



LEVEL OF SWINE PRODUCTIVITY ON THE SWINE DEVELOPMENT PROGRAM IN GIANYAR REGION

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Abstract. Raising swine for the people of Bali is usually done. Lately it has become a promising business considering that Bali as a tourist destination. Many technological innovations in the field of swine production have been produced but the problem is not all of the technology produced by the IAARD has been reached in the level of users. Therefore an approach is needed to encourages users to be able to apply recommendation technology from IAARD for developing their products. For this reason the purpose of this study was looked at the impact of technological assistance on the productivity in small holder farmers in Gianyar Regency. The parameters observed were body weight gain feeds consumption and profits gain data were analyzed by t test. The data showed that the body weight of the group of swine that were accompanied technology gave an increase in body weight 17.15% greater than the group of swine that were not accompanied statistically significantly different ($P < 0.05$), on feeds consumption the assisted group of swine consuming less ration rather than the group of swine that were non-assisted ($P < 0.05$). From farming analysis farmers group of swine that were accompanied gave a profit greater than the group of swine that were not accompanied, with B/C of 0.60.

1. Introduction

The need for community nutritional value, specifically animal protein per capita is still not sufficient. Moreover, in recent years the population of beef cattle has greatly declined. In order to be able to fulfill animal protein needs per capita, there needs to be an increase in livestock production. One source of protein fulfillment can be overcome by working on swine production. Pork is a leading commodity in Bali because it has an important role in improving people's welfare. Swine are prioritized for their development because these animals, besides having high economic value, also have social values in the Balinese community. Besides that, swine are also kept as a kitchen shelter and family savings [3].

Bali Provincial Animal Husbandry and Animal Health Service [3] reported that the swine population in Bali from 2012-2016 continued to decline from 927,739 animals (2012) to 794,936 animals (2016) or decreased by 16.08%. The shrinking of this population is partly due to the sharply increasing number of cuts from 1,608,362 in 2012 to 1,790,540 in 2016 which is not comparable with the increase in population each year.

For the development of the livestock sector, especially for non-ruminant animals which is swine production through research activities the Agricultural Research and Development (R&D) has produced several technological innovations, including feed technology including processing plant waste for feed, providing probiotics, utilizing local resources for feed a source of protein and carbohydrates, in the field of disease, namely the use of local strains to suppress diarrhea in weaning piglets. However, the results of external and internal evaluations show that the speed and level of utilization of technological innovations produced by the Agency for Agricultural Research and

Development tend to be slow, even declining. This phenomenon is clearly seen at the farm level, integrated farming technology innovation that has been introduced has not been fully adopted by all farmers living in rural areas.

Assistance activities at the location of the development of swine areas, is a breakthrough carried out by the Agency for Agricultural Research and Development which is an approach that encourages householders willing and able to implement the recommended agricultural R&D technology products. In the area development assistance activities, the technology disseminated is the technology that is ready to be spread. For this reason, the aim of this study is to find out the impact of technological assistance on productivity in pig farmers in Gianyar District.

2. Metodology

The location of the study was determined intentionally (purposive sampling), because it is the location of assistance for the national pig herds development area. The study was conducted in May - September 2018. The technology activities package that was disseminated was the regulation of rations + probiotics mixed in water as much as 2 cc / 1 liter of drinking water both in the starter, grower and finisher phases.

To see the effect of the technology being assisted compared with the way of farmers non-assisted location *with and without* analysis. Parameters observed include: body weight gain (kg), Covenant ration and economic analysis. The data obtained were analyzed by *t-test* [15]. As for farming analysis, the analytical method used is the Simple Partial Budget Analysis Method according to Swastika [12], Simple partial budget analysis can be used to evaluate the performance of a technology. To find out the level of income / profit of the farm that is accompanied by without assistance, an income analysis is performed and then described in a descriptive manner [1]. Farm income or profit is the difference between the result of multiplying the amount of production and the price per unit of production with the amount of costs (cash) incurred in the production process.

3.Results And Discussion

3.1.Characteristics of Fattening Swine in the Assistance Location.

The types of swine raised for fattening at this location are Landrace and crosses, Duroc and their crosses as well as saddlebacks and crosses, initial weight to be candidates for fattening (period starter) an average of 13 kg / head, with feed almost entirely in the form of concentrate from the factory (factory type 551), while for grower feed (weight reaching ± 25 to 50 kg / head) divided into 2 periods (Grower I and Grower II feed), the next characteristic is shown in Table 1.

Table 1: Characteristics of Fattening Swine at the Assisting location, Gianyar

No	Parameter	Type and Amount
1.	Types of Pigs	Landrace, Duroc, Saddleback, crosses
2.	Initial weight (starter)	12-15 kg
3.	Feed starter	100% concentrate
4.	Grower Weight	30 kg
5.	Feed Grower I	30% concentrate + 40% rice bran + 30% corn
6.	feed Grower II	25% concentrate + 55% rice bran + 30% corn
7.	Finisher Weight	150 kg
8.	Duration of Maintenance (Starter-Finisher)	7-8 months
9.	Feed Finisher	15% concentrate + 60% rice bran + 25% corn
10.	Average Ownership	10-20 head/householder

Table 1 show, the types of swine raised by pig farmers in the assistant location have varied, as is the formula for feed ration that is already close to the recommended standard feed ration. But farmer

practice feeding in terms of the amount of administration and the percentage of protein sources is too excessive, the amount of administration in the starter phase is almost 100% protein source (concentrate) given as much as 1 kg / head / day, at the grower phase the amount of administration is 2.5 to 3 kg / head / day and the phase finisher the amount of administration of 3.5 to 4 kg / head / day. According to NRC [5]. the need for food for pig rations during the grower period is 3265 kcal metabolic energy, 15% crude protein and 5% crude fiber content. Expected weight gain is 0.497 - 0.606 kg / day and ration consumption are 1.90 - 2.53 kg / day. Daily consumption of grower period swine with body weight 30-70 kg of 2160 gr / day. Whereas in the finisher phase the average consumption of rations is 3 kg / day with a body weight reached 115 kg. The total consumption of rations for 6 months of maintenance was 42 kg + 140 kg + 168 kg = 350 kg.

3.2. Increased Body Weight

The results of the fattening package dissemination can be seen in Table 2 below: The growth of fattening swine (Assisting) up to 121 days can grow an average of 0.65 kg / head / day, this increase in body weight is significantly higher ($P < 0.05$) when compared to non-assitant swine. Likewise, in the diversion of the ration, swine in the assisting location require less feed (4.23 kg) when compared without unassited (5.63 kg) to reach 1 kg weight. This is due to the introduction of supplementary swine in the form of Bio B probiotics as much as 2 cc / 1 liter of drinking water and formula ration is regulated both in quantity and nutrient content (mainly calories and protein) getting closer to the selling price above 60 Kg, source of protein is lowered by the percentage, while the source of calories is increased. This is in accordance with research conducted by Soeharsono *et. al.* [14] that the administration of probiotics in swine can also increase body weight and significantly increase the efficiency of ration use. It was also reported that the stool ammonia content also decreased by 11.8%, thereby reducing the odor from pig excrement.

Table 2: Increasing body weight of both assisted and non-assisted swine for 121 days

Parameter	non-companion	companion
Initial Weight (kg)	13,91 ^a	13,81 ^a
Final Weight (kg)	78,41 ^a	91,86 ^b
Total Body Weight (kg)	64,50 ^a	78,05 ^b
Weight gain (kg/days)	0,53 ^a	0,65 ^b
Consumption of ration (kg)	3,00 ^a	2,73 ^b
FCR(kg/kg)	5,63 ^a	4,23 ^b

Source: Primary Data

The results of this study were also supported by research conducted by Budiari and Guntoro [2] who gained daily body weight gain, and the conversion of pig feed that received Bio B probiotics was significantly higher ($p < 0.05$) compared to control pigs. The increased growth of swine is due to the provision of Bio B probiotics which causes the digestive value and metabolism of food substances especially proteins and carbohydrates to increase so that the growth of swine becomes faster. This means that the efficiency of feed use increases with the provision of probiotics. Feed conversion is the amount of ration consumed to produce weight gain in the same unit of weight and time [8]. Feed conversion can be reduced by reducing feed consumption through food restriction or by increasing production figures without increasing feed consumption, one of which is by adding probiotics into rations / drinking water so as to maximize the work of digestive organs [10].

3.3. Farm analysis

For farm analysis, it can be seen in Table 3. In the table it can be seen the average of ownership 11 fattening swine (with initial weight of 13 kg) with average piglets prices of Rp 550,000 /head, with an average amount of feeds per days of 3 kg per head. During 121 days of maintenance, the group of

livestock that was assisted gained 86.91 kg / head (10.84% heavier than non-assisted pigs). With the price of live weight at the time of sale is Rp 23,000 / kg, the benefits gained from the maintenance of 11 animals are Rp 8,730,160 (Rp 793,650 / head). The same thing was also found in the study of Rivo *et al* [11] which received an average selling price of hogs in force in the Tareran District in 2014 at a price of Rp.23,000 / kg of live weight, with a price for starter phase of Rp.550,000 / head. The average live weight of livestock for the starter phase is 25 kg / head, grower phase 105 kg / head, sows 141 kg / head and boar 122 kg /head. The amount of profits obtained by farmers is Rp. 1,512,367 /head/production period. The analysis shows that the average profit per year is Rp. 13,611,309 or an average per month of Rp.1,944,472. While the results obtained by Budiari and S. Guntoro [2] on the enlargement of swine given Bio B found that the treatment of Bio B probiotics provided the highest benefits (R/C ratio 1.92) compared without Bio B (1.71). It was further explained that the increase in profits was due to an increase in output as a result of increased growth. The provision of Bio B probiotics did cause an increase input by (Rp. 2,142) but the increase input was much smaller than the increase output (Rp. 234,000, -). In this assisting activity, the group of swine that were assisted by the provision of probiotics caused an increase in business efficiency which can be seen from the R/C ratio from 1.27 to 1.60.

The group of swine that are accompanied requires a lower selling price to get the break-even point, as well as the weight of the time of sale, the growth of swine in the assisted group of swine that are accompanied requires a lower body weight to reach break-even point than non-assisted group of swine.

Table 3. Analysis of assisted and non-assisted pig farming for 121 days with an average ownership of 11 animals

Component of Input-Output	Treatment	
	Non assisted (Rp)	assisted (Rp)
Initial weight (Kg)	13,91	13,81
Selling Weight (Kg)	78,41	86,91
A. Input Components		
1. Piglets (11 head)	5500000	5500000
2. Feed Starter phase	1.762.189	1.112.320
3. Feed Grower phase	3.526.490	3.117.400
4. Feed Finisher phase	3.641.000	3.593.700
5. Medication for worms, vaccinations etc	200.000	200.000
7. Maintenance workforce	187000	187000
8. Depreciation Pen and tools	800000	800000
B. Total Fattening Costs	15.616.679	14.510.420
C. Revenue		
(Weight P0=78,41; P1=91,86; @ Rp23000)	19.837.730	23.240.580
D. Profit (C-B)	4.221.051	8.730.160
E. R/C Ratio (C/B)	1,27	1,60
F. B/C Ratio (D/B)	0,27	0,60
G. Break-Even Point Price (Rp/Kg Life weight)	18.106	15.178
H. Break-even Point of Production (Kg)	62	57

For business feasibility, the assisted group of swine by the disseminated technology package is more feasible to proceed, with a B/C ratio of 0.60 while the non-assisted swine of 0.27. The limited capital

owned by farmers causes them to limit the number of livestock raise and the use of input factors so that it will have an impact on relatively small profit levels. This result is lower than the results of a study conducted by Parwati *et.al.* [9] where the ratio between cost and revenue shows that the way farmers treat B/C Ratio is 1.40 lower than B / C The ratio of swine given Bio B probiotics which reached 1.61. Further, it was said that in the way of treatment of farmers each Rp. 1000 costs incurred for fattening swine can bring in revenue of Rp. 1400. Whereas, the treatment given bio-B probiotics in fattening swine rations was able to provide far more profitable in the amount of Rp 1610 for 114 days.

According to Sihombing [13], the biggest production cost in the swine business is the cost of feed reaching 65-80 percent of the total production cost. The results of Hardyastuti's study [7] show that the cost of feed for swine ranges from 70-80% of the total production cost. Santa [18] who conducted research in the Minahasa District showed that feed costs exceed 80% of the total production costs. While in reality lately since the monetary crisis hit the economy, animal feed prices have increased. An increase in production costs without being followed by profits is a problem for farmers because production costs are a determining factor in the livestock business. Changes in factor prices will certainly have an impact on changes in profits received. In every livestock business always expects profit because the success of livestock business depends a lot on the profits obtained by farmers. There are several benefits that can be obtained in raising swine, in addition for being a source of protein, it can also make a large contribution to increasing the income of farmers' families

3. Conclusion

Dissemination of technology packages in assisting activities can increase productivity in fattening swine by 10.84% when compared to the productivity of the unaassisted group of pigs. During 121 days of maintenance, profits received by farmers increased by 51.65%, this is because in the assisting activities the amount of consumption feed was reduced, feed protein source was reduced during the growth phase but probiotics were added to maximize the digestive function of livestock, thereby impacting on decreases input but increases productivity. Technology packages that are disseminated to assisting activities feasible to be distributed more widely because they provide a larger B/C ratio.

4. References

- [1] Adnyana OM 1989 *Analisis Ekonomi dalam Penelitian Sistem Usahatani* Latihan Metodologi Penelitian Sistem Usahtani Badan LITBANG Pertanian Jakarta 1989 12p
- [2] Budiari LG dan S Guntoro 2015 *Pemberian probiotik Dan Enzim Untuk meningkatkan Pertumbuhan babi Peranakan Landrace Di Desa Tua, Kabupaten Tabanan.* Majalah Buletin
- [3] Dinas Peternakan dan Veteriner Provinsi Bali 2016 *Data Populasi Ternak di Provinsi Bali* Dinas Peternakan dan Veteriner Provinsi Bali.
- [4] Kompyang I P 2009 *Pemanfaatan Mikroorganisme sebagai Probiotik untuk meningkatkan Produksi Ternak Unggas di Indonesia* Majalah Pengembangan Inovasi Pertanian 2(3) Hal. 177-188
- [5] NRC 1998 *Nutrient Requirments of Swine.Nutrient Requirments of Domestic Animal* Ninth Revised Edition National Academy Press Washington DC
- [6] Guntoro S, N Suyasa, AA Badung dan M Londra 2008 *Pengaruh Pemberian Probiotik (Bio B) Terhadap Pertumbuhan dan Komposisi Kimia Karkas Ayam Pedaging* Makalah Seminar Hasil Penelitian- Bappeda tahun 2008 Denpasar 12 Desember 2008 8 hal
- [7] Hardyastuti S 2011 *Kajian Biaya Produksi Pada Usaha Peternakan Babi* Jurnal Sosek Peternakan Unibraw Malang Volume 12 No 1 Malang
- [8] Putri TI 2003 *Penampilan dan Karakteristik Karkas Babi Bali Diberikan Ransum dengan Taraf Limbah Hotel Berbeda* Prosiding Seminar Nasional Revitalisasi Teknologi kreatif dalam mendukung Agibisnis dan Otonomi Daerah.Hal 410-414 Denpasar 7 Oktober 2003 Pusat Penelitian dan pengembangan Sosial Ekonomi Pertanian Badan penelitian dan Pengembangan Pertanian. Departemen Pertanian
- [9] Parwati IAP, Luh Gde Budiari dan Nyoman Suyasa 2014 *Analisis Usahatani Penggemukan*

Ternak Babi Dengan Pengaturan Ransum Prosiding Seminar dan Lokakarya Nasional Ternak Babi Peran Peternakan Babi dalam Konstelasi penyedia Pangan Nasional Fakultas Peternakan UNUD

- [10] Parwati IAP dan I Nyoman Suyasa 2016 *Pengaruh Pemberian Probiotik Terhadap Produktivitas Dan Keuntungan Usahatani Ternak Babi* Prosiding Seminar Nasional Pengembangan Pertanian Berkelanjutan yang Adaptif Terhadap Perubahan Iklim Menuju Ketahanan Pangan Dan Energi. Fakultas Pertanian UNRAM
- [11] Rivo E. Kojo VVJ, Panelewen M AV dan Manese Nansi Santa 2014 *Efisiensi Penggunaan Input Pakan Dan Keuntungan Pada Usaha Ternak Babi Di Kecamatan Tareran Kabupaten Minahasa Selatan* Jurnal Zootek (ZootekJournal) Vol 34 No 1 : 62-74
- [12] Swastika DSK 2004 *Beberapa ternak Analisis dalam penelitian dan pengkajian Teknologi Pertanian* Jurnal pengkajian dan pengembangan Teknologi Pertanian Vol 7 N0 1 Januari 2004 Hal 90-103
- [13] Sihombing, DTH 2010 *Ilmu Ternak Babi*. Gadjah Mada University Press Yogyakarta
- [14] Soeharsono,Adriani L,Safitri R, Sjoifjan O, Abdulah S,Rostika R,Lengkey H A W, A Mushawwir 2010 *Probiotik Basis Ilmiah Aplikasi dan Aspek Praktis* Penerbit Widya Padjadjaran Bandung
- [15] Steel RGD and JH Torrie 1991 *Principles and Procedures of Statistics* Translated Bambang Sumantri PT Gramedia Pustaka Utama Jakarta.
- [16] Santa N 2012 *Analisis Pendapatan Usahatani Ternak Babi di Kabupaten Minahasa* Jurnal Agropem Volume 1 No 1 Januari 2012 Manado

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