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Design and training of rice thresher machines for the farming group communities in Besar II Terjun Village

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ABSTRACT

Most of the Besar II Terjun Village residents live in agriculture. So far, people still use conventional methods to separate rice by hitting the harvested rice. In this community service activity, a rice threshing machine was designed. The rice thresher machine has power = 5.5 HP with engine type = Air Cooled 4 Stroke OHV Single Cylinder; maximum torque = 1.1 Kg.m / 3600 rpm; and maximum output = 4 KW / 4000 rpm. This machine has a capacity of 300 kg/minute. This community service activity aims to help the Sukapura Village community maximize its potential and provide insight for SMEs regarding effectiveness, efficiency, productivity, and safety in carrying out the catfish production process. The methods used include observation methods to determine the needs of SMEs for processed catfish food, design methods, presentation methods, and discussion methods as a form of assistance in starting a catfish product processing business.

ABSTRAK

Sebagian besar penduduk Desa Besar II Terjun mempunyai mata pencaharian di bidang pertanian. Selama ini masyarakat masih menggunakan cara konvensional dalam melakukan pemisahan padi,yaitu dengan memukul padi yang dipanen. Pada kegiatan pengabdian masyarakat ini dilakukan perancangan mesin perontok padi. Mesin perontok padi yang dirancang memiliki daya = 5,5 HP; dengan tipe mesin = Air Cooled 4 Tak OHV Single Cylinder; torsi maksimum = 1,1 Kg.m / 3600 rpm; dan putput maksimum = 4 KW / 4000 rpm. Mesin ini memiliki kapasitas 300 kg/menit. Kegiatan pengabdian masyarakat ini bertujuan untuk membantu masyarakat Desa Sukapura dalam memaksimalkan potensi yang ada dan memberikan wawasan bagi pelaku UKM mengenai efektivitas, efisiensi, produktivitas, serta keselamatan dalam melakukan proses produksi olahan lele. Metode yang dilakukan antara lain, metode observasi untuk mengetahui kebutuhan UKM makanan olahan lele, metode perancangan, metode presentasi, dan metode diskusi sebagai bentuk pendampingan dalam merintis usaha olahan produk lele.

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1. Introduction

Besar II Terjun Village is one of the villages in Pantai Cermin District, which borders Pantai Cermin Kiri Village to the north, Temporary Village to the East, Lubuk Cemara Village to the South / Perbaungan District, and Sukajadi and Celawan Villages to the West. The area's boundaries are north of Pantai Cermin Kiri and Pantai Cermin Kanan Villages, south of Lubuk Cemara Village and Sukajadi Village, and west of PTPN.IV Adolina and Celawan Village and to the east of Temporary Village. The distance from the District Government center is 8.5 km, and the distance from the Regency Capital is 24 km. The beauty is suitable for developing a tourist village. This village is a large area of people's plantations. Various natural products are abundant in this village. The residents are very active in their work. They not only produce garden products but also make processed garden products. Among them are pandan curtains and mats [1-2].

Most of the population has a livelihood in agriculture or farming. The fertile soil structure and tropical climate make it suitable for agricultural land and plantations. In this village, agriculture significantly contributes to the economy and to meeting the community's basic needs, especially as the

population increases, which means the demand for food is also increasing. The availability of rice fields in Besar II Terjun Village is still huge, so there is an opportunity to improve the community's welfare, especially for rice farmers. So, there is a need for technological devices that help farmers produce effective and efficient rice. Technological advances in agriculture have a positive impact. Cultivating large areas of land requires farmers for a long time without technology. Farmers can spend one day cultivating 3 hectares of agricultural land. However, acquiring their land will be easier and faster with rural technology. Another example is the rice harvest; if it is threshed using the traditional method, namely manually or gebot, it will take quite a long time; the harvest capacity ranges from 0.10 to 0.16 hectares per hour, or 28-34 kg/person/ O'clock) [3-4].

Many types and types of mechanical rice threshing tools and machines have been used at various levels of rice farming, from subsistence to medium and large (agribusiness). The high cost of driving machines influences the price of the thresher machines on the market, so only a few farmer groups own them. Apart from that, limited space to place a reasonably large thresher machine in the middle of rice fields is also one of the reasons farmers are reluctant to use this machine. Making a rice threshing machine is one of the effective methods for overcoming the above problems. So, in overcoming the difficulties experienced by many farmers, a solution has been provided by engineers who have made rice threshing machines so that work that previously would have taken a lot of time will finally be very efficient [5].

2. Method

Threshing is mechanically separating a solid material along certain lines by a crushing tool. The cutting tool is described as a blade with a sharp edge. Threshing causes a material to have several new shapes called pieces or flakes, smaller than the original. The threshing process begins with contact between the nail and the falling material. Next, the shedding material experiences pressure, especially around the shedding line. Irregular separation occurs when the pressure on the material exceeds the shear strength (failure strength) of the material [1-5].

The Besar II Terjun Village community, especially the Besar II Terjun Village Farmers Group, has sufficient rice management capabilities. However, it still needs to be developed further to increase the product productivity and quality. Apart from that, it also applies safety values in carrying out its activities. The methods used are socialization, design, presentation, and discussion. Initial socialization and training methods to provide insight into the rice threshing process. Design method for designing an appropriate rice threshing machine for the people of Besar II Terjun Village. Presentation method to provide insight to the public regarding the production process using tools so that the work is effective, efficient, and safe. Discussion method to discover the extent of understanding the community has mastered.

3. Results and Discussion

3.1. Socialization

Even though currently in the COVID-19 pandemic condition, the people of Besar II Terjun Village are always optimistic in facing it and always try to find a way out, especially with support from local authorities such as smooth irrigation for farmers and collaboration with universities to carry out training activities, outreach, or other activities. This activity begins with outreach to the community [6-10]. (Figure 1) is a socialization activity as an effort to increase understanding of matters related to rice processing.

3.2. Training activities

The training activity in question is to provide convenience in threshing harvested rice. The rice threshing machine was ready to be used and implemented directly during this training. This activity is carried out to comfort the community when they have harvested. So that threshing rice can be done quickly with abundant results. This training activity was done by directly practicing a previously designed rice threshing machine (Figure 2).

3.3. Rice thresher machine design

If done manually, threshing rice takes a long time, and the results are small, making it less efficient. With a rice threshing machine, this can be done quickly, and the results are also significant. This machine uses a threshing iron attached to a pulley, which will rotate when the machine is turned on. The function of this iron is to thresh the rice from the stem by hitting the rice stalk to knock the grains out. The threshing iron uses a bolt as a threshing knife. The capacity of this rice threshing machine is 300 kg/minute.

Figure 1. Socialization activities.

Figure 2. Training activities.

(a) (b) (c)

Figure 3. Rice thresher machine (a) Side view, (b) Front view, (c) Isometric.

Figure 4. Besar II Terjun Village.

Figure 5. Putting rice into the rice threshing machine.

Figure 6. Rice threshing machine process.

4. Conclusion

The community or community service partners admitted they had never received training or provided a rice threshing machine. People still use conventional techniques in separating rice by hitting the harvested rice and then dividing the rice grains from the stems. After the training and provision of the rice threshing machine, the farmer groups that had been chosen as partners experienced ease in the process of harvesting the rice and felt immensely helped by the training that had been given regarding the rice threshing machine.

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