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# Integrated Dairy Cattle Breeding Contribution on Farmers' Income. A Case Study in Malang Regency, Indonesia

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***Abstract*—***This research aims to provide an economic analysis of integrated dairy cattle breeding farm with earthworm (Lumbricus rubellus) contribution to farmers household income in Kelompok Ternak Gading Mandiri, Dau District, Malang Regency, Indonesia. This research utilized a survey for data collection with a quantitative and qualitative approach. Respondents were purposively selected based on their experience in integrated farming. The Gading Mandiri Group members were located in Dau District, Malang Regency, Indonesia. Data were descriptively analyzed based on an economic approach, including the capital, cost, revenue, and financial contribution to farmers' household income. The integrated farming of dairy breeding and earthworm (Lumbricus rubellus) contributed to farmers' household income. The earthworm (Lumbricus rubellus) farming provides monthly income, while the dairy breeding farm provides yearly income.*

***Keywords*—***Integrated, dairy farm, breeding farm, earthworm, Lumbricus Rubellus.*

## I. INTRODUCTION

The population of dairy cattle in East Java reaches 50% of the total population of dairy cattle in Indonesia. The total population of dairy cows in East Java reaches 280,000 head of which in East Java in 2018 reached 508,000 or 55.9% of the total fresh milk production in Indonesia (Directorate General of Livestock and Animal Health, 2018) The total growth of cow's milk production is only by 1-2% annually. The growth rate of milk production is far from the growth of domestic milk demand which reaches 5% per year. Domestic fresh milk production is quite low, this is influenced by many factors such as the unavailability of dairy cattle breeds, the lack of availability of forage land and the management of dairy cattle maintenance that is not optimal. There are not many dairy cow companies and the limited IPS (Milk Processing Industry) is one of the factors for the low production of fresh milk. BPS information (2018) shows that the dairy farms covered are companies that carry out breeding activities, dairy cow cultivation, and cow milk collectors. In 2018, the number of active dairy farming companies was 33 companies. Based on the type of main activity, there is one company conducting dairy cattle breeding activities, 23 companies are dairy farming businesses and 9 other companies are dairy cow milk collection companies.

The activity of cow-calf operation or calf maintenance, on the other hand, is still very rarely carried out or used as a business, especially for smallholder farmers. Due to significant business capital, complicated marketing chain, limited means of transportation, land ownership, and a pretty long time. This nursery business requires approximately 18 months of maintenance to produce pregnant female cows. For about 18 months, the farmer does not get income until he makes pregnant cows sold.

Increasing farmers' income can be done by utilizing an integrated system between cow dung waste and the cultivation of earthworms (*Lumbricus rubellus*). The cultivation of Earthworms (*Lumbricus rubellus*) in The Gading Mandiri Group, Dau District, was initiated by the head of the livestock group, which was started in 2010. The Gading Mandiri group started this side business of cultivating earthworms by considering economic and environmental aspects. Therefore, this study will analyze the economic impact of the integrated nursery business that farmers have carried out. The purpose of this study was to examine the economic impact of the integration of dairy cattle breeding and earthworm (*Lumbricus rubellus*) cultivation on farmers and the cost structure of the integration of dairy cattle breeding and earthworm cultivation (*Lumbricus rubellus*).

## II. MATERIALS AND METHODS

The research was conducted at the Gading Mandiri Group located in Dau District, Malang Regency. The duration of the study and data collection in the field was carried out for approximately three months, from July to August 2021. The selection of research locations was carried out by purposive sampling. The research took dairy farmers as respondents in the Gading Mandiri Group, Dau District, Malang Regency. Respondents born are breeders with criteria who are still active in raising livestock for at least five years. Respondents are the Gading Mandiri group, which runs an integrated dairy cattle breeding business with worm farming business. Respondents were chosen because they have more than ten years of experience in raising livestock and have an integrated farming business, namely, dairy cattle breeding and earthworm cultivation.

This research was conducted in the Gading Mandiri group, Dau District. This research utilized survey research methods and quantitative and qualitative approaches. In quantitative analysis, the instruments used have been predetermined and



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well organized. The tool commonly used is a questionnaire (questionnaire). The data obtained for quantitative research comes from the annual record data of farmers in the Gading Mandiri Group, Dau District, Malang Regency. Meanwhile, qualitative data was obtained through in-depth interviews with respondents about the dairy cattle integration efforts and village officials who knew about this activity.

Primary data in this study were taken through observation and interviews. While secondary data was obtained from independent ivory livestock groups and carried out this literature study including literature studies, statistical data and other information by comparing books, journals, articles that are useful for obtaining information related to theories and concepts related to the feasibility study of integration business dairy cattle breeding.

Analysis of the data used is descriptive analysis used to obtain a general and in-depth picture of the object being observed. The data analysis process starts from reviewing available data from various sources such as observations, interviews and literature studies related to the integration of dairy cattle breeding. Data analysis is the most decisive step of a study, because data analysis serves to conclude the research results. The stages of data analysis that will be carried out include:

*A. Capital Analysis*

- Fixed/investment capital: the capital used to purchase fixed assets such as land, buildings, equipment, machinery and others.
- Current capital/working capital: ie capital used for operational financing and generally has a short period of time (< 1 year).

In this study, capital or capital is a combination of production factors that are owned by partners combined with the funding budgeted in this study.

*B. Total Cost (Total Cost)*

- Total Fixed Cost (TFC): the total cost incurred regardless of the amount of sexing cement produced.
- Total Variable Cost (TVC): the total cost used is based on the amount of sexing cement produced.

$$TC = TFC + TVC$$

Description:

- TC = Total Cost (Total Cost) (in rupiah)
- TFC = Total Fixed Cost
- TVC = Total Variable Cost (in rupiah)

*C. Revenue*

Revenue in this study will be calculated based on the total production generated by the sale of dairy cattle and earthworms multiplied by the selling price:

$$R = P \times Q$$

Description:

R =Revenue (in rupiah)
P =Price (price)
Q =Quantity (production quantity) (in kg)
If : TR> TR: then profit will be obtained
TR = TC: break even or break even point
TR<TC: will result in loss

*D. Profit*

The profit of farming is the difference between the value of the production and the total value of the production costs expressed in. The profit from the farming business is calculated from the sale of dairy cattle seeds and the cultivation of earthworms. That the calculation of profit or the value of profitability can be calculated by using the formula.

$$\pi = TR - TC$$

Description:

$\pi$ = Advantages of the milk storage unit (Rp/Year)
TR = Total Revenue or total receipts at the milk storage unit (Rp/Year)
TC = Total Cost or the total cost of the milk storage unit (Rp/Year)

## III. Result and Discussion

Respondents in this study were the chairman and members of the Gading Mandiri group, Gadingkulon Village, Dau District, Malang Regency. The identity of the respondents observed in the form of demographic characteristics include age, education and livestock population. The characteristics of the respondents observed included age, level of education, length of farming, livestock population owned, type of livestock, capital in the livestock business and animal science skills. Some of the respondent's characteristics that are considered necessary include land area, number of animals, age, education and livestock experience.

*a. Respondent Age*

The data in this study shows that the age range of breeders in the Gading Mandiri group, Dau District, Malang Regency, varies from 30 to 60 years. A person is said to be in productive age when he is in the age range of 15 to 55 years. Those still in the productive range usually have a higher level of productivity than older breeders due to limited human resources. For breeders who are younger or ineffective age, they will usually be more enthusiastic in doing business when compared to older farmers. The productive age limit is 15-64 years based on the BPS description. At productive age, individuals are expected to develop the potential of each farmer in doing business, significantly raising cattle. Research conducted by Baba, Syarif and Soharah (2021) shows that the breeder's age influences the farmer's decision in adopting the use of livestock waste.

*b. Level of Education*

The education level of farmers in the Gading Mandiri Group is primarily high school graduates (High School) with a presentation of 37%, followed by the education level for junior high school (Junior High School) by 36%. The lowest education is SD (elementary school), as much as 27%, and farmers' average level of education is still limited. It is still rare for breeders with a college education level to become breeders. Usually, breeders with teaching at the university level make the livestock business a side job. In contrast, breeders with higher education are expected to adopt the



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information innovation obtained.

The level of education is one of the benchmarks that can be used as a reference to measure the level of ability or absorption in receiving new information. Education is also a means of learning, which provides a more promising direction towards applying more modern animal science and animal science. The level of education of farmers has a positive correlation with the level of innovation adoption of farmers, especially dairy farmers (Baba et al., 2021).

*c. Farming Experience*

Respondents' farming experience was divided into three groups. Respondents with a length of time breeding ranging from 1-5 years as much as 40%, size of raising 6-10 years as much as 40% and length of experience raising > 10 years by 20%. The experience of raising livestock can be measured starting from when the farmer started his business until this survey was held. Usually, the experience of raising livestock for some breeders is passed down from their parents or family-owned farm businesses. Larasati Baba and Sirajuddin (2016) state that the long experience of raising livestock for many years indicates that farmers have more knowledge and skills in dairy cattle rearing management; besides, it is easier for farmers to apply accept innovation adoption. Several previous studies related to the level of innovation adoption among farmers also show that the experience of farmers affects the level of adoption of innovations received (Jermias et al., 2021; Mokoagow, Lombogia, & Lainawa, 2021).

*d. Main Livelihood*

Livestock is the primary job of all respondents. Respondents also run a dairy or beef cattle breeding business integrated with the cultivation of earthworms (Lumbricus rubellus), which aims to get additional income because the maintenance period for dairy and beef cattle is quite long. So during the rearing period (enlargement) of dairy and beef cattle, farmers still get income. Breeding is made the main job based on relatively large income and requires more time. Based on the statement of Purnomo, Rahay and Antoro (2017) that the main livelihood of the respondents as farmers, agricultural work is work carried out for generations to raise livestock as savings for sustainable needs. Small-scale cattle businesses can be used as savings for further urgent needs or as additional income for a relatively long period (Darmawi, 2011).

*e. Business Capital*

Business capital is the operational cost capital used to facilitate running a business that runs out in one production process. Capital is the basis for the operation of a business. Capital is also very influential on the continuity of a company in carrying out production activities. The capital used in livestock groups comes from self-financing, cooperative loans or bank loans from the KUR (People's Business Credit) program. The production costs incurred by the owner in the Gading Mandiri Cooperative, Gading Kulon Village, Dau sub-district consist of 2 types, namely fixed and variable costs.

The business capital taken into account is only for dairy cattle breeding and lactation cattle maintenance. This research focuses on the dairy cattle breeding business, which will be compared to the lactating cattle business to see which type of business is more profitable. Fixed costs incurred by farmers consist of PBB and depreciation costs for cages, warehouses, feed, and drinking places. Fixed costs (fixed costs) in dairy cattle breeding and maintenance of lactating dairy cows can be seen in table I.

TABLE I. Fixed Cost in Dairy Cattle Breeding Business and Lactation Cattle Business

| No | Fixed Cost | Quantity | Unit Price | Total |
|---|---|---|---|---|
| 1. | Depreciation of Cages and Warehouses | 1 | 250.000 | 250.000 |
| 2. | property tax | 1 | 214.500 | 214.500 |
| 3. | Equipment Depreciation | 1 | 41.500 | 41.500 |
| **Total Fixed Cost** | | | | 506,000 |

Source: Processed Primary Data (2021)

Variable costs in dairy farming and integrated with the cultivation of earthworms (Lumbricus rubellus) can be seen in table II.

TABLE II. Variable production costs per period Data A

| No | Variable Cost | Quantity | Unit Price | Total |
|---|---|---|---|---|
| 1. | 2 Months Dairy Cow Calf Breeding | 9 | 3.333.333,33 | 30.000.000 |
| 2. | Forage/period (kg) | 27.000 | 1.200 | 32.400.000 |
| 3. | Concentrate (kg) | 9.000 | 2.400 | 21.600.000 |
| 4. | Wormectin | 9 | 10.000 | 90.000 |
| 5. | Vitamin B-Plex | 9 | 20.000 | 180.000 |
| 6. | IB | 9 | 25.000 | 225.000 |
| 7. | Sales Vehicle Rental | 2 | 200.000 | 400.000 |
| 8. | Household and Enclosure Electricity | 16 | 35.000 | 560.000 |
| 9. | Household and Cage Water | 1 | 25.000 | 25.000 |
| 10. | Earthworm Seeds (*Lumbricus rubellus*) | 5 | 50.000 | 250.000 |
| **Total Variable Cost** | | | **85.730.000** | |

Source: Processed Primary Data (2021)

The data in table III shows the total variable costs of farmers. Variable costs are production costs that can vary during production activities. Variable costs are costs that will change every period. Variable costs include the cost of dairy cattle in the form of a 2-month calf, forage feed and concentrates, medicines, vitamins, vaccines, AI, electricity, water, rental of sales vehicles and worm seeds. In accordance with the statement of Rahardja and Mandala (2012) that as for variable costs, namely the cost component that depends on the amount of production.

The earthworm cultivation business in table 6 does not use feed costs, because the earthworm feed comes from the use of dairy cow dung. Variable costs or variable costs are influenced by the livestock population, the more population you have, the greater the variable costs.



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TABLE III. Variable costs of production per period Data B

| No | Variable Cost | Quantity | Unit Price | Total |
|---|---|---|---|---|
| 1. | 10 Months Dairy Cow Calf Breeding | 9 | 9.000.000 | 81.000.000 |
| 2. | Forage/period (kg) | 13.500 | 1.200 | 16.200.000 |
| 3. | Concentrate (kg) | 4.500 | 2.400 | 10.800.000 |
| 4. | Wormectin | 9 | 10.000 | 90.000 |
| 5. | Vitamin B-Plex | 9 | 20.000 | 180.000 |
| 6. | IB | 9 | 25.000 | 225.000 |
| 7. | Sales Vehicle Rental | 2 | 200.000 | 400.000 |
| 8. | Household and Enclosure Electricity | 1 | 35.000 | 560.000 |
| 9. | Household and Cage Water | 1 | 25.000 | 25.000 |
| 10. | Earthworm Seeds (*Lumbricus rubellus*) | 5 | 50.000 | 250.000 |
| **Total Variable Cost** | | | **109,380,000** | |

Source: Processed Primary Data (2021)

Table IV represents variable costs in Data B. The difference between variable costs in Data A and B lies in the cost of dairy cows and forage. The cost of seeds in data A and data B is very different due to differences in the age of dairy cows. Data A uses dairy cows aged 2 months at a price of Rp. 3,333.333 for Data B uses dairy cows aged 10 months at a price of Rp. 9,000,000,-. The pattern of rearing for breeders who conduct dairy cattle breeding business on a large scale, namely 18 cows, breeders have two different types of dairy cows, this also affects the cost of animal feed. The longer the maintenance of livestock, the greater the cost of feed and production costs. The high cost of feed is caused by the purchase of forage and concentrates. Farmers are still buying forage, because there is not enough forage in the fields. The type of forage given is corn tumpi. Breeders prefer corn tumpi because of the higher dry matter content than fresh forage. For the most part the cost of concentrate is subsidized by local cooperatives.

This is in accordance with Haloho (Haloho, 2020) that feed costs are the second largest cost contribution after purchasing seeds to livestock production costs. The costs incurred for concentrate feed are 31.70% and the cost of forage feed used is 42.52% so that if calculated cumulatively the costs incurred for feed costs are 74.22%.

Data A shows that the total variable cost reaches Rp. 85,730,000, - this is lower than Data B, which has a total fixed cost of Rp. 109.380.000,-. This is because the cost of dairy calves is very high which reaches Rp. 9,000,000 per head. The cost of feed on Data A is higher, because the maintenance on Data A takes longer, so it requires a fairly high cost. This is done by farmers so that dairy cows that are kept at the age of 10 months can be harvested first at the age of 18 months. The results from the harvest can be used to finance the first loan of a cooperative or bank, and can be used for daily living.

*f. Total Cost*

Production costs play a very important role during the production process. The method of production also greatly affects the cost of production. Production costs are divided into 2, namely fixed costs and variable costs. Production costs are the sum of the addition of fixed costs and variable costs. According to Kurniawati, Hanung and Wuryaningsih (Kurniawati, Ismono, & Sayekti) The determination of the cost of production is done by reducing production costs and maintaining the quality of the goods produced in accordance with economic law to set production costs to a minimum to get maximum results. product base produced is lower than the previous one. The cost of production is the highest cost of feed, while the lowest cost is the difference in the cost of equipment which is usually repaired or damaged in 10 years so it does not incur a lot of costs for equipment. This is in accordance with Santa, Anie and Waleleng (2014) The income received by farmers is determined by the size of the costs used in the production process, because production costs are one of the most important factors. Total production costs (total cost) in an integrated dairy breeding business in the Independent Gading Cattle Group, Gading Kulon Village, Dau District can be seen in table IV.

TABLE IV. Total Cost (Total Cost) Earthworm Integrated Dairy Cattle Breeding Business

| No. | Cost Type | Data A | Data B |
|---|---|---|---|
| 1 | Total Fixed Cost | 506,000 | 506,000 |
| 2 | Total Variable Cost | 85.730.000 | 109,380,000 |
| **Quantity** | | **86,236,000** | **109,886,000** |
| **Total Cost** | | | **196,122,000** |

Source: Processed Primary Data (2021)

Earthworms are animals that have a short life cycle and can be used as side income for farmers. This is in accordance with Utomo, et al. (2019). Lumbricus rubellus worm is a type of worm that is very easy to cultivate or breed, its development is very fast compared to other types of worms. Cow dung waste is very good for its growth and development. Economically, earthworm cultivation is quite promising, with great benefits for various sectors such as agriculture, animal science, health, and beauty, so earthworms can really be a source of business with great opportunities.

*g. Revenue (Total Revenue)*

The revenue that is calculated is in the form of sales of dairy cows. The price of dairy cattle is determined by the cooperative according to the quality of the seed, so farmers cannot determine the price. Details of the average income received by farmers who have dairy cattle integrated with earthworms can be seen in Table V.

TABLE V. Acceptance of Earthworm Integrated Dairy Cattle Breeding

| No. | Revenue | Quantity | Contribution Percentage (%) |
|---|---|---|---|
| 1. | Dairy Cattle Seed Sales | 360.000.000 | 90.85 |
| 2. | Sales of Earthworms and their Components | 36.240.000 | 9.14 |
| **Total Sales** | | 396.240.000 | 100 |

Source: Processed Primary Data (2021)

The data listed in table V shows that the contribution of sales of dairy cattle breeds contributes 90.85% and earthworms contributes 9.14% of the revenue. The percentage contribution of earthworms and their components in table 10 is relatively small compared to the sale of dairy cattle breeds. Although the percentage of contribution is quite small, it is very helpful in providing side income for farmers.



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This is because the dairy cattle breeding business model which is integrated with the earthworm cultivation business generates a side income of Rp.36,240,000,- per period or an average of Rp.3,020,000,- per month which can be seen in table 10. If breeders only rely on income from dairy cattle breeding, new breeders get income in the 6th and 18th months, this is as shown in table VI.

TABLE VI. Revenue Receipts From Dairy Cattle Breeding

| No | Month Income | Quantity (Tails) | Total Income |
|---|---|---|---|
| 1. | 6th Month Income | 9 | 180.000.000 |
| 2. | 18th Month Income | 9 | 180.000.000 |
| **Total Revenue (Total Revenue)** | | | **360.000.000** |

Source: Processed Primary Data (2021)

This earthworm business will greatly help the income of the farmer's household because the Lumbricus rubellus worm is a side business that is easy to cultivate or raise. The development of this type is also very fast compared to other types of worms. Revenue receipts from earthworm cultivation can be seen in table VII.

TABLE VII. Revenue of income from earthworm cultivation

| No | Month Income th-n | Quantity (Kg) | Total Income |
|---|---|---|---|
| 1. | 1st Month Income | 29 | 870.000 |
| 2. | 2nd Month Income | 18 | 540.000 |
| 3. | 3rd Month Income | 123 | 3.690.000 |
| 4. | 4th Month Income | 67 | 2.010.000 |
| 5. | 5th Month Income | 112 | 3.360.000 |
| 6. | 6th Month Income | 179,5 | 5.385.000 |
| 7. | 7th Month Income | 152,5 | 4.590.000 |
| 8. | 8th Month Income | 39 | 1.170.000 |
| 9. | 9th Month Income | 89 | 2.670.000 |
| 10. | 10th Month Income | 75 | 2.250.000 |
| 11. | 11th Month Income | 61,5 | 1.845.000 |
| 12. | 12th Month Income | 88 | 2.640.000 |
| 13. | 13th Month Income | 76,5 | 2.295.000 |
| 14. | 14th Month Income | 124 | 3.720.000 |
| 15. | 15th Month Income | 84,5 | 2.535.000 |
| 16. | 16th Month Income | 48 | 1.440.000 |
| 17. | 17th Month Income | 168,5 | 5.055.000 |
| 18. | 18th Month Income | 152,5 | 4.575.000 |
| **Total Revenue** | | **1639,5** | **36.240.000** |

Source: Processed Primary Data (2021)

*h. Income*

Revenue is the result obtained from the difference between revenues and costs or expenses. This is in accordance with Andaruisworo and Nur (2015) that income can be obtained by calculating the difference between total revenue (total revenue) and total production costs (total cost). Income can be influenced by many factors, one of which is the scale of business, capital, labor efficiency and the level of production of farmers. This income is calculated by the farmer per period or for 18 months.

TABLE VIII. Business Income of Earthworm Integrated Dairy Breeding

| No. | Income | Quantity |
|---|---|---|
| 1. | Total Revenue (Total Revenue) | 396.240.000 |
| 2. | Total Production Cost (Total Cost) | 196,122,000 |
| **Total Income** | | 200.118.000 |

Source: Processed Primary Data (2021)

*Business Contribution*

Calculating the business contribution means knowing how much influence the contribution of a dairy cattle business that is integrated with the cultivation of earthworms (Lumbricus rubellus) has on the income of the farmer's family. The following table IX shows the contribution of dairy cattle breeding business to livestock income per period.

TABLE IX. Amount of Contribution of Earthworm Integrated Dairy Cattle Breeding Business

| Description | Income | Contribution (%) |
|---|---|---|
| Dairy Cattle Breeding Business Income | 163.308.000 | 88,29% |
| Earthworm Cultivation Business Income | 27,058,000 | 12,71% |
| Total Farmer's Household Income | 184.966.150 | 100 % |

Source: Processed Primary Data (2021)

Table IX shows that the contribution of dairy farming is 88.29% of the total farmer household income per period. The contribution of earthworm business is 12.71% of household income. Farmer household income is generated by the main business of dairy cattle breeding with earthworm cultivation as another side income. The contribution of the livestock business to the income of the farmer is usually influenced by the household expenditure of the farmer and the production costs of the livestock business. According to Hartono and Purnomo (2011) the pattern of household expenditure is one indicator that can provide an illustration of where the income is distributed, the higher the income of farmers, the percentage of household expenditure for consumption will be smaller and vice versa if the income is small, the percentage of expenditure for consumption is getting bigger and more small expenditure for investment.

*Discussion*

Dairy cattle breeding business on a household scale is experiencing problems with a long period of maintenance, starting from raising calves to selling pregnant feeder cows. The length of the maintenance period causes at least some breeders to be interested in the care of dairy cattle. One solution that farmers can do to overcome this is integrating the dairy cattle breeding business with the earthworm business. The data in this study indicate that the maintenance of earthworms in the dairy cattle breeding business contributes 12.71% to the household income of farmers. Although the percentage contribution of revenue from the sale of earthworms is not very large, it provides a monthly payment to farmers of between Rp. 540,000 - Rp 4,475,000 per month, depending on the number of earthworms harvested. This monthly income helps farmers to be able to meet their monthly needs, in addition to the annual income obtained from the sale of pregnant dairy cows. The results of previous studies show that keeping earthworms provides additional income for farmers (Mashur, Agustin, Istaâ, Multazam, & Ningsih, 2020; Pratama, 2020).

In addition to the economic benefits to farmers' household income, the integration of the dairy cattle breeding business with earthworms has a direct impact on the cleanliness of the



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dairy cow shed and the management of livestock waste generated from the dairy cattle breeding business. Farmers will be more motivated to clean their cowshed with the earthworm business. The need to provide cow dung as earthworm feed. If the farmer does not give cow dung as earthworm feed, the earthworm harvest will decrease, which means that the monthly income from selling earthworms will also fall. On the other hand, this will directly influence the cleanliness of the cowshed. The cage's cleanliness is very influential in the management of disease control in the dairy cattle business (Nugroho, 2021). The cleanliness of the pen is a significant factor in the success of a dairy cattle breeding business. The stall's cleanliness will significantly affect the success of artificial insemination (Habibullah, 2020; Mustakim, 2020). On the other hand, the efficiency of dairy cattle breeding is highly dependent on the success rate of Artificial Insemination to produce pregnancy.

Another advantage of integrating the dairy cattle breeding business with earthworms is the breakdown of livestock manure into nutrients. Earthworms, as good decomposers, will convert livestock manure into nutrients in just 3-4 days. Cow dung that worms have decomposed will produce Vermikopos or Kascing (Ex-worms), which are very useful as organic fertilizer. Vermicompost is compost obtained from the decomposition of organic matter carried out by earthworms. If farmers have agricultural land, vermicompost or vermicompost is applied directly or can sell Kascing as organic fertilizer and provide additional income to the farmer's household income (Santoso, Jarmuji, & Brata, 2020). Vermicompost is a type of organic fertilizer that can be used as organic fertilizer for vegetable, fruit, and flower plants with advantages such as holding water better, providing nutrients for plant growth, and repairing damaged soil structures (Sipayung, 2020).

## IV. Conclusion

The economic impact of this integration effort greatly affects the income of farmers. The contribution of worm cultivation to the household income of farmers provides monthly income in addition to the sale of dairy cattle which requires 18 months of maintenance.

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