Vol 9 No 1, Maret 2025
ABDI DOSEN
Jurnal Pengabdian Pada Masyarakat
pISSN: 2614-6509
eISSN: 2620-5156

APPLICATION OF MECHANICAL CORN SHELLING MACHINE TO THE CORN FARMING COMMUNITY OF BIBIOSI VILLAGE ARSO SWAKARSA DISTRICT KEEROM DISTRICT

Thomas Pagasis, David Mangallo *, Rombe Allo, Enos Tambing, Selyus Rantepulung, Mickael Ruben Kaiway
Department of Mechanical Engineering, Faculty of Engineering, Universitas Cenderawasih
Jl. Kamp Wolker, Yabansai, Heram, Jayapura City, Papua 99224, Indonesia
Email: david_mangallo@ftuncen.ac.id

Abstract

The main problem faced by farmers in post-harvest handling of corn is that the corn shelling process is still carried out using simple tools, so it requires a long and labor-intensive shelling time. This situation means that farmers cannot immediately enjoy the proceeds from their corn sales. The solution used to overcome the problems faced by farmers is to switch from using simple shelling tools to implementing appropriate technology in the form of corn shelling machines that work mechanically. The application of corn shelling machine technology aims to increase the productivity of partner farmers in Bibiosi Village, Keerom Regency so that they can improve their welfare. The target to be achieved is the adoption of corn shelling technology which works mechanically by the target community, increasing corn shelling production and community income, as well as establishing intensive cooperation between Cenderawasih University as the producer and developer of appropriate technology, the community using the technology and the local government. The method used to achieve this goal is by providing a technological touch to the community in processing corn harvests so that corn production can be optimized through the mechanical shelling process of corn. Application of appropriate technology in the form of a corn shelling machine using a petrol motor with 5.5 HP power. Based on the performance test results, this corn shelling machine has a production capacity of 1000 kg/hour. This is expected to help corn farmers to produce shelled corn more quickly and save energy. The application of appropriate technology will have an impact on the welfare of the community in the community partnership program. Apart from that, the application of science and technology is a solution for farmer groups in building insight and mindset in society.

Keywords: Corn Shelling Machine, Corn Farmers, Productivity, Appropriate Technology

INTRODUCTION

Nowadays, many shelling tools are used, from simple shelling tools to modern ones. The entire tool is made so that the energy and time used to pipe is more efficient. The use of this sheller tool usually occurs in farming businesses that are quite large or extensive.

Submitted: February-2025 Received: February-2025 Available online: March-2025

Businesses in the agricultural business sector require careful and more efficient calculations, so these facilities are needed. But farmers generally still use their hands or simple tools.

Bibiosi Village, which is located in the Arso Swakarsa district, Keerom district, is a village that was only formed a few years ago. This village is an expansion of the Kwimi village in the local government's efforts to speed up the development process by opening up land that has so far been idle land. Based on the results of a survey conducted among the people of Bibiosi village, it turns out that the entire community is engaged in agriculture in the form of gardens and animal husbandry. People in Bibiosi village generally grow vegetables, taro, chilies, sweet potatoes, cassava and corn. (BPS Papua Province., 2018).

Figure 1. Partner Farmers Corn Farm

One of the Ministry of Agriculture's policies and programs to accelerate development in the border areas of Keerom Regency is to build export-oriented food barns. Various agricultural commodities that have the potential to be developed are: strategic food commodities in the form of rice, corn, soybeans, nuts and tubers; horticultural crops, vegetables, fruit, plantation crops and livestock (Lewaherilla et al. 2019).

During its development, the farming community in Bibiosi village formed farmer groups, where each farmer group consisted of between 10 and 20 farmers. For the plan to implement Community Service, we will partner with a farmer group, namely the Berkat Rama farmer group, which consists of 20 farmers. From discussions held with the Berkat Rama farmer group, chaired by Yosep Lolo Payung, there were problems regarding the corn shelling process. Farmers generally experience difficulties when shelling corn. Based on experience of corn harvests so far, 1 ha of land can produce 5 to 6 tons of corn

.

Figure 2. Mitra corn ready to be shelled

Corn harvests of this size must of course be shelled before being sold, because if they are sold whole with the cobs, the selling price will be lower. So far, corn shelling has been done using a simple sheller. This tool is made from a piece of wood with dimensions of 5 X 10 However, this tool cannot shell the corn completely from the cob. The remaining unpopped corn must be popped again using your hands. When popping corn by hand, your fingers often get blistered because of the large amount of corn to be popped. The shelling production capacity of this tool is around 10 - 15 kg/hour. This method of shelling using simple equipment poses a risk to work safety, namely that fingers are often injured due to being hit by the nails in this tool. Based on the production capacity of shelling from simple shelling equipment owned by farmers in Bibiosi village, if farmers shell 1 ton of corn it will take 67 - 100 hours. Of course, this tool is very inefficient and wastes farmers' time and energy.

By applying appropriate technology to the farming community, it will certainly save time and energy so that it can increase the level of farmer productivity. Based on the problems expressed, there are many things that must be overcome and solutions to the problems that occur are sought. It is hoped that problems in farming community groups can be resolved completely by implementing the use of appropriate technology to increase production results and people's welfare. Apart from that, it forms community understanding and knowledge in overcoming problems that occur by applying appropriate technology.

Figure 3. Simple corn sheller tool owned by farmers

IMPLEMENTATION METHOD

Implementation of the Application of Appropriate Technology to the community in the form of Community Service was carried out in Bibiosi village, Arso Swakarsa district, Keerom district, which is approximately 49.2 km from the Cenderawasih University campus with a travel time of ± 1 hour 28 minutes.

Before carrying out Community Service activities, the stages of activities that will be carried out are first planned. The activity design is synergized with the activities of the Community Service implementation team and partner farming community groups. After identifying community needs, it was agreed to implement technology in the form of a corn shelling machine that works mechanically with a large production capacity. Having this corn shelling machine will certainly save time and energy so that it can increase community productivity, in this case the partner farmer group. The next stages of activities include preparation, design, manufacture, test operations, assistance, operations and application of

technology to partner farming communities.

In implementing the corn shelling machine in partner communities, it is first demonstrated how to operate it to all parties involved in the partner group and village officials. During this implementation, training was also given to the public on how to maintain machines in a simple way and the problems that might occur when operating them. On this occasion, various views were also conveyed regarding the use and application of appropriate technology in an effort to increase production productivity in order to improve community welfare and foster insight into partner communities. It is hoped that this Community Service Program can run sustainably, which will then require assistance to ensure that this program continues to run and foster close emotional relationships between the campus (academic) and the community. For this reason, it is necessary to carry out monitoring, evaluation and coaching within a predetermined time period. This step is intended to see to what extent the activity output targets can be achieved, especially the benefits that can be obtained and felt by the corn farming community.

The method used to solve the problem is to make a corn shelling machine that works mechanically and carry out socialization/introduction activities for the tool to corn farmers consisting of:

1. Explanation of post-harvest corn processing techniques.
2. Explanation of the design process for mechanical corn shelling machines.
3. Explanation of the required tools and materials as well as the budget required to build a mechanical corn sheller machine.

Explanation of how to operate the mechanical corn sheller machine as well as possibilities for further development to other farmers around them.

Figure 4. Explanation of how to care for and use a corn sheller machine

RESULTS AND DISCUSSION

The process of implementing service activities for the application of mechanical corn shelling machines is carried out in the following stages. The preparation stage for extension activities includes: installing banners, preparing the corn shelling machine, and the corn to be shelled. Before this activity began, a dialogue was held with members of the farmer group regarding their knowledge and skills in using and maintaining corn shelling machines.

After completing the preparatory activities, the next activity is to explain how to use (operate) and maintain the corn sheller machine. Things that are explained to the farming community at this stage include: 1). How the corn sheller machine works, 2). Name of corn shelling machine components, 3). Corn shelling machine components that need attention to maintenance, in this case the drive motor and transmission system, and 4). Production capacity and quality of shelling results.

At this stage, the farmer group members were quite enthusiastic in receiving an explanation of how the machine works and how to care for the components of the corn shelling machine. After completing explaining how it works and how to maintain the corn shelling machine components, then proceed with the operation of the corn shelling machine. In the process of operating a corn shelling machine, members of the farmer group are directly involved in the shelling process. The shelling results showed that the corn kernels were completely separated from the corn cobs. After the corn shelling process is complete, a discussion is held with members of the farmer group about the performance of the machine and the quality of the shelling results.

Figure 5. Operation of corn shelling machine

In the next session, the capacity and shelling quality of this machine was explained. It was further explained that this corn shelling machine can shell corn as much as 1000 kg/hour. The quality of the shelling results is that the corn kernels are separated from the cobs, the corn kernels are not broken, and the epidermis at the bottom of the corn kernels is not separated. Based on information from members of the farmer group, this machine shelling is very good and the same as the results of manual shelling. Because the shelling results are good, the selling price is higher, namely IDR 5,500/kg. Based on the results of observations on the use of corn shelling machines by members of farmer groups, generally members of farmer groups are of the opinion that operating this machine is easier, can be operated by an operator, and can be done in their spare time. The results of shelling corn using this machine are cleaner because the corn cobs are separated from the corn kernels so no cleaning process is needed. The next session

is a question and answer session with the farming community which aims: 1). evaluate service activities, 2). Evaluate the extent to which participants can understand the education material on the use and maintenance of corn shelling machines, and 3). Find out how the corn shelling machine benefits in increasing the productivity and income of farmer group members

.

Figure 6. Question and answer with farmers

One of the output targets of this service activity is the availability of a corn shelling machine for the Berkat Rama farmer group in Bibiosi village. It is hoped that with this corn shelling machine that works mechanically, farmer groups can improve the corn shelling process. The service implementation team has handed over a unit of corn piping machine to the Berkat Rama farmer group in Bibiosi Village. It is hoped that with this corn shelling machine, the productivity of farmer group members will increase, which will have an impact on increasing family income and welfare.

CONCLUSION

Based on the objectives of community service activities at theThank Rama Farmers Group in Bibiosi Village, Arso Swakarsa District, Keerom Regency, it can be concluded:

1. Farmers gain knowledge in the form of corn sheller technology that works mechanically
2. A corn shelling machine that works mechanically with a petrol motor drive is a solution that can speed up the farmer's corn shelling process which can save time and energy.
3. The use of corn shelling machine technology by farmers will help farmers increase their corn shelling production capacity both in quality and quantity.

REFERENCES

Amar, K. and Zakaria. 2011. Anticipatory Policy and Strategy for Mobilizing Farmers Towards National Corn Self-Sufficiency. Bogor (ID): PSEKP. 15 pp.

Aqil, M. 2010. Development of a Methodology for Emphasizing Yield Losses in the Corn Shelling Process. Journal of agricultural R&D, Vol.29, No.3: 464 – 472.

BPS 2019. Central Statistics Agency for Papua Province BPS Papua Province, 2018.

BPS 2021. Keerom in Figures for 2020. Keerom Regency Central Statistics Agency.

Ministry of Agriculture. 2013. Food Security Statistics Data for 2012. Jakarta (ID): Food Security Agency, Ministry of Agriculture 2013.

Lewaherilla et al. 2019 Analysis of the Potential for Development of Corn Commodities in the NKRI – PNG Border Area, Keerom Regency, Papua.

Mulyono, J. and H. Nugroho. 2019. Regionalization and Feasibility of Corn Farming in Bantul Regency. Bogor: Center for the Study and Development of Agricultural Technology, Ministry of Agriculture in 2017.

Sudjudi. 2004. Easy and cheap corn sheller tool. Agricultural Technology Assessment Center. West Nusa Tenggara.

Sumarni Panikkai at al, 2017 Analysis of National Corn Availability Towards Achieving Self-Sufficiency Using a Dynamic Model Approach.

Tastra. 2003. Strategy for implementing post-harvest machinery for food crops. Journal of Agricultural Research and Development, Vol.22. No. 3:95 - 102.