

## **Influence the improvement of cattle feedlot production system to increase the welfare of feedlot farmers group in Indonesia through the implementation of integrated sustainability farming system**

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**ABSTRACT:** Beef cattle production has been established as a leading meat-producing commodity in Indonesia. Cattle farms in Indonesia are largely popular farms which contribute around 80-90 percent to national meat production. Ongole-Simmental Crossbred, which is a product of backcrossing between Simmental cattle (which is included as exotic breed) and Ongole cattle, represents the beef cattle that largely fattened by farmers under the feedlot system. Boyolali regency so far has been known as dairy producing area from FH dairy cow turns out to be potential beef cattle producing area as well, including Ongole-Simmental Crossing Beef Cattle. However, the regency has to faced with such constraints as conventional feedlot management, declining fertility of greenery land, and the lack of feeder cattle supply. These are among the factors impeding the improvement of the farmers' welfare. The problems can be simultaneously solved by applying of Zerowaste - LEISA (Low External Input Sustainable Agriculture) using an approach of Integrated Sustainability Farming System (ISFS). A case study, Sebelas Maret University through Animal Husbandry Department to get funds perform two activities that the Integrated Appropriate Technology Program (IATP) of Education and Culture Department of Central Java and be continued through a Working Class of Business Program (WCBP) of Directorate of Research and Community Service of the National Education Ministry. The group was consisted of 25 members with a total of 125 head Ongole-Simmental cross. The program implementation consists of usage of Ongole-Simmental Crossbred for feeder-cattle, improvement of the feed management system, housing system, and waste management. The activities were based on the technology application to the fattening process under feedlot system and to the production of solid and liquid organic fertilizers in the application of Zero Waste-LEISA based on the ISFS. Their final weight of fattening ranged after 120 days fattening was 510 to 560 kg, from their initial weight of 400 to 440 kg, with daily weight gain of 0,9 to 1.2 kg. Feces and urine wastes made up another income amounting to 110% and profit of 86%. Simental fattening enterprise based on feedlot system made profit up to IDR. 1.187.750 each, and feasible enough to work on with B/C and R/C of 1.5 and 3.5, respectively. The management of the program and/or asset after the copletionwith the application of imposing continued profit-sharing agrrement in the form of cooperative agreement between Farmer Group ("Sambi Mulyo") with Sebelas Maret University Team. Formula the profit-sharing : value added selling was devided by 70% for farmer group and by 30% for SMU Team. Ongole-Simmental Crossbred feedlot business in popular farming went off wasteless and environmentally friendly. Natural and human resources farmers group are greatly potential to develop into mainstay farmers.

**Key words :** feedlot production system, ongole-simmental crossbred, integrated sustainabilitiy farming sytem, welfare feedlot farmers group

### **INTRODUCTION**

Most of beef cattle farms in Indonesia represent popular animal husbandries, yet they contribute around 80-90 percent of national beef production. Beef cattle production has been established as a leading meat-producing commodity in Indonesia. Cattle farms in Indonesia are largely popular farms which contribute around 80-90 percent to national meat production. Beef consumption is around 23% of the total national consumption of meat. The average rate of increase in consumption of meat by 5.2% per year can not be full filled by the rate of increase in production that grows approximately 2%

per year. Ongole-Simmental Crossbred which is a product of backcrossing between Simmental (on exotic breed) and Ongole cattle in Java Indonesia, represents the beef cattle that largely fattened by the farmer under the feedlot system. Boyolali regency hitherto known as milk-producing area of FH dairy cow was also potential to become an enclave of beef cattle for Central Java Province. However, the regency was faced with such constraints as conventional feedlot management, declining fertility of greenery land, and the lack of feeder cattle supply. These are among the factors impeding the improvement of the farmers' welfare. The problems can be simultaneously solved by applying Integrated Sustainability Farming System using an approach to Zero Waste-LEISA (Low External Input Sustainable Agriculture). LEISA approach is a way in applying the concept of integrated farming with the use of inputs originating from the agricultural system itself, and, furthermore, the use of production inputs from outside the agricultural system is quite minimal (Diwyanto, et al., 2006).

The objectives are as follow: the program implementation consists of usage of Ongole-Simmental Crossbred for cattle-feeder, improvement of the feed management system, housing system, and waste management. The activities are based on the technology application to the fattening process under feedlot system and to the production of solid and liquid organic fertilizers in the application of Zero Waste-LEISA based on the ISFS. A case study, Sebelas Maret University through Animal Husbandry Department to get funds perform two activities that the Integrated Appropriate Technology Program (IATP) of Education and Culture Department of Central Java, and was continued through a Working Class of Business Program (WCBP) of Directorate of Research and Community Service of the National Education Ministry.

The IATP program aims at increasing the capacity and productivity of Ongole-Simmental Crossbred Beef fattening program; developing the culture of applying the academic research findings commercially and continually; improving the local human resource capacity and bring college institution closer to popular animal husbandry; providing employment for local people using potential local resources to improve the people's income; and developing business relationship with the private sector, foundation and marketing sector. It is implemented by improving the management of fodder, housing, processing and production of organic fertilizer, either in solid or liquid form, and analysis of business and marketing. In addition to the improvement of entrepreneurship and soft skill of the students in the field of beef cattle fattening, WCBP was also aimed at developing business plan and increasing the productivity of beef cattle fattening at the level of farmer group. Furthermore, the WCBP was intended to foster the culture of university research application commercially and continually, to develop local human resources, to move higher education institutions closer to the business of people's animal husbandry, to provide employment in local areas, and to increase the farmers' income.

## **MATERIALS AND METHODS**

This program was conducted on collaboration with livestock farmers' group "Sambi Mulyo" located in Jagoan Village, Sambi subdistrict, Boyolali Regency, Central Java Province. What has been done was an Integrated Appropriate Technology Program (IATP) of Education and Culture Department of Central Java in 2008, and continued in 2009 through a Working Class of Business Program (WCBP) of Directorate of Research and Community Service of the National Education Ministry. The group was consisted of 25 members with a total of 125 head Ongole-Simmental Crossbred.

The program implementation include : (1). The use of the Ongole-Simmental Crossbred for feeder-cattle with the Ongole-Simmental Crossbred which is a product of backcrossing between Simmental and Ongole cattle in Java Indonesia, represents the beef cattle that largely fattened by the farmer under the feedlot system, (2). Improvement of the feed management system with use of agricultural waste in the manufactured of feed concentrates through the application of appropriate formulation, (3).Improvement of the housing system with the designing and making through the creation of the healthy and environmentally friendly feedlot cattle housing, and (4) Improvement waste management with the processing and utilization of the feses and urin into solid and liquid organic fertilizer.

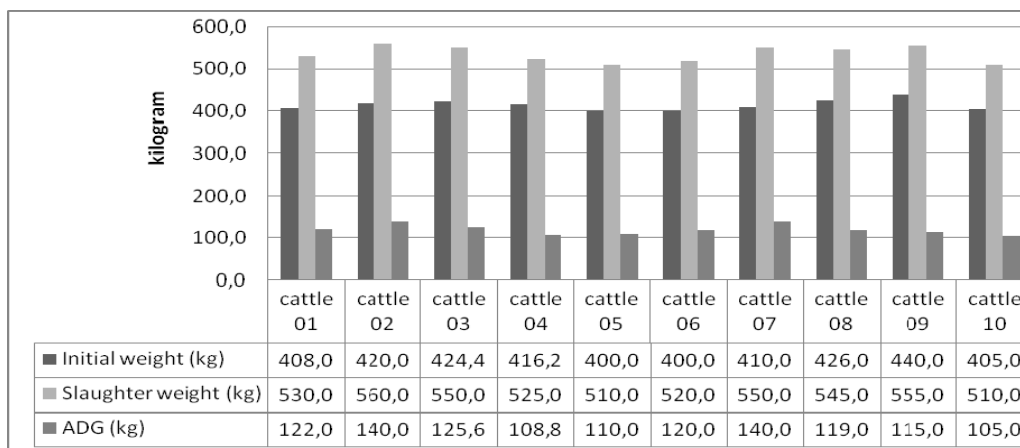
The activities of program implementation based on Integrated Appropriate Technology Program (IATP) included : (a) consolidation and coordination : identification and survey, site utilization permit, work program coordination, implementation agreement, (b) implementation (c) program at the feedlot farmers (program socialization, counseling, training, visits/comparative study, process of management improvements for feedlot production system (usage of Ongole-Simmental Crossbred, feeding, housing, feces and urine waste utilization), (d) monitoring and evaluating (to monitor and to evaluate the corresponding activities); (e) implementation of profit-sharing; (f) reporting (arrangement of reporting materials, the process of making the report by the team, duplication and delivery of reports); (g) publication (national scientific journals and national and/or international seminars). Sustainability program are the activities of program implementation based on Working Class of Business Program (WCBP) which involve student of Animal Husbandry Department SMU to help SMU team in the implementation of the program improve relation of science and technology applicative continue to feedlot production system in the farmer group as well as to improvement of the marketing, selling and bookkeeping system.

The management of the program and/or asset after the completion with the application of imposing continued profit-sharing agreement in forms of cooperative agreement between Farmer Group (“Sambi Mulyo”) with Sebelas Maret University Team. Formula the profit-sharing : value added selling is divided by 70% for farmer group and by 30% for SMU Team.

## RESULTS AND DISCUSSION

### *The Use of Ongole-Simmental Crossbred for Feeder-Cattle*

Simmental beef cattle of feedlot fattening system have been generated. Their final weight after 120 days of fattening ranged from 510 to 560 kg, from their initial weight of 400 to 440 kg (Figure 1), with daily weight gain of 0,9 to 1,2 kg (Figure 2). ADG Ongole-Simmental Crossbred from 0.9 to 1.2 kg / day was higher compared to those of PO cows that had only ADG .75 kg / day from the research Widyawati and Pratitis, 2007. Further more, Ongole-Simmental Crossbred cattle feedlot had superior characteristics and performance quality (efficient use of feed, the rate of daily weight high and low feed costs), Which was caused by the blood-exotic breed of Simmental. Agribusiness opportunities Ongole-Simmental Crossbred highly prospective. That market demand for local, regional and even quite encouraging exports. There's meat market opportunities Ongole-Simmental Crossbred for beef substitutes. Marketing cattle feedlot results is marketed in cooperation with the cutting and / or merchants. Marketing was good in the local market and surrounding areas of Boyolali district and then extended to West Java, West Java, DKI Jakarta, Yogyakarta and East Java.

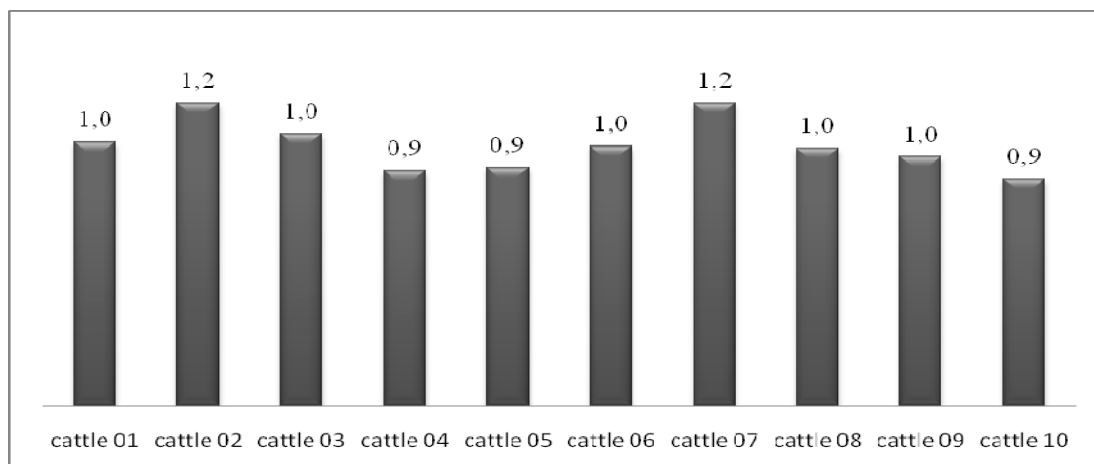


**Figure1.** Profile of the Body Weight (kg) and Gain (kg) Ongole-Simmental Cross after 120 days fattening.

### ***Improvement of The Feed Management System***

The fermented straw and concentrate were produced by the farmers. Fattening diet composition consisted of 70% fermented straw and 30% concentrate based on dry matter. The concentrate, known as GPFS (Growth Promoted Feed Supplement), was given as feed supplementing in concentrate basal (10 kg by product of mash-cassava industry or "onggok", 5 kg rice bran, and fermented straw *adlibitum*). Composition of GPFS included 5% urea, 20% molasses, 30% soybean meal, 5% "ketepeng" leave, 39% rice bran, 1% vitamin and mineral. Protein content of GPFS was 10,5% and the price IDR 2500/kg. The latter was made of local materials blended in a 600kg/hour capacity mixer machine. The former was made using Starbio starter. Fermented straw included 1 ton jerami, 6 kg starbio and 6 kg urea with price IDR 300-350/kg. All materials were derived from agricultural waste concentrate, the remainder of the agricultural crops and agricultural crops of industrial waste, while the rest comes from straw fermented rice crop harvest. Both ingredients are cheap, easily obtained and available at all times from nearby. Thus, feedlot was held with the method LEISA (Low External Input Agricultural Sustainability) or the use of production costs to a minimum by using agricultural waste materials as raw material feed (Riyanto, et al, 2010b).

GPFS was a feed supplement with a formula intended to manipulate nutrition to optimize bio-fermentation in the rumen (Widyawati and Pratitis, 2006a). Widyawati and Pratitis, 2008 reported that the GPFS composed of feedstuffs containing methane reduction agents (lemuru fish oil or ketepeng leaves). It provided also nutrients for rumen microbial synthesis (urea and molasses) and provide post-rumen protein (soybean meal or lamtoro leaves) (Widyawati and Pratitis, 2006b). Widyawati and Pratitis, 2007 explained that the use of GPFS (soybean meal) in rice straw-based rations could improve performance of male PO cattle with Average Daily Gain (ADG) of 0.75 kg/day and the use of GPFS (lamtoro leaves) could increase ADG up to 105% compared to the control diet (0.60 kg/day). Of the several kinds of PUFA source feedstuffs reviewed by Riyanto et al (2009 and 2010a) it was determined that soybean meal, fish meal, palm meal, protected lemuru fish and palm oils had an excellence fermentability kinetics in providing nutrients for ruminal microbes or the host in terms of high protein digestibility. It was further stated that the addition of the feed material did not interfere with ruminal environment as indicated by high VFA production kinetics as a reflection of fiber feed ration degradability.



**Figure 2.** Priflie of the average daily gain (ADG) kg/day Ongole-Cross after 120 days fattening

### ***Improvement Housing System***

The cattle housing was made for a group of cattle, equipped with facility and infrastructure for storing and composing solid (feces) and liquid (urine) organic fertilizer. Ongole-Simmental Crossbred fattening business under feedlot system in popular farming went off wasteless and environmentally friendly. Cattle housing was created as a place of integrated feedlot production process, where the

supply of feed, food preparation, processing and storage of solid and liquid organic fertilizer were done in one area of the cattle housing complex. This cattle housing was also called the cage healthy and environmentally friendly, because the cage waste (faeces and urine) could all be handled and processed into organic fertilizer in solid and liquid (zero-waste system). Both these fertilizers as additional income for farmers.

### ***Improvement of Waste Management***

All members of the group made a courtesy call to the beef cattle fattening company (“ CV Alam Makmur Sejahtera”, Klaten Regency. There they Joined the training of accounting management and business analysis for feedlot beef cattle fattening system and marketing development at the group level. The implementation included improvement of feed, feces and urine wastes, cattle housing, bookkeeping and marketing management. Five farmers were sent to attend a training program in Integrated Farming System at CV. “Lembah Hijau Multifarm” Sukoharjo Regency for the seven days. The activities were based on the technology application to the fattening process under feedlot system and to the production of solid (feces) and liquid (urine) organic fertilizers in the Pattern of Integrated Sustainability Farming System with the Concept of Zero Waste-LEISA (Low External Input Sustainable Agriculture).

The solid organic fertilizer and liquid organic fertilizer were produced by the farmers. Decomposition process to produce the solid organic fertilizer involved 65% feces, 20% Stardect starter, 10% kitchen ashes, 5% limestone powder. Urine was processed to generate liquid organic fertilizer by adding 8% local herbal spices (galangal, temu ireng, ginger, kencur, turmeric, sambiloto, and lemongrass), 2% molasses, and 0,1% starter.

### ***The Welfare of Feedlot Farmers Gorup and Sustainability Program***

Business analysis was performed on fattening Cattle enterprise that do not implement the use of GPFC concentrate and utilization of feces and urine as a commodity of solid and liquid organic fertilizer. Accretion rate of daily weight had reached 1,0 kg/ day/head with the profit of IDR 1.526.000/month/cow (15%) or IDR 381.500/month/cattle (4%) with the B/C and R/C values of 1.2 and 0.2., respectively. Meanwhile, business analysis after progame activities was conducted on the activities of Simental cattle feedlot systems that implemented the use of GPC concentrate and marketing of solid and liquid organic fertilizer with the daily weight gain of 1.2 kg/day/cow. The profit has reached IDR 1.187.750 /month/head (57%) or IDR 450.500/month/cattle (52%) with the B/C and R/C values of 1.3 and 0.3., respectively. From the comparison between the two, it seemed that there was a change up to 110% at the level of profits for 4 months, 110% at the level of monthly profit with the increase in B/C and R/C values of 8,3% and 50%, respectively.

The management of the program and/or asset after the completion of activities was conducted by imposing continued profit-sharing agreement in forms of cooperative agreement between “Sambi Mulyo” farmers group and Research and Community Service Department of Sebelas Maret University team. The profit-sharing formula was as follow: value added selling was divided by 70% for farmer group and by 30% for the team. Out of the 70% : 60% was for the farmer, 5% for the development of the group’s capital venture, and the other 5% was allocated to the medical cost. The outputs of WCBP are final report of activities, business plan report of beef cattle fattening of Simmental, the marketing of fattened quality beef cattle fed with fermented straws and GPFS supplement made from local fodder, the production of solid and liquid organic fertilizers madder from feces and urine, respectively (as the additional income) and continual and wastesless Simmental cattle fattening enterprise.

## **CONCLUSIONS**

The current research concludes that students gain direct experience in developing business plan for feedlot system of cattle beef fattening. WCBP team obtains applicable course material; relationship was established between Animal Husbandry Departement of SMU team and farmer group; increased

farmer income and improved management of feedlot system of cattle beef fattening. Ongole-Simmental Crossbred feedlot business in popular farming went off wasteless and environmentally friendly. Natural and human resources farmers group are greatly potential to develop into mainstay farmers

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