Utilization of Fermentation Technology for Processing Waste to be Composted and Biourine

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Abstract:
The main objectives of technology dissemination on Bhuana Sari group of pigs are (1) to overcome environmental contamination of the impacts of waste generated by the pig farming group, (2) to utilize pig feces and urine for compost and biourine. The methods used are counseling, training and mentoring. The results show that there is an increase in the knowledge of farmers on the production of cages that meet the requirements for sanitary healthcare and to prevent environmental pollution, tofu category increases by 10% from 30% to 40%, enough know categories increases by 20% from 45% to 65% do not know decrease from 25% to 0%. Nearly 90% of farmers have been well-informed of cattle manure processing techniques for organic fertilizers, and farmers have successfully made compost from pig manure (fesces). Almost 90% of farmers are well aware of the techniques of cattle manure (urine) for organic fertilizer (Biourine). And breeders have managed to make a biourine from urine pigs. Farmers have applied compost and biourine to fertilize banana and cocoa plantation crops.

Keywords: compost, biourine, stool, urine, farm, pig

Introduction:
Compost is a fertilizer made from the remains of living things both animals and plants are decomposed by organisms decomposers. Decomposer organisms can be either microorganisms or macroorganisms. Compost serves as a source of nutrients and growing media for plants, seen from the manufacturing process there are two ways to make compost, that is through aerob process (with air) and anaerob (without air / fermentation). Both of these methods produce compost which is just as good as the physical form is slightly different (Amara, 2017, Arumingtiyas, Istiyar, Fajriani, Santosa, 2017; Nurdiyanti and Ly, 2011; Utami, Bastian, Johan, 2017; Irawan and Romdiati, 2000; Widodo and Hendriadi, 2005; Yadava, and Hesse, 1981; Yapp, Rijk, Adrianus, 2005; Yessun, 2017). How to make compost by anaerob / fermentation method usually requires the inoculant of microorganism (starter) to accelerate the composting process. Inoculants are composed of selected microorganisms that can decompose organic matter rapidly, such as an effective microorganism (EM4). In the market there are also types of inoculants from various brands such as superbio, probio .. In the absence of sufficient funds, it can also make its own effective inoculant microorganisms (Amara, 2017; Arumingtiyas, Istiyar, Fajriani, Santosa, 2017; Nurdiyanti and Ly, 2011; Utami, Bastian, Johan, 2017; Irawan and
Bio urine is a popular term among developers of organic farming. Bio urine is urine taken from livestock, especially ruminants first in fermentation before use. Bio urine is obtained from anaerobic fermentation of urine with additional nutrients using nitrogen-fixing microbes and other decomposer microbes. Thus the content of nitrogen in the bio urine will be higher than in the urine. The advantages of bio-urine use is the use of more efficient volumes than solid organic fertilizers and the application is easier because it can be given by spraying or watering, and by the process can be increased the content of the nitrogen (Triwahyuningsih, 2009; Kartasasmita, Ginandjar, 1995; Yadava and Hesse, 1981).

Pig Farm Group "Bhuana Sari" is located in Banjar Lipah, Petang Village, Petang District, Badung Regency. This livestock group was inaugurated on Taggal, August 1, 2004, consisting of 43 people, acting as coach is Livestock Office Petang District and as supervisor is Subak Abian Mekar Sari Kecamatanan Petang, Badung. Each member of the group has its own cage and each cage has an average of about 50 pigs, so that of that group the number of pigs that dikelirara almost reaches 2150 pigs.

The type of enclosure used is a battery cage for fattening using iron as its seal, it shows that pigs have been cultivated with high capital by the group. Furthermore the livestock groups have also anticipated for business continuity, the group has provided seeds with the maintenance of broodstock. For breeding needs Bhuana Sari livestock group has been able to do marriage with Artificial Insemination technique (IB), by maintaining the stud as sperm bank. The advantage with IB is the success of pregnancy The female parent reaches 95%, and the risk of a leg fracture from a female parent such as a direct marriage of a male is virtually non-existent or zero percent.

The business of pigs is a very promising opportunity if developed professionally in this area and surrounding areas. Viewed from the market aspect of the demand for pork in Badung regency, Bali there is a tendency to increase in line with the increasing number of residents in Badung. The pattern of pork consumption in Badung is very high, when compared with beef consumption, especially before Galungan and Kuningan feast the demand for pork can be doubled from normal days and the price will also increase. In the year of Rp 2017 the price of pork Rp 50.000 / kg, before the holiday can increase to Rp 60.000 / kg. The increasing trend of pork demand is indicated by many restaurants in Badung that provide pork main menu with various processed products such as lawar, sate and pork bolsters, besides that the demand of pig is quite high as a means of upakara for Hindus in Badung. This condition motivates pig farmers to grow their business.

Nevertheless, there are still problems faced by the group is the livestock is waste, ie feces and urine, which have not been well managed, the waste generated around 3 kg / head / day feces and urine 3 lit / head / day has not been utilized optimally, either as organic fertilizer (compost) and as bio urine for biopesticide. Livestock manure produced smells unpleasant and often complained by the surrounding community. Therefore, the waste generated should be utilized as compost and biorine by using fermentation technology.

Two outputs of this activity, ie, compost and biourine can be applied to the plantation land of each group of member, because the cattle group of Bhuana Sari, Petang Village has banana plantations and the cocoa of both plants is less fertile, due to the lack of fertilizer, and expected from the output compost and biourine as a source of fertilizer from both plants and can also be marketed as a commercial product, because the demand of this product has a very good market prospect with its declared Bali as the island of Clean and Greend. With dissemination activities of this product technology is expected to impact on the provision of employment for the community, increase income and welfare breeders and in accordance with the Village Mission Petang is the empowerment and improvement of populist economy ie, productive economic activities and creative economy and agriculture in the broad sense can be realized. Based on the above situation analysis, and discussions between the proposing team and the Bhuana Sari Livestock Group, the current partner problems are: (1) livestock waste in the form of feces and urine often cause community complaints because it causes unpleasant odor in the cage environment; (2) pig waste waste (feces) has not been used, as compost or organic fertilizer; (3) pig waste waste (urine) has not been utilized, as bio urine and (4) member plantation plantations, such as banana and cocoa plants appear less fertile, due to less fertilization.
Method of Implementation:
Technology Dissemination Method:

The methods used for the Bhuana sari pig group are counseling, training and mentoring, in detail as follows:

1) counseling and assistance and management of livestock waste;
2) training and assisting the utilization of pig manure (feces) of pigs for composting;
3) training and guidance on the utilization of pig manure (urine) of pigs for the manufacture of biourine;
4) training and advisory application of the use of compost and bio-urine for banana and cocoa plants.

To measure the success of counseling and training, before and after the pre-test and post-test activities, the results will be measured the success of each activity activity, whether the given material is understandable or not, and whether it is necessary to deepen the material has been given to breeders. Field visits are conducted, to livestock groups that have successfully managed their livestock waste. Field trips were conducted with the aim of enhancing the insights of pig farmers, in the management of waste-specific enterprises.

Results and Discussion:

Cage Management for Sanitation Requirements for Livestock Health and Pollution Control

The growth and development of pigs is highly dependent on environmental conditions in cages such as temperature, humidity, wind speed. Therefore, management to maintain the conditions of the cages as mentioned above need to be met so that pigs can grow and develop in accordance with its genetic potential, as well as to suppress the occurrence of environmental pollution, which reduces the occurrence of odor around the farm area. To meet the standards that need to be considered in making the cage is; the size of the cage, feeding place, drinking pacifier, cage floor, plastic curtain should be closed in the cold / night, tank to mix drinking medicine, waste disposal.

Cages owned by livestock groups of about 70% have met some of these criteria. Nevertheless, almost 30% of farmers' cages have not met the criteria, such as the waste disposal has not been provided yet, the waste is only left outside the cage, the impact besides disturbing the environment also creates an odor around the cage, this is in accordance with the results of Viviyanthi (2011) that with the processing of pig waste into compost and biourine can reduce environmental pollution. The results of the counseling activities show that there is an increase in the knowledge of breeders on the production of cages that meet the requirements for sanitary healthcare and to prevent environmental pollution, the category of tofu increases by 10% from 30% to 40%, the category knows enough increases 20% from 45% to 65% do not know decrease from 25% to 0%. Therefore, counseling on sanitation sanitation and to prevent environmental pollution, needs to be continued and provided on an ongoing basis.

Utilization of manure (Feces) for Organic Fertilizer:

Pig livestock is very potential to be utilized as organic fertilizer. In the cattle group of Bhuana Sari in Petang Badung Village, livestock manure is left untreated, so besides disturbing the sanitation of the cage also creates an unpleasant odor around the cage. EM4 technology is a way of processing pig livestock manure into organic fertilizer as shown in Figure 1, EM4 is about 1 ¼ liters of liquid mixed with 1/4 kg of brown sugar dissolved in 20 liters of water. Mix 200 kg of pig manure with 10 kg rice husk and 10 kg of fine bran. Then pour the EM4 solution mixed with red sugar into the livestock mixture, then fermented for one week. The characteristics of the compost are ripe, the shape is crumb / easy to destroy, the color is blackish brown, not smelly.

According to Yessun, (2017), daily excretion of swine pig is about 1.9kg faces and urine 3.5kg. The nutritional content of pig manure is relatively high compared to other manure, especially potassium. And the nitrogen and phosphorus content is only lower than sheep manure among all the animal waste. The percentage of organic matter and water in pig manure is about 25% and 70%, and NPK values are 0.45%, 0.2% and 0.6%. Furthermore, according to Amara, (2017) Fertilizers derived from unclean manure that has changed its shape, if it is seen no longer appear the initial form.

If each farmer is able to produce 25 kg / day organic fertilizer in one production process and the price of organic fertilizer Rp 1.000 / kg, then the additional income for each member of the pigs group once every production process is Rp 25,000.00 / day, the income earned by each breeder is Rp 750,000.00 / month. The results show almost 90% of farmers are
well aware of the techniques of cattle dung processing for organic fertilizer.

Picture 1 Processing of Poultry Livestock (Feces) Pigs into Compost

Organic fertilizer from pig feces processing, especially used for cocoa farm and banana owned by farmers, because the result is abundantly commercial plan, because the market demand is high enough. And according to Amara, (2017) fertilizer from pig feces is not why it is utilized in a more rajih (stronger) opinion. Because the dirt is being punished as a new substance so fertilizer is like this legitimate to be traded.

Based on the view of Al Hanafiyah school it can be concluded that the sale or purchase of pig manure is allowed on the condition that the dirt from pigs as fertilizer material has been mixed with the soil instead of pure pig manure, then Vivianthi research (2017) found the use of organic fertilizer, one of which compost can reduce residues on the land so that the balance of nutrients in the land is maintained, the plants become fertile, and can produce large, fresh fruit and delicious, the use of compost can increase the soil fertility level, stimulate healthy roots, improve soil properties both physical properties of soil, soil biology and soil chemistry so that compost can lead to higher soil buffer capacity and can also improve soil structure by increasing soil organic matter content and will improve soil ability to maintain ground water content.

Utilization of Pig Urine for Biourine:

Currently being rampant - widespread GO GREEN program (Bali has declared as a province / area Clean and Green) which all the products specifically consumed by humans are pursued to be organic. The world of agriculture and livestock as International Journal of Contemporary Research and Review, Vol. 9, Issue. 02, Page no: ME 20467-20472 doi: https://doi.org/10.15520/iicrr/2018/9/02/420

With the process of processing and a little touch of technology, the livestock waste can be dkemas into organic fertilizer, which has a double advantage in addition to beneficial to plants can also improve the nutrients on land that is not owned by chemical fertilizers, so that soil fertility can be maintained. Furthermore, looking at the existing conditions at which the price of an-organic fertilizers or chemical fertilizers manifest, the waste cage is an additional business opportunity that has a selling value. Seeing these opportunities many people are quickly turning to organic products by utilizing various waste for the manufacture of organic fertilizer. In addition to improving agricultural yields for both hard and soft crops, organic fertilizer is well suited to use in this tropical realm, since it leaves no residue in the soil and leaves the soil loose. Residues that accumulate in the soil in the long term will damage the nutrients in the soil that resulted in the soil becomes hard and clot.

Urine / urine cattle Pig Group Bhuana Sari Village Petang now began to be used as a fertilizer organic fertilizer liquid (bio urine) as shown in Figure 2 onwards applied to watering plants and Banana Chocolate. The advantage of using biorine is the use of more efficient volume than solid organic fertilizer and its application is easier because it can be given by spraying or watering, and by the process will be able to increase its nutrient content (Nitrogen element). The results of Arumingtiyas (2017) found that Biourine application can increase the growth and yield of rice plants by using legowo 4: 1 jajar method which includes plant height, number of tiller, leaf number, leaf area, leaf area index, number of panicle-1 clump, grain of panai-1, weight of 1000 grains, dry weight of clump-1, harvest t ha-1.

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in the bio urine will be higher than in the urine. Excess Liquid Organic Fertilizer (Bio Urine) (1) Has more nitrogen, phosphorus, potassium and water content than cow dung (2) Contains growth stimulants that can be used as growth regulator and (3) has typical urine odor cattle that can prevent the coming of various pests of plants. The results show almost 90% of farmers are well aware of the techniques of cattle manure (urine) for organic fertilizer (Biourine). The target of this activity, each breeder is able to make Biourine 5 liters / day, if per liter is Rp 2,500, then the additional result obtained by breeder per day is Rp 12,500 per day or Rp 375,000 per month.

And breeders have managed to make biourine from urine pigs

Reference:

Picture 2 Processing of Pig Urine to Be Biourine

Conclusion:
Based on the results of the activity can be concluded:

1. There is increasing knowledge of the breeders about the production of cages that meet the requirements for sanitary health of the cage and to prevent environmental pollution, the category of tofu increases by 10% from 30% to 40%, the category knows enough increases 20% from 45% to 65% and the category do not know decreased from 25% to 0%.
2. The results show almost 90% of farmers have been well aware of the techniques of cattle manure processing for organic fertilizers, and farmers have managed to make compost from pig manure (fesces)
3. The results show almost 90% of farmers have been well aware of the techniques of processing manure (urine) for organic fertilizer (Biourine).
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