Nutritional Balance Education for Parents, Supported Innovation of Corn Briquette Products for Family Economic Added Value

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Abstract. Stunting can occur as early as 1000 days after conception and is related to many factors, including socio-economic, nutritional intake of pregnant women and infants, infection, nutritional status of the mother, infectious diseases, micronutrient deficiencies and the environment. Stunting is a nutritional problem in children globally. Data from Dadapayu District shows that the stunting rate is quite high, due to limited housewives causing children's health conditions to experience growth and development disorders. With technological devices to determine stunting in children, attention towards children’s nutrition’s needs to be socialized to the community through the understanding of PKK mothers and other residents. With the fulfillment of children's nutritional needs, it is necessary to increase the family economy. Every year, the village of Dadapayu experiences an abundant corn harvest, so corn cobs are only used as fuel for residents who have livestock, which is to repel livestock mosquitoes. With this information, a product innovation from corn cobs needs to be created. The need for energy is increasing and so is the level of demand for fuel oil, which triggers a scarcity of energy sources. It is necessary to look for alternative energy sources to replace the dwindling amount of fuel oil. This effort has been able to develop innovation and provide insight and training to the community to utilize abundant natural resources, namely corn cobs into charcoal briquettes.

Keywords: corn cob, socio-economic, value added

1 Introduction

Dadapayu Village is located in the southern part of the city of Wonosari Gunungkidul, this village is bordered by Gombang Village, Pucanganom Village, Kilat Village and Candirejo Village which are in the Semanu sub-district of Gunungkidul Yogyakarta. With a wide variety of natural resource potentials, it is necessary to consider the developing potentials to advance local regional results for the benefit of the community.

Stunting is defined as a height-for-age index (TB/U) less than minus two standard deviations (-2SD) or below the existing standard average (AAC/SCN, 2000). This shows that normal height for age ranges from -2SD to +2SD on the WHO growth curve [1]–[4]. Stunting
describes the status of chronic malnutrition during the period of growth and development of children from the beginning of life which is the result of a complex interaction of various factors [5]–[7], namely between household, environmental, socio-economic and cultural influences. This also occurs in rural areas. Dadapayu Semanu Gunungkidul.

The target of the second activity is corn cobs, corn is the main agricultural than the yield of rice as a staple food. After harvesting corn, there will be some waste or residue left. The waste is in the form of stems, leaves, hair, and corn cobs. Corn stalks, leaves and hair are usually used as animal feed, but corn cobs are only thrown away or burned on the spot causing environmental pollution as shown in Figure 2. The commodity of the people of Sumberejo village, even the yield of corn is greater.

Fig. 1. Database of Stunting Dadapayu Village

The first problem in Dadapayu Village is about nutrition, especially stunting in toddlers which is quite a lot, because it has a negative impact that will take place in the next life. The short-term impact of stunting can cause death, illness and disability in children. Meanwhile, long-term effects can cause growth disorders in adulthood, development of cognitive abilities, economic productivity, reproductive performance, metabolic and cardiovascular diseases. From the data in Figure 1, it can be seen that the stunting rate is quite high.

Fig. 2. Corn waste

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The aim of the first edition of community service is to produce trained cadres to conduct health education and non-formal field practices as well as provide insight to mothers in the
Dadapayu sub-district to prevent stunting which poses a risk to children's growth and the health development of toddlers or children. Corn is the main secondary food commodity in Indonesia in terms of the use of its products, namely as a raw material for food and feed, especially in Dadapayu Semanu Village, Gunungkidul. In terms of demand for corn which continues to increase, of course, it is accompanied by the waste generated due to the use of corn, corn cobs are no exception. Corn cobs are leftovers from the processing of the corn agricultural industry, whose numbers will continue to increase in line with increased production capacity. The content of corn cobs can be calculated using the Residue to Product Ratio (RPR) value of corn cobs of 0.273 (at a moisture content of 7.53%) and a calorific value of 4451 kcal/kg. Based on the content of corn cobs, corn cobs which so far have only been used as raw material for traditional grills, it turns out that animal feed can be used as a medium for growing mushrooms [8], [9]. Utilization of plant waste is an alternative to keeping the environment clean from pollution as well as for creativity and increasing the community's economic resources. There needs to be an effort to optimize the utilization of agricultural waste so that it can increase the creativity of the village community with results that can be used personally or marketed. With the abundant natural resources and favorable environmental conditions, charcoal briquettes made from corn husks is a business opportunity that has good prospects for development in Dadapayu village. The quality products have promising development prospects because prices can compete according to developments. Optimizing the use of corn cobs is a strategic step in the utilization of agricultural waste in improving the welfare of the people of Dadapayu village.

Briquettes are fuel made from solid organic matter or biomass which is made by compressing unformed biomass raw materials into high density solid fuel by drying, cutting, co-writing and forming through pressing (Smith et al., 1997). The advantages of using briquettes are that they produce less smoke, provide high heat, and have a longer lasting fire than ordinary charcoal [8]–[11]. Briquettes from corn cobs have a fairly high heat capacity when compared to coconut coir; and based on the research conducted by Hamidi et al (2011) it is concluded that blotong briquettes added with 15% corn cobs can increase the heat capacity value from 2,074 cal/g to 2,726 cal./g. Then, from briquette research it was confirmed that the heat capacity produced by briquettes from corn cobs was 9,454 cal/g (Masturi et al., 2017). In general, the use of biomass energy has advantages, namely energy efficiency and low air pollutant emissions [12], [13]. The process of converting renewable energy from biomass to briquettes is the main thing to be developed in Indonesia because it has the advantages of being simple and low cost, a source of clean energy for household cooking applications, especially in rural areas which have abundant sources of biomass. Furthermore, the technological process of making efficient briquettes has already been known. However, the development of biomass renewable energy in the form of briquettes in Indonesia is still slow. In addition, over the last few decades, the price of petroleum has fluctuated according to global market demand. As a result, the industrial and household sectors which are highly dependent on fossil fuels are the sectors most affected.

2 Methodology

The first activity used the method of measuring body weight and height to determine the nutritional status of toddlers, while the second activity used the direct practice method using natural ingredients, namely janggel jangung found in the local residents' environment. The form of the method is depicted in Figure 3.
The method of implementing Community Service was based on establishing a community empowerment model in Dadapayu Semanu Gunungkidul Village, namely PKK women and mothers of toddlers. While the second implementation method was to apply the method of making corn cob briquettes with simple tool technology. PKK women and farmer groups communicate with each other to make charcoal briquettes made from corn janggel which is made into charcoal first, then the janggel charcoal is crushed which is then mixed with starch with a certain dosage and then printed as desired.

The solution taken in community service activities was to provide education about nutrition to PKK women and parents of toddlers. The purpose of this service activity was to increase the knowledge of parents of toddlers about nutrition that must be consumed by toddlers who experienced stunting and other mothers of toddlers, so that the life and changes in good nutritional behavior can improve children's health and nutritional status. The benefit of this activity was that parents, especially pregnant women and mothers of toddlers, know the importance of adequate nutritional intake for toddlers to prevent nutritional problems in toddlers and improve the health and nutritional status of toddlers.

3 Results and Discussion

3.1 First problem solution

The solution to the first problem proposed was to provide training to PKK cadres and farmer groups in Dadapayu Village, Semanu, Gunungkidul, Yogyakarta on the characteristics of stunting and toddler nutritional intake. The stakeholders had carried out health and nutrition intervention programs which were implemented directly by related parties with the aim of tackling stunting by providing insight from an early age, including by providing equipment to support toddlers who had been stunted. In addition, the government has also launched programs in other sectors to address indirect causes of stunting, such as poor nutrition, lack of access to quality health services, diet, these conditions lead to the need for appropriate interventions by providing knowledge and skills. Regarding balanced nutrition for families, PKK women and women from the Dadapayu village community must be involved in managing family food intake. Young mothers who incidentally had high activity and curiosity were expected to be the potential targets in developing a community model that would be able to become a companion and strengthen the understanding and behavior of balanced nutrition, including 1000 HPK nutrition in pregnant and lactating women to prevent stunting. The activities were carried out offline and leaflets and brochures were produced to be distributed to the community as a target to be used as continuous learning media for all family members. The activity of understanding the dangers of stunting at Posyandu is shown in Figure 4.
Figure. 4. Activities to understand the dangers of stunting at Posyandu

This activity was carried out in conjunction with the Posyandu, where the counselling and weighing of children's weight and height were also held at the same time. Based on the data before the counselling was carried out, it was shown from the survey that the mothers who had children of toddlers with a level of understanding in the category of not understanding was 52%, understanding 6% and very understanding 42% as shown in Fig. 5. From the results of the data, it can be seen that there were still families who did not understand stunting, so intensive assistance was needed to reduce the illiteracy about stunting.

Figure. 5. Data on the Understanding Level of Participants before the activity

After conducting counselling about the meaning of stunting, many enthusiastic mothers who were aware of the nutrition being given to their children felt deficient. For this reason, this activity was felt to be very successful in evoking the insights of PKK women and women of Dadapayu residents who had toddlers, as evidenced by an increase in the level of understanding of stunting, 22% did not understand, 39% understood, and really understood 39% of the data shown in Figure 6.
3.2 Solution to the second problem

The solution to the second problem was to provide innovation to PKK cadres and farmer groups so that they always synergize with agricultural products, the result of which is corn. Corn crops in Dadapayu Village are very abundant so that the community has been quite prosperous with corn yields, but the community has not performed corncob waste processing innovations. This activity offers innovative corncob products in the form of briquette charcoal using the block press method, with this method the briquettes would become dense and not break easily. The result was that dense and hard charcoal briquettes could be used as a daily substitute for gas and was able to reduce the family's expenditure burden, besides that, it could provide a plus value to improve the economy by selling to the market. With a combination of corncob charcoal and wood charcoal, the results would be of higher quality. The results of briquette charcoal innovation are shown in Figure 7.

The second problem solving was done by providing training in making briquettes made from corn cobs. The procedure for making janggel was that it was initially made from charcoal, then pounded into flour, then mixed with starch which had been cooked beforehand. After being evenly distributed according to the desired mixture, then put into the mould that
had been provided. The data on residents in making briquettes were 3% unsuccessful, 88% successful and 9% residents who had used them with the characteristics shown in Figure 8.

**Fig. 8. Data on the success of residents in making briquettes**

### 4 Conclusions

This community service activity was successfully carried out with several implementations at the location and with the residents of Dadapayu. The PKK women and women who have children of toddlers were very supportive because they acquired insight along with training on processed menus that were beneficial for children. The activities of the two PKK women and the farmer group were very enthusiastic, because every house had raw materials for making corncob briquette charcoal. After the training and assistance the residents began to develop the results of the training that had been given, this showed that this service was successful.

### References


