, with high productivity and a short harvest period (± 3 months). The community tends to cultivate corn because the attractiveness of the crops is very high. The corn crop needs to dry naturally in the field before being harvested. Afterward, it is sold in the form of dry corn kernels. A small portion of corn is harvested freshly or when the plants are still green with the cobs starting to fill, and the taste is sweet because it is used for consumption directly. Unfortunately, during the harvest season, the price of shelled corn plummeted to Rp. 2000/Kg.

There are 12 Farmer Groups scattered in every hamlet of Joho Village with an average number of members in each group are 80 people. The Farmers Group Associations (FGA) activity has not been running regularly and tends to be stagnant. Based on the high potential of corn production and a direct request from one of the community leaders in the area, Joho Village was selected as a partner village.

According to the agreement between the UNS lecturer team and the FGA of Joho Village, several problems were identified which were prioritized to be resolved, namely: (1) The abundant corn production with a very low selling price for shelled dry corn; (2) The need for socialization and training of the FGA in Joho Village due to the low level of community knowledge about food product processing, entrepreneurship, and marketing techniques (e.g: digital marketing); and (3) Limited corn-based

food processing equipment. Corn production is abundant, but the product is being sold only in the form of dry corn kernels, triggering a drop in corn shell price during the harvest season and resulting in losses in the farming community of Joho Village. The selling price of dry corn does not cover the high planting costs, hence the welfare of farmers or the surrounding community cannot be guaranteed. The local community has not utilized corn as a processed food product or staple food and still depends a lot on rice for their daily staple consumption. The activities of the FGA of Joho Village have not been carried out routinely with limited activities, so the FGA has not played much of a positive role in the economic sector of Joho Village.

The FGA chairman conveyed the plan to utilize the abundant corn to village officers, but the limited community knowledge about entrepreneurship, processing, and marketing techniques of food products has resulted in stagnant activities and is far from realized. Village officers have donated some equipment for FGA activities, but it is still limited to glassware kinds. Therefore, business equipment related to food processing is not yet owned (especially corn-based food products), so FGA's food product business activities are still minimal. The synergy between the lecturer in agricultural product technology of Universitas Sebelas Maret and Joho Village as partners are expected to optimize the implementation of science and technology as well as community empowerment in Joho Village through socialization and training regarding corn grits, corn grit production process, production equipment, entrepreneurship, and digital marketing. Thus, the aim of this service activity is to optimize the program for implementing science, technology, and FGA empowerment in Joho Village to discover corn grit production potential and ensure the sustainability or continuity of FGA community activities.

METHODS

The community service activities were held from February until November 2021 at Joho Village, Pracimantoro District, Wonogiri Regency. The partner is Joho Village FGA which consists of 12 Poktan with ± 80 people in each group. The used material in this community service activity is corn, while the tools were a digital scale, disk mill, cabinet dryer, and other

supporting tools. The community service activities were carried out through participatory counseling methods, which involved the farmers directly in socialization, counseling, and training. The participatory counseling method involves the community in activities that are divided into several stages as follows: (1) Licensing, Socialization (corn grits, production equipment, entrepreneurship, and digital marketing), and Services Program; (2) Materials and tools preparation for community service activities; (3) Corn grits production and entrepreneurship training; (4) Evaluation the success of community service activities.

The first implementation of community service activity was the socialization of corn grits and its production procedure by hybrid method (online through Zoom meetings and offline through direct discussion). Then, the introduction of production equipment was conducted through a direct discussion method. Corn grits production training was held as the next agenda through hands-on practice methods. Lastly, the socialization and training of entrepreneurship and digital marketing were done through direct discussion methods. The evaluation of socialization activity was measured by questionnaire method (pre and post-test). Meanwhile, monitoring activity was carried out by long-distance communication method between the service team and partner as follow-up actions after all of the community service activities had been completed.

RESULTS AND DISCUSSION

Socialization about corn grit and its production method

The community service team has carried out socialization regarding the introduction, explanation, advantages, and process of corn grit production. The socialization was done with a hybrid model. Online activities through Zoom meetings were completed by the community service team in Surakarta, while partners at Joho Village Hall held an offline activity on Friday, August 13th, 2021. Joho Village people joined the socialization together with the Zoom application through a large screen provided by Joho Village due to limited media and signals of each resident.

Grits are the definition of broken kernels, so corn grits are corn kernels that are processed from whole form to broken kernels through the principle of size reduction. The size reduction of

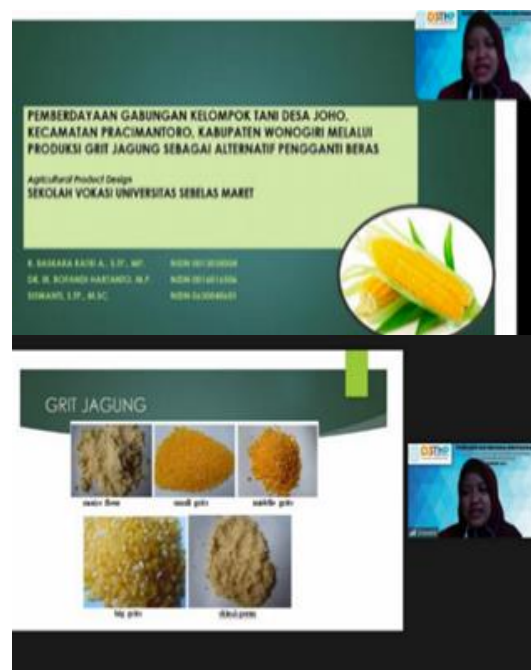


Figure 1. Online socialization about the introduction and production of corn grits

agricultural commodities generates a new product with different quality and value. The size reduction results in further processing efficiency for agricultural commodities. Moreover, the uniform particle sizes of agricultural commodities due to size reduction prevent unevenness in processing treatment and product characteristics (Anandito *et al.*, 2022). Corn grits are widely used as a staple food and rice substitute to realize food diversification. There are various kinds of production techniques to produce corn grits (Kumar *et al.*, 2022; Kumar *et al.*, 2018). The online socialization activity regarding corn grit introduction and its production method (Figure 1) succeeded in explaining and demonstrating the process of corn grit production with the following procedure: corn kernel grinding, polishing, and corn grit sieving (Figure 2).

The socialization activities and the process of corn grit production affected the increase of the FGA community's knowledge about corn grits. This phenomenon is proven through an increase in the pre-test and post-test evaluation scores that have been fulfilled.

Table 1. The evaluation results of corn grits socialization

| The evaluation results | Score |
|----------------------------------|-------|
| The average score of pre-test : | 50 |
| The average score of post-test : | 90 |
| The increase in knowledge : | 80% |

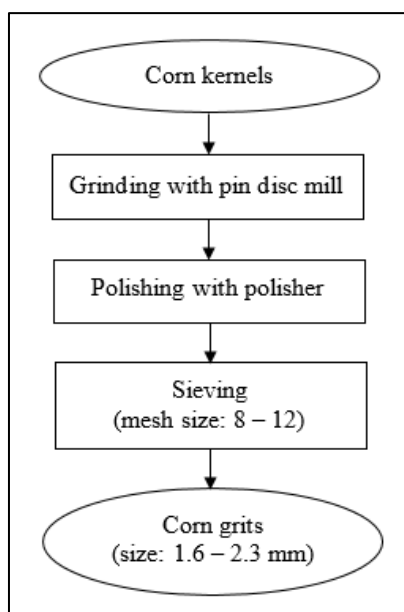


Figure 2. The procedure of corn grits production

The evaluation results of corn grits socialization which are presented in [Table 1](#) were in line with several studies' results that showed the activities of socialization significantly increase the participant's understanding of the socialization theme or topic. One example is the results of the socialization evaluation reported by [Siqhny \(2022\)](#) which shows the percentage value of participants' understanding level about food products before socialization was <20% and was proven to increase to 85.7% after socialization.

The introduction of production equipment

The lack of the FGA's community knowledge about corn grit processing also underlies the shortage of understanding regarding agricultural commodity drying tools other than direct solar heat. So, the process of drying agricultural commodities in Joho Village solely relied on solar heat. Due to the dependence on the drying process through solar heat, the FGA community does not yet have a generator and stabilizer to support drying equipment performance. Therefore, the community service team has introduced and donated several production equipment to increase effectiveness and efficiency in the drying process of agricultural commodities in general, to increase electricity availability and stability of drying tools, as well as to support the corn grits production process. The equipment is a cabinet dryer, a supporting generator, and a stabilizer ([Figure 3](#)). The community service -

Table 2. Specification of cabinet dryer

| No | Specifications | Notes |
|----|------------------------|---------------------------------|
| 1 | Type | CD 10A |
| 2 | Dimensions | 75x45x120 cm |
| 3 | Material | Stainless steel |
| 4 | Electrical power | 1500 watt |
| 5 | Temperature controller | Automatic thermocontrol digital |
| 6 | Blower | 120 watt |
| 7 | Shelf size (6 pieces) | @ 60x40x4 cm, stainless steel |
| 8 | Capacity | 20-40 Kg |

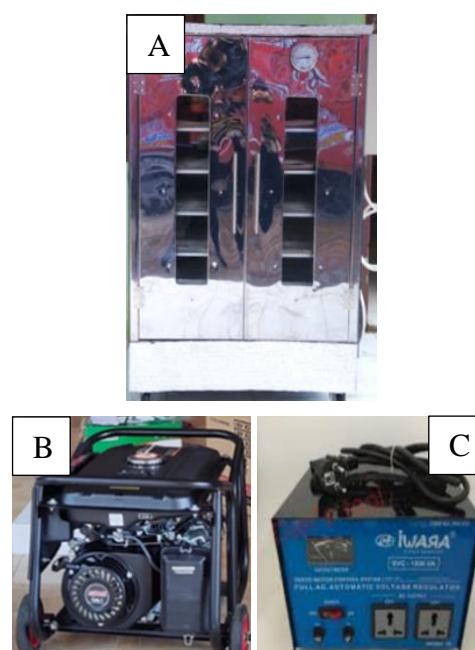


Figure 3. The equipment that was donated to partners: cabinet dryer (A), generator set (B), stabilizer (C)

team also introduced a pin disc mill (ungranted), considering the FGA's unfamiliarity with the corn grinding process and the importance of this tool for producing corn grit with large capacity and uniform size. Procuring a pin disc mill was delegated as the responsibility of the FGA community as they eagerly enthusiast to produce corn grit in the future. The grant cabinet dryer has a capacity of 20 – 40 Kg with six pieces of product shelf, which is expected to optimize corn grit production ([Table 2](#)).

A cabinet dryer is a machine or tool widely used in product drying with a simple procedure. There are various types of cabinet dryers whose size, capacity, heat source, and several other aspects can be adjusted to the needs ([Agato et al., 2021](#)). Great cabinet dryers with

high effectiveness and efficiency are shown by their large capacity, high-speed drying, even heat distribution, good temperature control, and low energy requirements ([Misha et al., 2013](#)). The principle of operation in a cabinet dryer is dry air blown through the heating medium to the materials that were arranged on the shelves so the water content of the material evaporates into the environment ([Suwati et al., 2021](#)). A pin disc mill is a grinder machine that has a circular disc. Two opposing spinning rotors comprise the grinding zone of pin mills, where many rows of circumferential pins alternately center around them. Due to centrifugal force and the airflow produced by the rotor, the material moves between these pin rows in the direction of the periphery ([Ammala, 2023](#)). The donated equipment is expected to be used optimally by partners for the drying process of corn grits.

Corn grits production training

Training or hands-on practice in corn grits production was held on October 14th, 2021 at the Joho Village Hall ([Figure 4](#)). The activity was attended by all members of the farmers' groups association in Joho Village along with the officials of the village. The participants were divided into several groups to produce corn grits directly. The practical activities for corn grits production were done after the introduction of material that is related to corn grits production.

Good-quality corn kernels were obtained through the sorting stage. The sorting stage effectively separates good and bad kernels. Generally, the good kernels appeared intact, unbroken, and filled (un-empty). The sorting stage can be done conventionally (hand-work / manual selection) or mechanically (blower or winnower). The next procedure is grinding the corn kernels using the attrition (friction) method, followed by the polishing stage using a polisher machine that separates the epidermis (pericarp)



Figure 4. Training activities and production of corn grits



Figure 5. Corn grits product result

from the corn kernels. This will be beneficial for further corn grit application such as in corn flour production. This stage (polishing stage) increases the carbohydrate content, water absorption capacity, expansion capacity, and corn flour viscosity due to the decrease of ash, crude fiber, and fat content which are found in the removed pericarp. This also allows for long shelf life because of the decrease in product rancidity potential due to the decrease in fat content. The sieving process aims to homogenize the corn grit size and separate other foreign objects (gravel or scrap). Further application of corn grits as a raw material for several production processes such as corn rice, corn flour, extruded snacks, and other products ([Anandito et al., 2022](#); [Kumalasari et al., 2015](#); [Nasir & Harijono, 2018](#); [Rausch & Eckhoff, 2016](#); [Richana et al., 2014](#); [Yulianto et al., 2013](#)).

Based on these service activities, a corn grits product was produced with 8-12 mesh size (2.3-1.6 mm of corn grits size) and generated 86% yield. Corn grit products are packed using standing pouch packaging with a weight of 250 grams ([Figure 5](#)). The used package was equipped with a packaging label.

Socialization of entrepreneurship and digital marketing

Socialization about entrepreneurship aims to increase the enthusiasm and knowledge of the farmers' groups association in Joho Village so that they actively utilize the natural resources in Joho Village to become something more valuable. [Purnomo et al. \(2020\)](#) and [Kusuma et al. \(2021\)](#) explained that entrepreneurship is a dynamic, creative, and developing behavior that actively dares to take risks. Entrepreneurship skills are the result of honed training and practice.

Table 3. The evaluation results of entrepreneurship and digital marketing socialization

| Entrepreneurship socialization | |
|----------------------------------------|--------------|
| The evaluation results | Score |
| The average score of pre-test : | 48 |
| The average score of post-test : | 87 |
| The increase in knowledge : | 81.25% |
| Digital marketing socialization | |
| The evaluation results | Score |
| The average score of pre-test : | 50 |
| The average score of post-test : | 85 |
| The increase in knowledge : | 70% |



Figure 6. Socialization of entrepreneurship and digital marketing

Entrepreneurship training is considered capable of providing learning space and increasing the capacity of business ideas to increase motivation in starting a business.

Entrepreneurship socialization activities are expected to trigger the farmers' groups association to become reactive and overcome stagnancy. The main topic of the training is the tips for successful entrepreneurship. Based on the training activities, partners are expected to understand and master the first steps of starting a business, the tricks of developing products, and the tricks of maintaining the market.

The focus of provided training given to the community is not only on entrepreneurship but also the information technology-based marketing. The main issue in this training is marketplace development and management, so partners are expected to conceive and master the development, management, and marketing tricks through social media such as Facebook, Instagram, WhatsApp, and other platforms.

A marketplace is a platform that houses e-commerce in providing goods or services to consumers. The existence of a marketplace recently changed the way consumers shop from conventional to digital through Internet media. These technological enhancements increase the

efficiency and effectiveness of business processes for goods or services. The role of e-commerce has a positive impact on small and medium businesses with easy marketing processes and buying-selling transactions (Cahya *et al.*, 2021; Yustiani & Yunanto, 2017).

The socialization and training of entrepreneurship and digital marketing were held at Joho Village Hall, on October 14th, 2021 (Figure 6). The evaluation results of entrepreneurship and digital marketing socialization which are presented in Table 3 showed that the average score of pre-test both these socializations was lower than the post-test. Thus, socialization activity effectively increases Joho Village FGA's knowledge about the techniques of entrepreneurship and product marketing based on the online platform (digital marketing).

There are several difficulties during the implementation of community service activities, such as the enforcement of the restrictions on citizens' activities due to the COVID-19 pandemic. The restrictions caused a delay in the implementation of offline community service activities in Joho Village. Corn grit production has also not been running continuously (only 1x of production since the conducted training) due to the pandemic situation. Corn grit products have not been analyzed for their chemical characteristics and product shelf life, so this agenda becomes a plan to be implemented to ensure corn grit products' quality. The evaluation of corn grit properties is very important to meet the standards, such as moisture content, aflatoxin content, and other properties. Moisture content in corn grits related to the product's freshness, product's long-term durability, product's shelf life, and other aspects. Meanwhile, aflatoxin content in corn grits is related to human health issues (carcinogenic, genotoxic, and hepatotoxic), as the aflatoxin contamination is corn products' biggest problem (Hidayah *et al.*, 2019; Kadir *et al.*, 2019; Porto *et al.*, 2019).

Good communication between the service team and partners is very helpful in carrying out the activities. The officials of the village also actively contribute to mediating the service team with the farmers' groups association at Joho Village. During all the service activities, Joho Village FGA showed high enthusiasm and diligently participated on average, which is proven by the high level of invitees' attendance according to the data in Table 4.

Table 4. The evaluation results of farmers groups association enthusiasm average level towards all the service activities

| The evaluation results | Score |
|------------------------------------|-------|
| The number of invitation : | 100 |
| The number of invitees attending : | 90 |
| The attendance percentage : | 90% |

The high enthusiasm of the farmers' groups association is very helpful in accepting the socialization of the service activities. Therefore, follow-up actions that can be taken to overcome such difficulties in organizing activities include establishing regular communication (long-distance communication) with partners and evaluating the community service activities that have been finished. If necessary, the community service team will arrange meetings with the farmers' groups association regularly to ensure corn grit production and FGA activities run continuously. If the production of corn grits is stable in the future, then the farmers' groups association will take care of the Home Industry Food Production Certificate (PIRT) immediately and proceed with the business activities for these corn grits. In this way, corn grit economic value and the welfare of FGA or the village could guaranteed eventually.

CONCLUSION

The accomplished community service activities positively impacted the knowledge and abilities of Joho Village FGA regarding the benefits and production process of corn grits, as well as entrepreneurship and digital marketing. The community also received a grant for corn grits production equipment (cabinet dryer, generator set, and stabilizer) and gained knowledge about the operation and usage of this equipment. The service activities succeeded in increasing corn grit production expertise (86% of yield), corn grits – production process knowledge (80% of increased knowledge), entrepreneurship knowledge (81.25% of increased knowledge), and digital marketing knowledge (70% of increased knowledge) of Joho Village FGA. Based on these results, corn commodities in Joho Village seemed potential to be processed into corn grit products. Moreover, according to corn commodities availability in Joho Village and based on the increased knowledge of Joho Village FGA regarding the corn grit production process, entrepreneurship,

and digital marketing, it is indicated that Joho Village FGA has a business opportunity involving corn grit products in the future. Hence, the accomplished community service activities embarked on the beginning of Joho Village FGA's empowerment continuity and sustainability.

ACKNOWLEDGEMENT

The Community Service Team would like to thank the Directorate of Research and Community Service Deputy for Strengthening Research and Development Ministry of Research and Technology / National Research and Innovation Agency in line with the Community Service Contract Implementation of the Community Service Program Number: 002/SP2H/PPM/DRPM/2021, March 22nd, 2021.

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