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Application of Environmentally Friendly Technology To Dairy Farming In South Tomohon Subdistrict, North Sulawesi, Indonesia

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Abstract: *The dairy farms in Tomohon generally not implement good agricultural practice in the handling of manure (dung), because the sewage system is not constructed. The impact of not well-organized sewerage of cow dung is the surge of manure surplus, so that farmers will extra pay for the waste stream to another place. In addition, cow manure (dung) emit methane gas that otherwise mitigated, giving the effect of greenhouse gases (GHG) which is one of the causes of global warming.*

The environmentally friendly technology to dairy farmers program was conducted in Pinaras, sub district of South Tomohon. Problems in dairy farming are the location and construction of the cage is quite good, but the construction of livestock sewage in the form of dung and urine were less good. Though the wastes can be converted into biogas. In addition, farmers face the problem of the availability of forage fodder, other than those produced by the farmers themselves also buy from nearby farmers, but the production of forage grass the surrounding farmers is also very low because the quality of the forage that is grown not using superior forage type. Grass forage cropping pattern is also not used for good fertilizer, so very low forage crop productivity. The potential for using organic fertilizer is available because it is not processed and is not used by farmers. This program introduce superior forage elephant grass cultivar Dwarf (Pennisetum purpureum cv. Mott). Well-organized sewage through biogas digester building, enclosure environment becomes cleaner, odor and flies are reduced, and the availability of biogas substitute firewood and fuel.

This program results can be concluded: (1) With this program as a pilot biogas digester, expected around farmer community can participate and use the biogas and organic fertilizer produced; (2) The occurrence of dispersal superior forage plant seed type of Pennisetum purpureum cv Mott to the target groups of farmers and ranchers around it, so that there will be an increase in forage production to meet the forage fodder needs of farmers will for dairy cattle or other ruminant livestock belonging to the farmers; and (3) to tackle the environmental impact of cattle farm that used to substitute the use of conventional fuel for cooking, and substitute the conventional chemical fertilizers for forage crops so to create a clean and healthy environment..

Keywords: *Dairy farming, forage crops, good agricultural practice*

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I INTRODUCTION

Cattle farms in Tomohon City generally have not implemented good practice in handling cow manure, due to poor sewerage. The impact of the uncontrolled cow dung waste disposal system is the surge of manure surplus, so that farmers will incur extra costs to transport the waste elsewhere (IAEA, 2008). In addition, cattle dung release methane gas that if not mitigated, giving effect greenhouse gases (GHG) which is one of the causes of global warming. Therefore, Osak et al (2016) suggested that dairy cattle farming practices need to be managed and applied technology based on organic and environmentally-friendly farming systems, such as dairy cattle farming that can reduce the effects of environmental degradation and ensure technological, ecological and economic sustainability. Integrated crop-livestock systems, implying a diverse range of integrated ecological, biophysical, socio economic conditions, have been a foundation of agriculture for hundreds of years (FAO, 2010).

Farmers generally only cultivate forage crops in the lands, fields and on the edge of the irrigation canal. Cultivation of forage grasses of fodder will be more effective with livestock integration systems with plants. Integration system of cattle and plantation is often considered as a step forward in farming practices that are environmentally friendly and sustainable, and Osak et al (2015) explained that an alternative approach to diversify sustainable agricultural production is to integrate cash grain cropping with ruminant livestock production.

The problem of low quantity and quality of dairy cattle feed in Indonesia continues from year to year, according to Kusnadi and Juarini (2007) the cause is the income of dairy farmers who are still relatively low so can not afford to buy high-quality feed. The limited sources of forage feed for dairy cattle can also lead to reduced farmers' ability to strive on a more efficient economic scale. Prawiradiputra and Priyanti (2008) state that in almost all dairy cattle production areas there is no system that ensures effective supply procurement of fodder available throughout the year.

Based on the problems faced by dairy farmers that need to be addressed is the arrangement of sewerage channels dung cattle dung to reduce the direct impact on the surrounding community. Forages grass planting pattern also has not used a good fertilizer so that the productivity of forage was very low. Whereas the potential of fertilizer using manure is quite available, because it is not processed and used by dairy farmers. Cow dung's solid waste can be composted, so domestic waste at the household level can be recycled on an ongoing basis (Cheng dan Dilger, 2009).

II METHOD OF IMPLEMENTATION

The procedures and steps of IbM's program are as follows:

1) Preparation of the construction of sewage feces of dairy cattle, and manufacturing biogas digester installations by fixed-dome digester construction on the side of the dairy cowshed.
2) Counseling, training and mentoring of the manufacture and utilization of bioslurry into compost fertilizer.
3) Counseling, training and facilitation of superior forage cultivation is elephant grass cultivar Dwarf (Pennisetum purpureum cv mott) by using compost fertilizer intercropping in coconut plantation field.

III RESULTS AND DISCUSSION

Community service activities of IbM program was conducted in Tomohon, Province of North Sulawesi, Indonesia. Activities that have been implemented are preparation, socialization, counseling and training, construction of biogas digester and biogas utilization trial, and tillage and cultivation of forage grass.

The results of this activity are:

1) Implementation of extension and training of biogas reactor utilization of fixed dome reactor type to dairy farmer. Biogas obtained from the fermentation of dairy cattle manure waste in digester has been used as a fuel for biogas stove. Biogas is very potential as a fuel because of its high methane content.
2) The implementation of counseling and training on the utilization of bioslurry waste as organic fertilizer in forage crops. Mud bioslurry from biogas installation, processed and used as organic fertilizer. Bioslurry contains macro and micro organics that are needed by plants. Bioslurry is an organic fertilizer that is very rich in the elements needed by plants. In fact, certain elements such as proteins, cellulose, lignin, and others are not replaced by chemical fertilizers.

   Organic fertilizer has been processed from bioslurry by separated between solids and liquids from biogas installation outlets. The bioslurry solid was then dried and / or aerated to dry to obtain solid fertilizer. Through this IbM program, the utilization of bioslurry solids as organic fertilizer has been done by farmers in forage crops to normalize soil fertility organic and without chemical fertilizers, so environmentally friendly.
3) Implementation of socialization, counseling, training and planting of forage crops of superior species of Pennisetum purpureum cv Mott.

Through this IbM program, introduction and cultivation of elephant grass cultivar dwarf (Pennisetum purpureum cv Mott) has been planted in the coconut plantation land of 0.25 ha. The land is completely processed and then given organic fertilizer dry bioslurry solids and then planted with grass Pennisetum purpureum cv. Mott with a spacing of 100x50 cm.

The results showed that the production of fresh forage Pennisetum purpureum cv. Mott on devolation I (75 days after planting) of 3.37 kg per grass clump. Assuming a plant spacing of 100 x 50 cm or 20,000 plant populations per ha less than 20% is ineffective to only 16,000 plant populations, the yield potential for the first harvest is 75,040 kg per harvest.

With a distance of 45 days defoliates then in a year there are 8.3 times the harvest so that the fresh feed of 600.320 kg per ha per year. If the amount of consumption per cow per day is 40 kg fresh then carrying capasity Pennisetum purpureum cv. Mott per ha of land under the coconut as much as 41.11 AU (Animal Unit).

IV CONCLUSION

With this program as a pilot biogas digester, expected around farmer community can participate and use the biogas and organic fertilizer produced. The occurrence of dispersal superior forage plant seed type of Pennisetum purpureum cv Mott to the target groups of farmers and ranchers around it, so that there will be an increase in forage production to meet the forage fodder needs of farmers will for dairy cattle or other ruminant

livestock belonging to the farmers, and to tackle the environmental impact of cattle farm that used to substitute the use of conventional fuel for cooking, and substitute the conventional chemical fertilizers for forage crops so to create a clean and healthy environment.

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