Cattle Cow Dung Use As An Alternative Energy Source And Organic Fertilizer Friendly Enviroment Village Kasang Districts Batang Anai Padang Pariaman

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Abstract. The increasing number of farmers will have a negative impact on the increase of waste generated. Waste from the farm can be either solid, gas and liquid waste. Livestock waste can be processed to produce biogas as an alternative energy substitute for oil stove and organic fertilizers. The research objective is: a) know how the biogas production process in Kanagarian Kasang District of Batang Anai, Padang Pariaman, b) know how to slug biogas applications in rice plants. The usefulness of this research would be useful to increase incomes of farmers, especially in Kanagarian Kasang District of Batang Anai, Padang Pariaman district on the field of alternative energy, and the use of organic fertilizers and can support government programs to support the development of the field of energy and sustainable agricultural development. The research concludes that: a) The process of making digester system balloon is most appropriate at household level because they are cheap and the manufacturing process is that starting with the manufacturing process digester system balloon, when the digester is ready, followed by installation of biogas and biogas stove using secondhand goods. b) sewage sludge biogas very well be used as organic fertilizer because it can be directly available for the plants and very good impact on the environment.

Keywords: manure, biogas, organic fertilizer, sludge, rice

1.INTRODUCTION

Nagari Nagari Kasang is one of three (3) districts that are in the District of Batang Anai, Padang Pariaman District of West Sumatra Province with a population of 12 721 inhabitants with 2,943 households. This is a potential Nagari village with natural resources and biodiversity are large enough, adequate, and promising sectors including agriculture, livestock, forestry, water resources, and estates as well as other types of resources. Various efforts are developed and has great potential to support life bringing in per capita income in the community with the expertise and skills capital and supported his experience and knowledge in their respective fields (1). Demand for fuel oil (BBM) in the province of West Sumatera, especially in Kanagarian Kasang from year to year has increased along with population growth, led to the need for energy, particularly fuel is increasing. In anticipation of this the government has taken a policy of replacing fuel oil with gas. Problems occur sometimes people are still hard to get gas, and although there is gas, there is public anxiety worry exploded and others.

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To anticipate expensive fuel, gas is hard to come by, and sometimes expensive, if we can not live without the use of fuel oil. It was not so. energy source alternatives would have been found as a substitute for fuel, one of which is Biogas. Biogas technology is not something new. Various countries have applied this technology since many years ago as farmers in the United Kingdom, Russia and the United States. Meanwhile in the continent of Asia, India is the pioneer and biogas users since 1900 when she was colonized by the British. The country has a special institution that examines the utilization of manure waste, called Agricultural Research institute and source Gas Research Station, in 1980 the Institute has been able to build as many as 36,000 units of biogas installations. In addition to the above-mentioned countries, Taiwan, China, Korea also have made use of manure as a raw material for biogas. If we continue to rely on fuel oil (BBM) and Gas as a primary energy without looking for other alternatives would then live load will be heavier, especially small rural communities when alternatives to easy to create biogas from manure. It is time for the government to allocate a portion of the fuel subsidy reduction for developing biogas from livestock manure to all rural areas. It is time we also think and try to develop creativity to develop energy alternatives would of livestock manure, as are many scientific studies successfully. The activities we have to do now is to apply the results of these studies for the benefit of society. This effort should be supported by changing the mindsets of the people to accept the presence of new technologies (2) Potential manufacture of biogas as an alternative energy in Kanagarian Kasang quite nice. This is because the average farmer rice cultivators have 2 cows. Increased farming activities will certainly have a positive impact and negative. The positive impact of increased farmer incomes, expansion employment opportunities, and increase food availability. However, if not managed properly will have disastrous environmental problems, namely in the form of solid waste, air and liquid, such as feces, urine, food waste, and air. According to the UN Food and Agriculture

Organization (FAO) in 2006 the farm is a major contributor to greenhouse gases. It is estimated that greenhouse gas emissions equivalent to 7,516 million metric tons of equivalent CO2 (CO2e) per year, or 18% of greenhouse gas emissions each year are caused by livestock, cattle, sheep, goats, camels, horses, pigs, and poultry , This amount exceeds the combined emissions from all transport in the world such as motorcycles, cars, trucks, planes, and others which accounted for 13 percent of greenhouse gases or power plants throughout the world who contribute 11 percent of greenhouse gases (1). The rising prices of oil and gas news for household increasingly disturbing the public. Besides expensive, fuel is also increasingly rare in the market. Efforts to overcome these encouraging thinking will need to search alternative energy sources that fuel needs can be met without damaging the environment. As a result of rising fuel prices, people's lives both in villages and cities increasingly difficult. Residents are vying for alternative energy sources, there is the use of solar energy, water energy, and wind energy. But so far they have not found a source of energy that can actually replace fossil fuels. But, there are actually a source of alternative energy that is relatively simple and very suitable for rural communities, namely energy biogas (3), (4]. The use of farm waste (livestock manure) is very appropriate to address the rising prices of fertilizer and fuel shortages oil [5]. Moreover, the use of manure as a fuel source in the form of biogas. the use of manure as an energy source, does not reduce the amount of organic fertilizer derived from livestock manure [6]. this is because in making biogas manure that has been processed restored to the state it was taken only of methane (CH_4), which is used as fuel. Basically the use of biogas has the dual advantage (7), namely methane gas that can serve as fuel, while liquid waste and solid waste can be used as organic fertilizer. Some of the advantages of biogas, among others: a) Realizing the farm is clean and reduce environmental pollution Reduce Greenhouse Gas emissions (GHG), b) Saves public expenditure, by making use of biogas as a fuel substitute kerosene, firewood, to cook and as power generation, c) Increasing farmers' income farmers with quality organic fertilizer produced so that the dependence of farmers on chemical fertilizers can be reduced, d) Encouraging the growth of domestic industry in the countryside with the support of alternative fuel. The purpose of this study are: a) to know how the biogas production process in Kanagarian Kasang District of Batang Anai, Padang Pariaman, b) know how to slug biogas applications in rice plants. The usefulness of this research would be useful to increase incomes of farmers, especially in Kanagarian Kasang Districts of Batang Anai, Padang Pariaman district on the field of alternative energy, and the use of organic fertilizers and can support government programs to support the development of the field of energy and sustainable agricultural development.

2.Raw and Methods

2.1. Time and place :

The study lasted from July to August 2016. These activities include the design and construction of biogas systems bioreactor balloon until the application of biogas utilization for alternative energy and biogas slug applications for rice. Location as a research site is in the hamlet of Korong Tanjung Kanagarian Kasang Districts of Batang Anai, Padang Pariaman District of West Sumatra Province with an area of approximately with an area of 37.76 km2. Geographically located in the 0011'5 Nagari Kasang - 30 30 'South latitude and 98036-100040' east longitude. The distance from the central province of ± 25 km, and 65 km from the center of Padang Pariaman and the distance from the District of Batang Anai ± 7 km. Nagari Kasang is an area of plains and hills with a slope that varies. In areas kasang with the flatness of about 5%, sometimes there are hills with a slope of ± 30% with a height above sea level (average) 7-1000 mdpl

2.2. Materials research

Tools and materials research include: Plastic PE (poly ethylene) ukuran7 x 1 m thickness of 0.2 mm, Blower size of 2 inches 1 piece, Clamp 8 pieces, Slang ¾ inches to 2 meters, 2.5-inch plastic pipe Knei 1 piece, Tee 2.5-inch pipe 2 pieces, 1 piece Insulation tire lacquer, Kran 2 ¾-inch pieces, clamp rubber for waterproofing 2 pieces, glue pvc 2 pieces, threaded socket inside and outside the four ¾-inch pieces, stirrer digerter 1 fruit, rubber strap of used tires in the motorcycle 3 pieces, Slang ¾ inch to 1 meter, gas stove designed cans of paint and use of materials from the former one piece cast in cement, grobak 1 piece, plastic bucket contents of 10 liters of 2 pieces.

2.3.Raw research

The materials used in this study is cow manure amounted to about 15 liters and 15 liters of water

2.4. The research method

Implementation of the research activities are designing a biogas installation for the use of cow manure waste into alternative energy as a raw material for making biogas from anaerobic using balloon systems and applications on a gas stove. In addition, from the biogas production process will produce residual slug of manure form which can be directly used as organic fertilizer in rice plants. The economic potential of biogas is very large, it is given that 1 m3 of biogas can be the equivalent of 0.62 liters of kerosene (1). In addition, organic fertilizer produced from biogas production process certainly has economic value that is not small.

2.5. Biogas Production Process

After workmanship digester system along a 6 meter balloon with a diameter of 1.2 meters is completed then start the process of making biogas with the following steps (1):

1. Cow dung mixed with water to form a slurry with a ratio of 1: 1 on a container vessel while. Stirring is carried out to form a slurry of cow dung. Forms will facilitate entry into the sludge digester.
2. Mud from the mixing tub while then flowed into the digester through a hole in revenue. At first charging the digester to be filled to the brim. In this initial charge required slurry manure in large numbers until the full digester.
3. Where required the addition of a starter as much as 1 liter and fresh rumen contents from abattoirs (slaughterhouses) as much as 5 sacks for digester capacity from 3.5 to 5.0 m2.

4. On day 1 until the 8th of gas produced discarded because of gases is CO2 gas. While on day 10 to day 14 the new methane (CH4) formed began to increase gas being CO2 begins to decrease.
5. On day 14 of gases began to be used to light a gas stove or other needs. On the composition of CH4 (54%) and CO2 (27%), the biogas will light. Biogas does not smell like the smell of cow dung. Furthermore, the sludge digester kept filled continuously cow dung to produce biogas which is optimal.
6. Mud compost (slurry) coming out of the digester tank at capacity in the mud. Dry organic fertilizer ready to be used as organic fertilizers that are environmentally friendly.

2.6. Application of waste biogas (sluge) for rice

For biogas applications in rice plants supplied directly evenly at the beginning of the planting season, rice age 40 day (going in generative phase) with doses of 600 liters / ha.

3. Results and Discussion

3.1. Designing a biogas digester.

Prior to the placement of the tube digester first conducted site surveys in Kanagarian Kasang. The survey aimed to determine the type of digester is used and the availability of raw materials. With the existence of this site surveys hopefully will be able to produce biogas which is optimal. So that the desired results can be achieved. The location should be built close to the cage so that livestock manure can be directly channeled into the digester. Besides the digester to be built as well as sludge container which can then be separated and made into solid organic fertilizer and liquid organic fertilizer. So that the tube is not quickly broken digester there are several steps taken at the location of the biogas digester, namely: a) provide fencing digester in order Spared From the cattle trampling own.b) Then give the roof above the tube digester digester that is not easily torn when it crashed and wooden branch befall the digester. The design of the biogas digester as Figure 1 below.

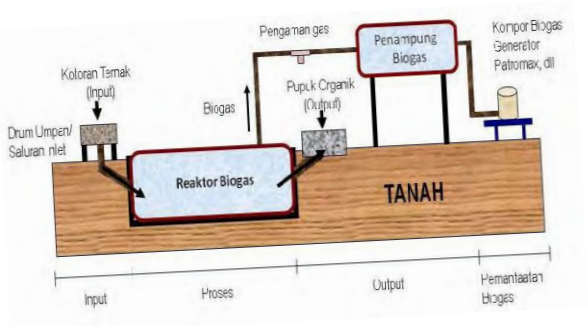

Figure 1. Household scale biogas digesters

Caption :
1. Position the lower tube intlet digesternya it from the outlet ± 30 cm.
2. Make a tank while rectangular ± 130 cm
3. Make Points put animal manure (Inlet) using 4-inch pipe.
4. Make a digester tube, length 7 meter use plastic PE (polyethylene) used thickness 0:20 mm
5. Install the gas pipeline from digister tube into the house.
6. Installed regulator in order to keep the gas so that the gas does not come out of the tip of the regulator.
7. Make a residual output from the decomposition of manure (outlet) which can be used as organic fertilizer.
8. Installed stop kran.untuk deliver gas into the house.
9. Make a compass to check the remaining gas that stayed in place for gas storage.
10.Use plastic hose in order to connect the stove to the gas.

Results from making biogas installations have been installed in the Cape Kanagarian Korong Kasang Districts of Batang Anai, Padang Pariaman district. Installation of biogas 1 unit biogas system with a balloon. The documentation of the installation of biogas as figure 2 below.

Figure 2. Installation of Biogas Digester system scale Households with balloons

For biogas operations to be run then after 15 days, the new continuously added about 10 liters of manure that has been mixed with 10 liters of water. To view the needs of livestock manure depending on the gas contained in digester biogas can be checked on the regulator. When the gas in the regulator is already a bit then you can add animal manure. The results of field observations belong to a group of farmers tuah sakato 1 that a cow capable of producing solid and liquid dirt as much as ± 10 kg / day. Subsequently (8), reported that a young cow gelding will produce 15-30 kg kg dung per day. Newly produced cow dung can not be directly given as fertilizer for crops, but must undergo a process of composting advance In the manufacture of biogas digester highly desirable microbes that can work in anaerobic, so in

this study in digerter added about 5 liters of rumen contents for gas capacity of 4 m^3. Anaerobic bacteria need nutrients as an energy source containing nitrogen, phosphorus, magnesium, sodium, manganese, calcium and cobalt. The addition of nutrients with simple ingredients such as glucose, industrial waste, and the remains of plants is given with the aim of increasing the growth of bacteria (9).

3.2. Applications biogas sludge waste into organic fertilizer for rice

Results biogas sludge waste is not discarded but utilized for paddy crop fertilization. The dose of sludge carried 600 liters / ha is given at the beginning of the rice planting and at the generative phase. Slugde granting process at the beginning of the planting is very important to help prepare the ground for the start of the crop nutrient. The advantages of this biogas slug can be directly absorbed by plants will vary with cow dung, because it was free with methane gas. In the generative process also provided slug biogas with the aim to assist in the formation of fruit on rice plants. As for the appearance of cow manure waste biogas as figure 3 below.

Figure 3. Waste biogas manure provided directly on paddy land farm location farmer groups tuah sakato 1

Some of the reasons why organic materials such as manure should be composted before use as fertilizer plants, among others are: 1) if the soil contains enough air and water, decomposition of organic matter takes place quickly so that it can interfere with plant growth, 2) decomposition of fresh material is very little supply of humus and nutrients into the soil, 3) the structure of organic material fresh very rude and power binding to water is small, so when directly embedded will cause the soil becomes very loose, 4) cow manure is not always available when needed, so that composting is a way of storage organic material before being used as fertilizer, while the cow manure that has been processed into gasbio composting process relatively quickly. The content of macro nutrients nitrogen (N), phosphorus (P) and potassium (K) and micro-nutrients in cow manure out of the digester after solidified analyzed in Bogor soil laboratory (1). From the results of laboratory analysis showed that C / N ratio is relatively too high at 42.6, this was due to organic C is very high, while the value of C / N ratio is allowed between 15 - 25. the high C indicates that organic carbon as an energy source too excessive by comparison with the availability of N . it is possible that the composting process is still too short so it still takes a long time to stay longer. Low of N possibly because nitrogen in complex chains so as not ready to be absorbed by plant roots, to make N in the chain that simple then required the administration of N fastening bacteria, which are: bacteria Azotobacter, Azotomonas, Pseudomonas and many other bacteria N fastening. So a laboratory analysis sludge that comes out of the outlet (let out) can not be categorized as a solid fertilizer, so it still needs to be processed further in order to meet the standards of organic fertilizers (1).

4. Conclusions and Recommendations

4.1. Conclusion

From the results and discussion above it can be concluded as follows:

1. The process of making balloon digester system is most appropriate at household level because they are cheap and easy manufacturing process which started with the process of making balloon digester system, when the digester is ready, followed by installation of biogas and biogas stove using secondhand goods ,
2. Waste excellent biogas sludge used as organic fertilizer because it can be directly available for the plants and very good impact on the environment.

4.2. Suggestion

1. For the biogas production process at household level in order to note that the process of livestock manure biogas production can continuously.
2. In making balloon digester system in order to be considered aspects of treatment, if treatment is not good enough direct sunlight it can hold up to 5 years
3. Use slug biogas for organic fertilizer rice plant can develop only need for more research on the exact concentration of slug on rice plants in order to provide maximum rice production.

Aknowlegment

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