



Increasing The Skills of Kadilajo Village Residents in The Processing of Rice Waste Into Briquette as an Efforts to Realize Economic Independent Villages

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Abstrak. Desa Kadilajo merupakan salah satu wilayah yang terletak di Kecamatan Karangnongko, Kabupaten Klaten, Provinsi Jawa Tengah. Kadilajo didominasi oleh masyarakat yang bekerja sebagai petani padi. Padi menjadi prioritas utama penunjang persawahan di Desa Kadilajo. Produksi padi setiap tahunnya memberikan angka yang tinggi dalam produksi limbah sekam padi. Selama ini limbah sekam padi hanya dimanfaatkan sebagai bahan dalam proses pengadukan tanah, dalam hal ini limbah sekam padi belum dimanfaatkan secara maksimal oleh masyarakat Desa Kadilajo. Melihat banyaknya limbah sekam padi memberikan suatu inovasi untuk diolah menjadi briket, maka briket limbah sekam padi dapat dimanfaatkan sebagai bahan bakar alternatif yang ramah lingkungan dan menjadi produk yang memiliki nilai jual dalam meningkatkan perekonomian Desa Kadilajo. Tujuan dari kegiatan ini adalah untuk melatih masyarakat Desa Kadilajo agar memiliki kemampuan dalam mengelola limbah sekam padi menjadi briket. Metode yang diterapkan berupa sosialisasi dan pelatihan pembuatan briket kepada masyarakat Desa Kadilajo. Hasil dari program KKN UNNES Giat 2 menunjukkan bahwa masyarakat Desa Kadilajo Kecamatan Karangnongko Kabupaten Klaten telah mendapatkan pengetahuan tentang pemanfaatan limbah sekam padi dalam pembuatan briket sebagai bahan bakar dan sumber pendapatan masyarakat. Dengan adanya kegiatan ini, masyarakat dapat memanfaatkan limbah sekam padi.

Abstract. Kadilajo Village is one of the areas located in Karangnongko District, Klaten Regency, Central Java Province. Kadilajo is dominated by people working as rice farmers. Rice is the main priority for supporting rice fields in Kadilajo village. Rice production every year gives a high number in the production of rice husk waste. So far, rice husk waste has only been used as an ingredient in the soil mixture process, in this case the rice husk waste has not been fully utilized by the people of Kadilajo Village. Seeing the large amount of rice husk waste providing an innovative to processing into briquettes, rice husk waste briquettes can be used as an environmentally friendly alternative fuel and become a product that has a selling value in improving the economy of Kadilajo Village. The purpose of this activity is to train the people of Kadilajo Village to have the ability to manage rice husk waste into briquettes. The method applied is in the form of socialization and training in making briquettes to the people of Kadilajo Village. The results from program the KKN UNNES Giat 2 show that the people of Kadilajo Village, Karangnongko District, Klaten Regency have gained knowledge about the use of rice husk waste in making briquettes as fuel and a source of income for the community. With this activity, the community can take advantage of rice husk waste.

Keywords: Briquettes; Community; Husk; Rice; Husk

Introduction

The increasing demand for fuel consumption is not in line with the reduced availability of fossil fuels (Paduloh et al., 2019). It is estimated that in the next 10-15 years oil reserves in Indonesia will be depleted (Maulinda et al., 2020). This needs to be balanced with the provision of abundant and cheap alternative energy sources so that they are affordable by the wider community (Irfansyah et al., 2016). Therefore, it is necessary to consider an alternative such as biomass energy.

Biomass is an environmentally friendly alternative renewable energy source with high production potential (Jahirul et al., 2012). Biomass consists of carbohydrate compounds (cellulose, hemicellulose, lignin and other small amounts of organic matter) which are deter-

mined as elements of carbon, hydrogen and oxygen and have a high energy content (Isahak et al., 2012). Biomass resources are usually in the form of wood and wood waste, industrial or agricultural residues and their waste by-products, urban waste, animal waste or special energy plants (e.g., fast growing trees, shrubs and grasses) and so on (Demiral et al., 2012). Some biomass has considerable potential, one of which is rice husk. Biomass energy from rice husks is formed into raw materials into a form for easier use.

In Kadilajo Village, located in Karangnongko District, Klaten, Central Java, Indonesia has an area of 208 hectares consisting of 136 hectares of rice fields and 72 hectares of non-rice fields. Kadilajo Village is one of the villages whose territory is dominated by rice fields. Based on these data, it can be concluded that the work of the people of Kadilajo Village is farming. This is supported by the harvested area of rice paddy reaching 328 ha and corn harvesting area reaching 30 ha. Rice is the main commodity in agricultural development in Kadilajo Village (Dinas Karangnongko, 2020). One of the two areas in Kadilajo Village is Margosono Hamlet and Potro Hamlet, the livelihoods of most of the people there are rice farmers. One of the agricultural wastes produced is rice husk.

Rice husk waste which is a residual material from the rice milling process can be processed into briquettes. During the harvest period, 20 - 30% of husks are obtained, 8 - 12% of bran, and 50-63.5% of milled rice of the initial weight of the grain (Kementerian Pertanian Republik Indonesia, 2022). Utilization of rice husk waste in Kadilajo Village, especially Hamlet Margosono and Hamlet Potro is still not fully utilized. It is proven by the waste of rice husks which are only burned and left to accumulate in the yard of the house. Unmanaged rice husk waste will be easily blown by the wind and disrupt the environment and the health of the surrounding community. This is because there is no use of rice husk waste due to low knowledge and interest in processing rice husk waste.

To prevent environmental pollution due to unmanaged rice husks, rice husks can be used as an alternative fuel to replace kerosene, gas, or wood charcoal and also be processed into environmentally friendly organic fertilizers. Rice husk has been proven to be used as a source of heat energy because of its high cellulose content. Processing of rice husk waste can be used as fuel for briquettes. Making briquettes itself is an effort to utilize rice husks where briquette processing can be done with a simple process and relatively inexpensive in terms of cost. Briquettes from rice husks have advantages such as less smoke and more durable.

Based on interviews as well as observations made by the KKN UNNES Giat 2, the people of Kadilajo Village have not been able to maximize the use of rice husk waste from milling results. The amount of husk produced by farmers is quite large. Referring to the suboptimal use of rice husks by the community in Kadilajo Village, it is necessary to have activities that are expected to have a positive impact on the environment, health and economy of the people there. Utilization of husk charcoal can provide additional income that can support the economy of the community in Kadilajo Village. The husk charcoal can be further processed by adding adhesive and molding it into charcoal briquettes. These charcoal briquettes can be sold and used for cooking, lighting, and industrial needs.

In the context of the utilization of rice husks, socialization activities for the use and manufacture of briquettes from rice husks were carried out to the people of Kadilajo Village. Briquettes from rice husks can be used as a substitute for wood charcoal so that they can be used in home industry activities. Briquettes from rice husks are energy from biomass that is processed from rice plant waste, so they are often found in villages where the majority of the population is farmers. Briquettes from rice husks have a high calorific value so that they can burn for a long time. Rice husk briquettes have several advantages compared to ordinary wood charcoal, including: (1) The heat generated by charcoal briquettes is relatively higher than that of wood fuel. (2) Charcoal briquettes when burned do not cause smoke or odor. (3) After the charcoal briquettes are burned (become embers) there is no need to fan. (4) The

method of making charcoal briquettes is simple and does not require any chemicals. (5) The equipment used in the manufacture of charcoal briquettes is quite simple.

The purpose of the activities in the community is to help farmers to utilize rice husk waste into briquettes. This can encourage the community to prevent environmental pollution due to husks that are not managed properly. This is evidenced by the rice husk which can be used as a source of heat energy because it has a fairly high cellulose content.

Therefore, the development of briquettes is an alternative in the utilization of rice husk waste. The use of briquettes is an alternative solution to conserve the use of fossil fuels in a sustainable manner so as to reduce the impact of carbon emissions. With this, it is hoped that it can improve the economy of rural communities towards independent economic villages. In addition to improving the economy of rural communities, the socialization of making briquettes also aims to obtain quality fuel that can be used for all sectors as a substitute energy source

Methods

The place for the implementation of the KKN UNNES Giat 2 in Kadilajo Village is located at the House of the Head of Kadilajo Village Rw 08 Kadilajo Village, Karangnongko District, Klaten Regency, Central Java, Indonesia. The targets of this program are PKK member and the people of Rw 08. The event for the community by the KKN UNNES Giat 2 in Kadilajo Village accompanied by the head of the Rw 08 and the Kadilajo Village Head was carried out by taking to the village community field.

The tools used in the manufacture of rice husk waste briquettes are wood and iron stirrer, press, 60 mesh filter, grinder, used cans, basins, measuring spoons, scales, stoves, measuring cups, pans. The materials used in this activity are rice husk, starch as adhesive and water.

While the method of implementing this activity consists of 3, namely as follows:

(a) Socialization

The implementation of this activity was carried out as a form of socialization to PKK member and the people of Rw 08 Kadilajo Village, considering that most of the people here work as rice farmers who annually produce rice and of course rice husk waste. The socialization was carried out face-to-face by interacting directly with PKK member and the people of Rw 08 Kadilajo Village while still adhering to the health protocol rules. This socialization is also to provide an understanding of the use of rice husk waste as an alternative fuel. This activity is also equipped with a "question and answer session" which is intended for people who want to know more about this program, so this session is held at the end of the presentation of the material. According to Asfar, in 2019, this extension method is known as the Community Participation method, which means involving community groups in this program, namely PKK member and the people of Rw 08 by absorbing the skills given by doing (Asfar et al., 2019)

(b) Demonstration and Practice

Demonstrations and practices are carried out directly, which means that together with the KKN UNNES Giat 2 provide training by first providing a guide brochure for making rice husk waste briquettes but still under the guidance of the implementing team. After the demonstration was carried out, it was continued with practice with PKK member and the people of Rw 08 in making briquettes from rice husk waste which was carried out in several stages, namely the use of training results through exposure to work programs by the KKN UNNES Giat 2 at Kadilajo Village to PKK member and the people of Rw 08 who were seen as mentoring face to face. carried out until the community succeeded in making rice husk waste briquettes so that it became a good product.

(c) Evaluation

This stage is carried out after the implementation of the stages of socialization, demonstration and practice. This stage is the final stage as the point of success or failure of the implementation of this program. Evaluation is done offline. In this evaluation apply the interview method. Interviews conducted at the evaluation stage were intended to determine the participants' abilities in making and utilizing rice husk waste into briquettes. This evaluation stage serves to provide solutions in solving problems faced by the community in the process of making rice husk waste briquettes. This activity has an indicator of success which lies in the emergence of solutions to these community problems and becomes the basis for future benchmarks so that this program continues and develops to create independent economic flows for the residents of Kadilajo Village.

Result and Discussion

Surveys and interviews with the community in Kadilajo Village, Karangnongko District, Klaten Regency were carried out at the beginning of the activity. Based on the results of surveys and interviews, it was concluded that the community still did not have the knowledge in processing rice husk waste. In addition, the community only uses rice husks to be burned. Rice husk waste is commonly found in Kadilajo Village, where rice husks are most often thrown away and some are simply burned. The socialization of the use of rice husks began with socialization between RT, joint discussions, then the practice of making briquettes from rice husks.

Socialization

Direct socialization activities were carried out in Rw 08 which were divided into several sessions based on the number of RTs in the area. On August 5, 2022 at RT 22, August 7 2022 at RT 20, August 15 2022 at RT 21 Rw 08. Then it will be done together on Monday, September 5, 2022, from 13.00 to 16.40 WIB by inviting the Village Head and Village Apparatus Kadilajo. This work program activity was attended by 20 PKK member and the people of Rw 08 as well as village officials while still complying with health protocols (always wearing masks and carrying hand sanitizers).

The socialization activity explained in more detail the purpose of the training, what briquettes are, the characteristics of briquettes, the benefits of briquettes, the use of briquettes, how to make rice husk waste briquettes, how to make starch glue, the composition of the ingredients for making briquettes, printing methods, and packaging. In order to be easily understood by the public, the implementation of the material regarding rice husk waste processing is carried out in a simple manner where in the socialization counseling using a tool in the form of a poster containing the processing of briquettes from rice husk. In the socialization, discussions are always held on how to use rice husk waste and packaging briquettes so that it can strengthen community service activities.

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Figure 1. Attendance Sheet



Figure 2. Presentation of material by the KKN UNNES Giat 2

Demonstration and Practice Stage

Furthermore, demonstrations and practices were held on how to make briquettes with a guide brochure as a reference. In making briquettes, assistance is carried out by the KKN UNNES Giat 2 and directs and coordinates in helping make briquettes with the community. The activity is divided into several stages, including:

(1) Rice husk drying

Rice husk is the raw material for making briquettes where rice husk can be found in rice mills. The rice husks are first collected and dried for several hours so that the rice husks become dry and easy to burn.

(2) Rice husk charcoal making

The manufacture of husk charcoal begins with dry rice husks which are then put into used cans as much as 10% of the volume of the cans. Burning is carried out on medium heat until the husk turns dark black in order to make the texture easy to grind.

(3) Rice husk charcoal making

Rice husks that have turned into charcoal are crushed using a grinder so that they have a smoother texture and are easy to filter. After being mashed, the rice husk charcoal can be filtered. filtering aims to equalize the size of the charcoal powder. Filtering uses a sieve size of 60 mesh to obtain fine rice husks.

(4) Adhesive manufacture

Making adhesive is done by mixing starch with water in a ratio of 2 : 7,5. In the process of mixing while heated over medium heat for about 5 minutes until it turns thick and transparent.

(5) Adhesive and raw material mixing

The adhesive is then mixed with rice husk charcoal that has been filtered with a ratio of rice husk charcoal and starch which is 5 : 2. Then the rice husk charcoal and starch glue are stirred until the dough is evenly distributed and easy to shape.

(6) Rice Husk Briquette Printing

Rice husk charcoal that has been mixed with adhesive glue until it is perfectly mixed is molded using an iron pipe mold and compacted so that when the briquettes are removed from the pipe they do not break and get perfect briquettes. Briquettes are printed with a uniform weight of 30 gr. The molded briquettes are left for a few minutes and then removed from the iron pipe mold.

(7) Drying of rice husk briquettes

The briquettes that have been removed from the mold will then be dried in the sun for 3 days to get perfectly dry briquettes. The dried briquettes are ready to be packaged and used.

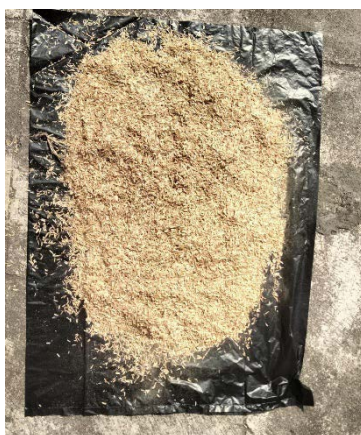


Figure 3. Drying of Rice Husk



Figure 4. Rice husk charcoal



Figure 8. Rice husk briquette printing



Figure 5. Rice husk charcoal refining and filtering

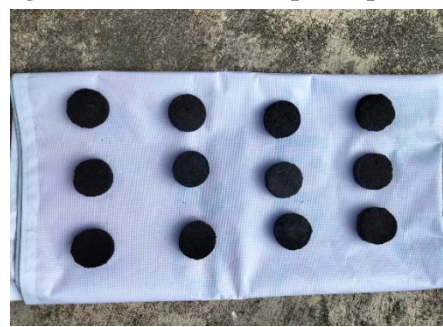


Figure 9. Drying rice husk briquettes



Figure 6. Making adhesive



Figure 10. Testing of briquette burn



Figure 7. Mixing adhesive and raw materials



Figure 11. Rice husk briquette products

Activity Evaluation Stage

At the activity evaluation stage, the dry briquettes were reviewed by the KKN UNNES Giat 2. The results of the briquettes were obtained that met the requirements. Nursyiwani et al., 2021 stated that a good briquette requirement is that the briquette has a smooth surface texture and when held does not leave black marks. Furthermore, on this occasion, the KKN UNNES Giat 2, together with PKK member and the community, conducted a rice husk briquette burn test. It was found that briquettes are flammable, burning lasts a long time and produce high heat.

Overall the activity went well and smoothly. From the beginning to the end of the activity where all participants attended according to a predetermined schedule. The training activities for making rice husk waste briquettes received a positive response where the participants actively participated in socialization such as asking questions about briquettes and actively participating in the practice of making briquettes. The success of the implementation of this program, namely the KKN UNNES Giat 2, was able to educate the people of Kadilajo Village, especially PKK member in utilizing rice husk waste into environmentally friendly charcoal briquette fuel.



Figure 12. Documentation of rice husk briquette socialization and training activities with PKK member and the people of RW 08

Conclusion

The implementation of the work program of the Unnes KKN Giat 2 processing briquettes from rice husk or husk waste has been carried out well. Members of the PKK and the people of Rw 08 Kadilajo Village actively participated in the process of making, composing, mixing, uniting materials, printing briquettes and drying, packaging and labeling briquettes. With the training from this work program, members of Ms. PKK and the the people of Rw 08 Kadilajo Village are able to carry out activities that utilize rice husk waste into processed briquettes that have financial capabilities, add insight and useful knowledge in processing and making briquettes from rice husk waste and become one of the an activity that is able to support the economy of the people of Kadilajo Village towards a village with an independent economy.

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