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# DIGITAL-BASED ZERO WASTE MANAGEMENT IN JASMINE INTEGRATED FARMING TO IMPROVE COMMUNITY WELFARE

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**Abstract**

Jasmine Integrated Farming is a farmer group located in community unit 19, Antapani Tengah Subdistrict, Bandung City. Jasmine Integrated Farming was founded in 2019 with all its problems, namely (1) organic waste processing that is not yet optimal, (2) irregular planting and harvest schedules, (3) catfish harvests are not optimal, (4) lack of understanding about caring for seed houses and nurseries. plants, (5) Lack of partner knowledge about digital marketing, (6) Lack of knowledge about bookkeeping and financial reports. With all its problems, it is difficult for this farmer group to generate profits for the welfare of its members. The solutions offered are training and assistance on organic waste processing, training and assistance on seeding and planting schedules, training and assistance on the use of digital media for promotions along with recording digital-based financial reports using applications. The conclusion of this service is that there is an increase in partners' knowledge about organic waste processing, planting schedules, using social media as a marketing medium and recording application-based financial reports via Buku Kas.

**Keywords:** Zero Waste, Sustainibility, Digital

## INTRODUCTION

The city of Bandung has a population that is increasing every year from 2,507,888 people in 2019 to 2,510,103 people at the end of 2020 (1), causing an increase in waste produced every day. Data from (2), waste production in Bandung City in 2020 with types of waste in the form of food waste and leaves, namely 772.69 m3/day (44.51%), wood and twigs amounting to 69.09 m3/day (3.98 %), paper 222.76 m3/day (13.12%), plastic 324.28 (18.68%), metal 15.62 m3/day (0.90%), cloth 82.46 m3/day (4.75%), and rubber and leather 41.32 m3/day (2.38%). Dominated by food waste and leaves (44.51%). The Mayor of Bandung, Mr. Oded M. Danial, and the Deputy Mayor of Bandung, Mr. Yana Mulyana, created a flagship program, namely Kang Pisman, namely reduce, separate, utilize waste which was launched on October 17 with the aim of reducing the volume of waste at final disposal sites (3). However, the program is considered to have not run optimally, because until


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now rubbish is still found polluting rivers and other corners of the city. Apart from that, the waste disposed of in landfills has not decreased significantly (4).

Antapani Village RW 19, Bandung City with the Integrated Farming Concept which has launched the game of sae and Kang pisman in an effort to increase food security in integrated agricultural areas whose results can be utilized by residents and solve the waste problem starting from home so as to reduce the volume of waste that will be thrown into landfills. Final (TPA) (5) with the principle of zero waste. The zero-waste principle is a waste management concept based on 3R activities (Reduce, Reuse, Recycle). Zero waste management is management by sorting, composting and collecting goods worth selling. Zero waste is basically not management so that no more waste is produced because there is no human activity that does not produce waste. However, this concept emphasizes efforts to reduce to zero the amount of waste entering the landfill (6).

Jasmine Integrated Farming was founded in 2019 and consists of 15 women from RW 19, Antapani Tengah Subdistrict, Bandung City, with an area of 850 m2. Since it was founded until now, the residents of RW 19 in Jasmine Integrated Farming have been trying to carry out the Kang Pisman and Buruan Sae program by processing organic waste from residents in RW 19. Results of interviews with Mrs. Eni as Chair of the Jasmine Integrated Farming Farmers Group, organic waste collected by residents every 2-3 days with an average amount of 135 kg per RT. There are 5 RTs in RW 19, so the total organic waste is 675 kg, with an abundance of organic waste from community members. One of the efforts made is to create an upstream to downstream cycle with zero waste management where the organic waste is then composted, thus providing an output in the form of organic fertilizer (compost) and used as BSF (Black Soldier Fly) feed so that cassava is produced for organic plant cultivation fertilizer, and produce animal products in the form of maggots as catfish feed. The potential this region has is in the fields of trade and industry. This sub-district has four traditional markets which can be a means for trading activities, namely Antasari market, Cicadas market, Cicaheum market and Gedebage market. This could be a potential for the Jasmine Integrated Farming Farmer Group to market its products. On the other hand, considering the dense population in this sub-district accompanied by massive technological developments, this could be a potential for the Jasmine Integrated Farming Farmer Group to market its products through digital media. Considering that there are opportunities and potential for the Jasmine Integrated Farming Farmer Group to develop, it is necessary to empower farmer groups so that they can produce optimally. Therefore, the PKM team plans to carry out a program to improve community welfare through zero waste management in the Jasmine Integrated Farming Farmer Group. This program will involve lecturers from the UNJANI Faculty of Economics and Business and lecturers from the Agrotechnology Study Program at Univesitas Bale Bandung.

Based on the results of interviews with the Jasmine Integrated Farming Farmer Group, there are several problems faced, namely:

1. **Organic waste management is not yet optimal**

   Separating wet and dry organic waste is very important in the organic waste management process, especially composting. However, members of farmer groups pay little attention to this matter. This causes the composting process to take longer and only uses conventional methods by covering organic waste with a tarpaulin. The following is the condition of the overlay bricks which are not maintained due to the need for a

separation process first.

**Figure 1. Organic Waste Processing Equipment**
Source: Author (2023)

**2. Maggot BSF Cultivation Management is not yet optimal**

Black Soldier Fly (BSF) or black soldier flies in their life cycle after dropping eggs will become larvae (maggots) which can be used to convert organic waste so that it has economic potential. Jasmine Integrated Farming already has a cage for cultivating BSF, but the biopond facilities are not yet optimal because the separation between baby maggots, juvenile maggots and pre-pupae is still done manually (Figure 6), so experts are needed who understand the different phases of maggot development and the need for sufficient time. It takes quite a long time to sort and select maggots according to their development phase. Therefore, efforts are needed to improve maggot cultivation cages (BSF) which already have a system for separating maggots according to their development phase, so that they are more efficient and effective.

**Figure 3. Biopond**
Source: Author (2023)

**3. Management of planting and harvest schedules is not yet regular**

The next problem is that there is no regular planting and harvest schedule, so that after harvest there are no more plants ready to be moved to the land. This will cause there to be times when the land is not utilized optimally. In fact, if they have good scheduling regarding planting and harvesting, farmer groups can increase their product yields. Figure 2 shows conditions where land is not used due to planting and harvest schedules not being implemented continuously.

**Figure 2. Agricultural Land**
Source: Author (2023)

4. **Lack of knowledge about how to market the product so that the product is not yet known by the market.**

During operation, the target consumers are the people around Antapani Village. Even though farmer groups can reach traditional markets that are not too far away and use social media to market their products, members lack knowledge about how to introduce products. Apart from that, farmer groups have tried to use social media in the form of Instagram to socialize their activities and the products they produce, but the consistency, quantity and quality of the content has not been managed optimally. The following is Jasmine Integrated Farming's Instagram social media.


**Figure 4. Instagram Jasmine Integrated Farming**
Source: Jasmine Integrated Farming

5. **Lack of knowledge regarding bookkeeping and financial reporting**

Another problem is that financial recording which is done manually has not been done consistently due to time and knowledge constraints. On the other hand, financial recording is very necessary to find out performance and information about finances that occur in a period of a business. Manual recording can certainly cause inaccuracies in income calculations which ultimately have an impact on financial reports. Financial reports should be a necessity for every business considering the benefits that can be obtained for the sustainability of the business itself.

## IMPLEMENTATION METHOD

Based on the problems described previously, to overcome the problems that occurred, Digital Based Zero Waste Management was developed for Jasmine Integrated Farming to Improve Community Welfare. The entire program will be implemented within a period of 8 (eight) months. The priority of this program lies in improving community welfare with zero waste management through continuous training and mentoring. The advantage of this activity is that partners are equipped with skills in environmental conservation by processing organic waste into compost and animal feed and marketing it both traditionally and through digital applications. Furthermore, based on the main problems expressed by partners, several alternative solutions can be proposed to overcome these problems.

Planning, implementation and evaluation of Increasing Community Welfare through Digital-Based Zero Waste Management at Jasmine Integrated Farming involves the women of RW 19 or the Jasmine Integrated Farming Group located on Jl. Banjarsari IV RW 19 Antapani Tengah Subdistrict, Antapani District, West Java, 40291. The priority issues to be handled in this program were prepared together with the PKM team and the women who are members of the Jasmine Integrated Farming Farmer group. The implementation of the program to improve community welfare through zero waste management based on digital finance will be carried out regularly every week involving FEB UNJANI lecturers, lecturers from the Agrotechnology Study Program, Faculty of Agriculture, UNIBBA, and FEB UNJANI students. The lecturers and students will provide training to the Jasmine Integrated Farming Farmer Group regarding organic waste management, farming and livestock management, marketing management, and management, recording and financial information. Apart from that, lecturers and students will also provide assistance regarding making video tutorials related to waste management and seeding systems, managing and using social media as a means of promotion and establishing collaboration with vegetable selling platforms in the city of Bandung as well as using simple financial systems in making financial reports.

## RESULTS AND DISCUSSION

### Results

As a result of implementing community service activities, several activities have been carried out, including:

1. Training and assistance in organic waste management
   This activity includes training and workshops as well as assistance in managing residents' organic waste. Garbage is separated and collected from each house and then taken to Jasmine Integrated Farming to be further processed into maggot food.
2. Training and assistance for BSF maggot cultivation
   In this activity, participants were given training and assistance regarding BSF maggot cultivation. The Jasmine Integrated Farming farmer group is equipped with an effective and efficient method to increase the population of BSF maggots thereby increasing the members' income. Apart from this, the service team also provided a tool in the form of a biopond cage which has been designed to suit the life cycle of the BSF maggot. Adult BSF maggots that no longer need to eat will automatically move to the place provided, so that members of the farming group do not need to spend a lot of time sorting adult maggots before they metamorphose into flies.

3. Training on planting schedules and seeding mechanisms
   This activity includes training and assistance related to breeding and land use.
4. Digital marketing training and mentoring
   This activity includes training and direct practice to optimize the use of social media as a marketing medium which is expected to increase sales of agricultural products such as vegetables, maggots and compost.
5. Training and assistance in digital-based financial recording
   This activity includes training and assistance in digital financial recording using the Bukukas application.

**Discussions**

The implementation of community service activities was attended by members of the Jasmine Integrated Farming farmer group and 30 young people from RW 19, Antapani Subdistrict. There is an increase in the knowledge of service participants as shown in table 1 below.

**Table 1. Level of Knowledge of Service Participants Before and After Training and Mentoring**

| No | Indicator | Before Training and Mentoring | After Training and Mentoring | Enhancement |
|---|---|---|---|---|
| 1 | Knowledge of organic waste management | 3,79 | 4,52 | 0,73 |
| 2 | Knowledge of BSF maggot cultivation | 3,27 | 4,42 | 1,15 |
| 3 | Knowledge of seeding mechanisms and planting schedules | 3,39 | 4,09 | 0,70 |
| 4 | Digital marketing knowledge | 2,88 | 4,33 | 1,45 |
| 5 | Knowledge of digital-based financial recording | 2,79 | 4,15 | 1,36 |

Source: Author (2023)

Based on table 1 above, it can be concluded that the average increase in knowledge of community service participants is 1.08. Before the implementation of training and mentoring, the average knowledge of participants was 3.22 and became 4.30 after being given training and mentoring. The biggest increase was in the knowledge indicator about digital marketing, which was initially 2.88, increasing by 1.45 to 4.33 on a scale of 1-5. Meanwhile, the lowest increase was in the knowledge indicator regarding planting schedules and seeding mechanisms, namely 0.70, where before implementation the knowledge level of service participants was 3.39 and became 4.09 after training and mentoring. The smallest increase was because it was assumed that the participants were competent in the planting schedule and seeding mechanisms.

1. **Organic Waste Management**

   Table 1 above explains that the level of knowledge of organic waste management before the training and mentoring was carried out was 3.79 on a scale of 1 – 5. After the training and mentoring was carried out, the knowledge level of the participants increased by 0.73 to 4.52. The training and mentoring is focused on optimizing the management of organic waste from residents of 19 Central Antapani sub-districts with the hope that it can become feed material used for cultivating BSF maggots.

2. **BSF Maggot Cultivation**

   Table 1 above explains that the level of knowledge of BSF maggot cultivation is 3.27 on a scale of 1-5 before being given training and mentoring. The participants' level of knowledge increased by 1.15 to 4.42 after being provided with training and mentoring. The biggest obstacle previously experienced by Jasmine Integrated Farming was the limited number of biopond drums used as cultivation media. On this occasion, the service team provided a solution, namely an innovative tool in the form of a biopond that could work more effectively and efficiently. Adult BSF maggots will automatically separate themselves by moving to a prepared place. The BSF life cycle is metamorphosis with four phases, namely egg, larva, pupa and adult BSF (Popa & Green, 2012).

   The compost resulting from the decomposition of maggots is then partially used as a planting medium for organic plants and the rest is sold to local communities to increase members' income.

3. **Seeding mechanism and planting schedule**

   Table 1 above explains that the level of knowledge about seeding mechanisms and planting schedules before being given training and assistance was 3.39 and then increased by 0.70 to 4.09. The limited level of knowledge of the Jasmine Integrated Farming farmer group regarding seeding mechanisms and planting schedules means that harvest results are not optimal.

4. **Digital Marketing**

   Table 1 above explains that the level of knowledge about digital marketing was 2.88 before being given training and mentoring. The level of knowledge of members of the Jasmine Integrated Farming farmer group increased by 1.45 to 4.33 on a scale of 1 – 5 after being given training and mentoring. So far, Jasmine Integrated Farming already has an Instagram account but it has not been managed optimally. The training and assistance provided is in managing social media such as Instagram, Facebook, Tiktik, YouTube and WhatsApp business.

5. **Digital-Based Financial Recording**

   Table 1 above explains the level of knowledge regarding digital-based financial recording from members of the Jasmine Integrated Farming farmer group of 2.79 before being given training and mentoring. The training and assistance provided is optimizing the use of digital-based financial recording applications, namely the Bukukas application. Partners are also given video tutorials on using the Bukukas application. After being given training and mentoring, partners' level of knowledge increased by 1.36 to 4.15 on a scale of 1 – 5.

## CONCLUSION

The service activities carried out on September 9 and 16 include several things, namely:

1. Training and assistance in processing organic waste;
2. Training and assistance for BSF maggot cultivation;
3. Training on planting schedules and seeding mechanisms;
4. Digital marketing training and mentoring;
5. Training and assistance in digital-based financial recording.

Based on the activities above, it can be concluded that the level of knowledge of members of the Jasmine Integrated Farming farmer group increased by an average of 1.08 after being given training and mentoring.

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