Increasing of livestock revenue through integration corn and Bali cow

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Abstract. The study was conducted in farmers at Gantarang Keke, Bantaeng Regency, South Sulawesi. The purpose of this study was to determine increase of farmers' income in the integration maize and Bali cow. The study used surveys, interviews and questionnaires for 30 farmers. Randomized block design uses 2 fertilizer factors, organic 4 levels and inorganic 3 levels, with 3 replications respectively. Parameters are production and biomass (straw, cob and klobot) of corn. The 15 head of Bali cow are used with 3 corn feed treatments and 5 replications. Results of research on corn production showed that organic fertilizers did not show significant different (P >0.05) but inorganic fertilizer showed increase significantly (P <0.05). There was no interaction effect in both fertilization treatments. The results of economic research on corn production showed net profit of corn business income by organic fertilizer which in the amount of Rp.6.27 million/harvest and R/C of 1.57. The net profit by inorganic fertilization was Rp.7.28 million/harvest, R/C was 1.65. The profits of the Bali cow was Rp. 4.78 million/year, R/C of 1.44. The integration of corn plants and Bali cow in farmers, gives good results because it is economical, effective and efficient. This business is economically feasible to try again.

1. Introduction

Indonesia has a good agroecosystem, as well as abundant natural resources and suitable soil conditions for the development of the agricultural sector [1]. The agricultural business system in Indonesia is almost nonexistent, especially those carried out by rural farmers. Integration between food crops and Bali cattle in the village of Tombolo, Gantarang Keke District, Bantaeng Regency, South Sulawesi Province, has been carried out. Integrated business patterns have been widely applied and lead to farming with a system of Low External Input Sustainable Agriculture (LEISA) [2]. Potential areas of Buttono Village, Gantarang Keke Subdistrict, Bantaeng Regency in South Sulawesi Province are sufficiently supportive for the development of the integration of maize and Bali cattle. Besides that, the availability of labor of family farmers is still quite high, thus supporting integrated farming. According to Ilham [3] that, almost 90% of farmers carry out their business traditionally and others are feedlots. Integrated agricultural businesses in Indonesia have implemented a system of crop integration with livestock “on station multiple cropping”.

The integration system has developed and lately the term cropping pattern emerged in the farming system effort and finally the integration system between food crops and livestock called CLS (crop livestock system) [4]. According to Rusdiana et al [5] that, farmer resources are an important
supporting factor in getting ideas to innovate for developing their business. Natural, human and capital resources that can be utilized, plays an important role for economic growth that will improve the farmers welfare through increased development of agricultural and livestock businesses [6,7]. Human resources as farmers will go through a process to increase knowledge and creativity in enhancing their livestock integration efforts [8]. The success of farming and livestock business in increasing productivity and product quality must be supported by adequate supporting facilities and infrastructure [9].

This is very important for farmers and their relation to the acceptance of applications of technological innovation, through counseling [10]. These technological innovations can be applied through farmer groups, useful for improving business scale, so that the expected benefits can be achieved. From a macroeconomic perspective, the accumulation of human resource productivity and technological innovation will drive the growth of sustainable agricultural production. The development of potential farmers’ resources in improving livestock business needs to be adjusted to the ability of farmers and their capital in an effort to increase livestock competitiveness [11–13]. Production costs for providing beef cattle, feed are very high and as the main input that needs to be supplied daily [14]. Beef cattle business can be integrated with corn and/or other crops [15–17]. The corn crop business and Bali cattle, is a sizable business opportunity for farmers in South Sulawesi, as an effort to increase farmers’ income.

The integration of maize and Bali cattle can support the adequacy of feed and increase the productivity of Bali cattle and at the same time increase farmers’ income. The integration of corn and cattle can get a double benefit value, both from corn, corn biomass (straw, cob and klobot) and beef. According to [18], a similar integration can be applied moreable to the integration of oil palm plantations and Bali cattle for increasing farmers’ income, cattle population, and domestic meat production. Yuliani [19] also said that, the integration of rice fields and beef cattle in the agricultural system is a very important strategy, and can improve the welfare of farmers. Saptana and Ilham [20] shows, the integration of sugarcane plantation and Bali cattle can also increase farmers’ incomes. Opinion of Sodiq et al. [21], the need to strengthen farmers through group dynamics could be able to apply technology together between members in order to improve beef cattle productivity and farmers’ welfare. Togetherness in the farmers group is very important, because land-based beef cattle breeding for forage feed sources, its capacity is increasingly limited, so it is necessary to integrate the business of sugarcane, corn, rice and palm, which is an alternative, as a solution to the problem of meeting the needs of Bali cattle feed and domestic beef requirements.

According to Idris et al. [22] that, through the intervention of maize, plantations and Bali cattle, can increase the independence of farmers to utilize agriculture by products. Merging several types of commodity businesses in a certain area is an opportunity that can increase farmers’ income [20]. Farmers can increase the production of maize and Bali cattle, through intensification, extensification and integration. Corn is one of the land resource ecosystems that has great potential as a food and feed industry and its biomass as Bali cattle feed. According to Rouf and Soimah [23] that, livestock farmers have not been doing business technically and economically efficiently, so farmers need to do business efficiency through production resources, so as to increase the number and quality of production output. The concept of integration of corn and Bali cattle provides a synergistic advantage, namely from corn and Bali cattle. Carrying capacity of forage and agricultural waste is readily available and can be used as Bali cattle feed. This is due to the benefits of by-crop corn as food, and livestock produce organic fertilizer that can be returned to agriculture. Based on the problems mentioned above, it is necessary to do research on the integration of maize and Bali cattle in farmers. The purpose of this study was to determine the increase in farmers’ income in the integration between maize and Bali cattle.

2. Materials and Method
The study was conducted in the village of Buttono, Gantarang Keke District, Bantaeng Regency, in the Province of South Sulawesi in 2017. The study used surveys, interviews and questionnaires for 30 farmers. This study uses an arrangement based on a randomized block design with 2 factors, 3
replications and 12 treatment combinations. The first factor is organic fertilizer (PO) which consists of 4 levels, namely: (A0) PO=0 kg, (A1) PO=1000 kg/ha, (A2) PO = 2000 kg/ha, and (A3) PO=3000 kg/ha. The second factor is inorganic fertilizer from 3 levels: (K1) 375 kg+Urea 270 kg/ha (K1 is a recommendation of fertilizer treatment); (K2) 75% of K1 (the recommendations); and (K3) 50% of K1 (the recommendations). From 2 kinds of fertilization treatments, 12 kinds of treatment combinations will be obtained in 3 replications, so that there are 36 treatment combinations. The parameters measured are corn biomass (straw, cob and klobot) and the corn production. The Pioneer 27 maize variety is used in this research and the variety is a hybrid corn. In the integration of maize and Bali cattle, there are selected 15 female heads Bali cattle were used with ages between 2-3 years.

The selected female Bali cattle used in the study are those in the care of farmers where the method of maintenance and feeding is not tested and is considered to be ad libitum for feeding and drinking. Those Bali cattle are vaccinated with Anthrax and SE vaccines, then given worm medicine and multivitamin. Provision of drugs and multivitamins is to keep Bali cattle in good health, and also to anticipate mineral deficiencies. Furthermore, the Bali cattle were included in the study and divided randomly into 3 level feeding treatments and 5 replications each, with the following feeding: treatment S0 = (100% elephant grass+0% corn biomass)+1% concentrate of cow body weight; in the subsequent treatment that changed was the amount of elephant grass and corn biomass, while the concentrate remained the same in each treatment, namely 1% of body weight; S1 = (75% elephant grass+25% corn biomass)+1% concentrate of cow body weight; and S2 = (50% elephant grass+50% corn biomass)+1% concentrate of cow body weight. The composition of the concentrate is: 54% bran, 15% corn meal, 15% coconut cake, 15% corn cobs, 0.5% mineral and 0.5% salt.

Primary data obtained through the evaluation results of integration of maize and female Bali cattle are from farmers. Then the data is analyzed using ANOVA (Analysis of Variances) statistics. Then the data analysis is continued with the 5% HSD test to compare between the average observations of each variable [24]. All primary data used are collected from farmers and secondary data obtained from the relevant Livestock Services Office. Then the data are analyzed and tabulated descriptively, quantitatively and economically. Financial economic analysis can be done using partial factors and indicators of analysis, which can be used to predict profit or loss efforts. On the integration of maize and Bali cattle for one year, calculation is based on the value of R/C ratio (Benefit Cost Ratio) [25,26]. To find out the amount of farmer labor costs for one year, data is calculated based on the results of previous calculations [27].

3. Results and Discussion

3.1. Regional general conditions

The population of South Sulawesi in 2018 was 8.3 million people with a population density of 344 people/km² and spread almost evenly in each district. Distribution of population in 67 villages/kelurahan in 8 Subdistricts in Bantaeng Regency in a large group of 496 inhabitants/km² spread at 395.83 km². The population working in agriculture is almost 90% and others are traders, employees and temporary workers. Government support for farmers and ranchers including Balinese cattle ranchers and farmers who work on other farms is very good. The government prioritizes the Bali Cows because they are seen as being able to increase farmers’ income. Besides that, the support of farmers’ workforce and enough natural resources are available nearby, so they can be utilized more optimally. The distribution of the population will be more balanced and the standard of living of the farmers (that could not be separated their role as farmers) will increase their income and welfare Bali cattle population is close to 1 million and corn plants areas reaches 420,984 ha and the distribution of corn plants and bali cattle is quite evenly distributed in South Sulawesi as well as in Bantaeng districts. Nevertheless the integration between corn crop and Bali cattle has not been implemented with a good order for optimizing the productivity of each commodity through a pattern of integration between corn and Bali cattle in the districts.
3.2. Production biomass of maize plants
Cow plant biomass production that consisting of straw, cob and klobot with the treatment of organic and inorganic fertilizers and the interaction of the two treatments are shown in table 1. Production of corn biomass in coul be looked at table 1. This table also show that hybrid corn plants are more responsive to optimal fertilization. Biomass production of corn treated by organic fertilizers and inorganic fertilizers in a single way and in interaction between both treatments was significantly different (P<0.01) to the production of corn straw, cob and klobot.

| Table 1. Production biomass of maize plants tons/ha |
|---------------------------------------------------|
| Treatment | Production of corn straw | Production of corn cob | Production of corn klobot |
| Factor I (Organic fertilizer levels) |
| A0 = 0 kg/ha | 11.36a | 3.02a | 4.14a |
| A1 = 1000 kg/ha | 12.44b | 3.32b | 4.56b |
| A2 = 2000 kg/ha | 12.77b | 3.40b | 4.68b |
| A3 = 3000 kg/ha | 11.88b | 3.17b | 4.37b |
| Factor II (Inorganic fertilizer level) |
| K1=NPK 375kg+Urea 270 kg/ha | 13.22b | 3.52b | 4.84b |
| K2 = 75% of K1 | 12.01a | 3.2ab | 4.40a |
| K3 = 50% of K2 | 11.11a | 2.96a | 4.08a |
| Interaction |
| A0 K1= 0 kg/ha organic fertilizer and NPK 375 kg + Urea 270 kg/ha | 12.75ax | 3.37ay | 4.63y |
| A0 K2 = 0 kg/ha organic fertilizer and 75% of K1 | 10.75ax | 2.87ax | 3.91az |
| A0 K3 = kg/ha organic fertilizer and 50% of K1 | 10.59ax | 2.82ax | 3.89ax |
| A1 K1 = 1000 kg/ha organic fertilizer and NPK 375 kg + Urea 270 kg/ha | 12.81ay | 3.42ay | 4.70y |
| A1 K2 = 1000 kg/ha organic fertilizer and 75% of K1 | 13.01cy | 3.48cy | 4.77cz |
| A1 K3 = 1000 kg/ha organic fertilizer and 50% of K1 | 11.53bx | 3.07bx | 4.22dx |
| A2 K1= 2000 kg/ha fertilizer organic and NPK 375 kg + Urea 270 kg/ha | 13.65bx | 3.64bx | 5.01cz |
| A2 K2 = 2000 kg/ha organic fertilizer and 75% of K1 | 12.92cy | 3.44cy | 4.73cy |
| A2 K3 = 2000 kg/ha organic fertilizer and 50% of K1 | 11.74bx | 3.13bx | 4.31cx |
| A3 K1 = 3000 kg/ha organic fertilizer and NPK 375 kg + Urea 270 kg/ha | 13.67bx | 3.65bx | 5.03cz |
| A3 K2 = 3000 kg/ha organic fertilizer and 75%of K1 | 11.36by | 3.03by | 4.17by |
| A3 K3 = 3000 kg/ha organic fertilizer and 50% of K1 | 10.61ax | 2.83ax | 3.90ax |

Different superscripts in the same column showed significantly different (P <0.05)

3.3. Production of corn straw
Treatment of single fertilizer of organic fertilizer A2, was not significantly different (P >0.05) with A1 and A3, and significantly different (P <0.01) with A0; while A2, A1 and A3 were not significantly different (P <0.05) each others. The treatment of single fertilizer of inorganic fertilizer affected the production of corn straw, with high production in the K1 treatment has significantly different (P <0.05) with the K2 and the K3 treatments, while the K2 was not significantly different (P >0.05) from K3. The interaction between organic and inorganic fertilizer treatment on A3K1 similar to A2K1
treatments gave a very high production of corn straw as much as 13.67 tons/ha. The results show that hybrid corn is more responsive for optimal fertilization to get the highest yield of corn straw.

3.4. Production of corn cob
Single of organic fertilizer and inorganic fertilizer respectively as well as the interaction between both fertilizers have a significant effect ($P<0.01$) on corn cob production. The Three treatments A2, A1 and A3 have not significantly different ($P>0.05$) each others and have significantly different ($P<0.01$) with A0 treatments to corn cob production. High production in K1 treatment has statistically similar ($P>0.05$) with K2 and has significantly different ($P<0.05$) with K3. However, the corn cob production by K2 treatment was not significantly different ($P>0.05$) with K3. The interaction between the treatment of organic and inorganic fertilizers in A3K1 and A2K1 treatment gave a very high production of corn cobs as much 3.65 tons/ha.

3.5. Production of corn klobot
Organic fertilizer and inorganic fertilizer as single fertilizer respectively as well as the interaction between both fertilizers have a significant effect ($P<0.01$) on corn klobot production. The three treatments A2, A1 and A3 have not significantly different ($P>0.05$) each others and all of them have significantly different ($P<0.01$) with A0 treatment to corn klobot production. Highest klobot production 4.84 ton / ha that perform in K1 treatment has significantly different ($P>0.05$) with K2 and K3, while K2 with K3 has statistically similar one to another ($P>0.05$). The interaction of organic and inorganic fertilizer treatment on A3 K1 resulted in corn clobot production of 5.03 tons / ha. The treatment interaction namely A3K1, A2K1 and A1K2 are not significantly different ($P>0.05$) between them. The high production of klobot shows that corn klobot is able to make a good contribution to the availability of Bali cattle feed in integrated system between corn plants and bali cattle. The results of observations in the field can be seen that the potential of corn biomass used for feed can increase the growth of bali cattle and for fertilizer could increase a number of organic fertilizer in farmers (Table 2). The use of waste or by-products of corn biomass in the form of straw and klobot.

| Utilization      | Corn waste |
|------------------|------------|
|                  | Straw   | Cob   | Klobot |
| As animal feed   | 96.67%   | -     | 96.67  |
| As organic fertilizer | -     | 96.67 | -     |
| All burned       | 3.33%   | 3.33% | 3.33%  |
| Total            | 100%    | 100%  | 100%   |

Should be used as beef cattle feed providers and corn cob for organic fertilizer. Both product can increase the income and welfare of farmers in the patten of integration between corn and Bali cattle properly.

3.6. Corn crop production
Using a combination of organic fertilizer and inorganic fertilizer on corn production was significantly different ($P>0.01$). The single effect of inorganic fertilizer had a very significant effect ($P<0.01$) on corn production and the interaction between organic and inorganic fertilizer had no significant effect ($P>0.05$). Corn crop production is shown in Table 3.
Table 3. Corn production (ton/ha)

| Treatment | Production (ton/ha) |
|-----------|--------------------|
| **Factor I (Organic Fertilizer Dosage)** | |
| A0 = 0 kg/ha | 11.47^a |
| A1 = 1000 kg/ha | 11.28^a |
| A2 = 2000 kg/ha | 11.39^a |
| A3 = 3000 kg/ha | 11.48^a |
| **Factor II (Inorganic Fertilizer Dosage)** | |
| K1 = NPK 375 kg + urea 270 kg/ha | 12.37^c |
| K2 = 75% | 11.4^b |
| K3 = 50% | 10.43^a |
| **Interaction** | |
| A0 K1= 0 kg/ha organic fertilizer and NPK 375 kg + urea 270 kg/ha | 12.16^a |
| A0 K2 = 0 kg/ha organic fertilizer and 75% | 11.70^a |
| A0 K3 = 0 kg/ha organic fertilizer and 50% | 10.56^a |
| A1 K1 = 1000 kg/ha organic fertilizer and NPK 375 kg + urea 270 kg/ha | 12.20^a |
| A1 K2 = 1000 kg/ha organic fertilizer and 75% | 11.43^a |
| A1 K3 = 1000 kg/ha organic fertilizer and 50% | 10.20^a |
| A2 K1 = 2000 kg/ha organic fertilizer and NPK 375 kg + urea 270 kg/ha | 12.43^a |
| A2 K2 = 2000 kg/ha organic fertilizer and 75% | 11.30^a |
| A2 K3 = 2000 kg/ha organic fertilizer and 50% | 10.43^a |
| A3 K1 = 3000 kg/ha organic fertilizer and NPK 375 kg + urea 270 kg/ha | 12.70^a |
| A3 K2 = 3000 kg/ha organic fertilizer and 75% | 11.20^a |
| A3 K3 = 3000 kg/ha organic fertilizer and 50% | 10.53^a |

Description: Average values followed by different superscript in the same column show significant differences.

The data in table 3, shows that single effect of organic fertilizer had no significant effect (P>0.05) on corn production with the productions is 11.48 ton/ha/harvest. Possibly caused by the influence of organic fertilizer not directly on the plants but only on the soil then on the plants. Different with organic fertilizer treatments, the inorganic treatments include the recommended inorganic fertilizer treatment K1 is significantly different (P>0.01) from the treatment K2 and K3 with the corn production is 12.37 ton/ha/harvest. While the K3 is significantly different (P>0.01) from K2 of corn production. The interaction between organic and inorganic fertilizers had non-significant effect (P>0.05) on corn production of 12.70 tons / ha giving the highest yield by A3K1 treatment.

3.7. The economic value of corn crops
Corn plants have long been cultivated by farmers in rural areas. But the way to farm is to plant the paddy fields after the harvest and carried out to the extent that farmers have. Corn plants can be developed starting from dryland agroecosystems, rainfed lowland rice fields to irrigated rice fields. The use of organic fertilizer can improve the physical and chemical properties of the soil to be more fertile, so that corn can grow well with high production and is safe for consumption. Soil fertility can also be influenced by optimal land conditions. The farmer labor costs on organic fertilization land, corn cultivation using A0, A1, A2 and A3 treatments are calculated based on one year of IDR.5.400,000/year. Production costs for treatments A0, A1, A2 and A3: for the purchase of corn seeds, land management, planting, replanting, fertilizing, land clearing, post-harvest and other costs of IDR.5.550.500/production, with a selling price of corn of IDR.1.500/kg. Corn production with A0 treatment was 11.47 tons/ha, A1 was 11.28 tons/ha/production, A2 was 11.39 tons/ha/production and A3 was 11.48 tons/ha/production.
As for the labor costs of farmers in inorganic fertilization land, corn cultivation with treatments K1, K2 and K3 are calculated based on one year of IDR.5.400.000/year. Production costs for treatments K1, K2 and K3: for purchasing corn seeds, land management, planting, replanting, fertilizing, land clearing, post-harvest and other costs of IDR.5.875.500/production, with a selling price of corn of IDR.1.500/kg. Corn production with K1 treatment is 12.37 tons/ha, with K2 was 11.41 tons/ha/production and K3 was 10.48 tons/ha/production. Economic analysis of the income of corn cultivation by organic and inorganic treatment can be seen in table 4.

| Table 4. Economic analysis of corn cultivation |
|-----------------------------------------------|
| Discription                  | Organic fertilization | Inorganic fertilization |
|                              | A0 (IDR.000) | A1 (IDR.000) | A2 (IDR.000) | A3 (IDR.000) | K1 (IDR.000) | K2 (IDR.000) | K3 (IDR.000) |
| Labor cost                  | 5.40          | 5.40          | 5.40          | 5.40          | 5.40          | 5.40          | 5.40          |
| Production cost             | 5.55          | 5.55          | 5.55          | 5.55          | 5.88          | 5.88          | 5.88          |
| The number of fees          | 10.95         | 10.95         | 10.95         | 10.95         | 11.28         | 11.28         | 11.28         |
| Gross income                | 17.21         | 16.92         | 17.10         | 17.22         | 18.56         | 17.12         | 15.72         |
| Net income                  | 6.26          | 5.97          | 6.15          | 6.27          | 7.28          | 5.84          | 4.44          |
| R/C                         | 1.57          | 1.55          | 1.56          | 1.57          | 1.65          | 1.52          | 1.40          |

Data in Table 4, shows that, each of the production costs incurred for corn cultivation is the cost of labor and for production. The net profit of farmers from the results of corn business by organic fertilization treatments, A0 treatment is IDR.6.26 million/harvest and R/C of 1.57; A1 treatment is IDR.5.97 million/harvest and R/C is 1.5; A2 treatment is IDR.6.15 million/harvest and R/C is 1.15; and A3 treatment is IDR.6.27 million/harvest with R/C is 1.57. The net profit gained by K1 inorganic fertilization treatment is IDR.7.280.000/harvest with R/C of 1.65, K2 treatment is IDR.5.84 million/harvest with R/C is 1.52 and K3 treatment is 4,440,000/harvest, with R/C is 1.40. The production of corn was significantly different (P <0.01) and the R/C ratio was >1 in each treatment. The results of Rusdiana et al. (2019) farmers’ profits from corn business amounted to IDR.1,100,600/harvest with R/C of 1.23. The results of this study indicate that the treatment of organic and inorganic fertilization on corn plant business in farmers is economically profitable so it is worth trying again.

3.8. Utilization of manure as organic fertilizer

Cow manure is one of the potential ingredients for making organic fertilizer [28]. Making organic fertilizer from manure known as compost is still a new thing in farmers, they have never made it. So firstly, Farmers need to get a pilot method of making organic fertilizer that is good and right. Secondly, farmers have been able to produce their own organic fertilizer with introduction technology. The results of organic fertilizer can already be bought and sold, although on a limited scale. Making organic fertilizer, in addition to be useful for one’s own corn, can also be used as a sideline business. Farmers can routinely make their own organic fertilizer or in mutual cooperation in groups. The profits derived from the sale of organic fertilizer can be divided equally among the farmers based on the contribution of each group member. Utilization of cow manure as organic fertilizer by fermentation is used by 25 farmers or 83.3%, used without fermentation as many as 3 people or by 10% while those who do not use manure as organic fertilizer are as many as 2 people or 6.7%

The need for organic fertilizer will increase in line with the demand for organic products that are environmentally friendly, especially in the urban areas. Rosidah and Ida [29]; and Maunte et al. [30], stated that organic fertilizer, come from vegetable waste, plants and manure, has been widely used as plant fertilizer and the products that produced are healthier and guaranteed not to contain residues. The use of organic fertilizer, especially from livestock manure, can be adapted to the needs of each food crop varieties. According to Simanjuntak and Kurniawan [31] the use of inorganic or chemical fertilizers, should be reduced and not excessive, use only as needed, so as to increase plant growth and
to produce high yields. Excessive use of inorganic fertilizers can damage land biological systems and soil porosity. Similarly, the use of organic fertilizers for food crops and continuously and excessively can pollute the environment around residential areas. Organic farming system is the best solution to improve biological properties of soils and corn or other plants. Organic fertilizer has a very good nutrient content, and is more quickly absorbed by maize. The utilization of organic fertilizer from Bali cattle manure is seen in figure 1.

3.9. Productivity of Bali cow
The use of regulated feed for Bali cows, is an indicator to determine growth or daily body weight gain, and regular and continuous feeding will ultimately streamline the amount of feeding in Bali cows, so that it is not over-wasted in the herd. According to Handayanta et al. [32], the amount of nutrient requirements daily in female beef cattle is very dependent on the type of livestock, age, physiological phase, including being ready to mate, pregnant, giving birth, breastfeeding, sick and environmental harshment. The performance of Bali cows can be influenced by feeding management, feed quantity and quality [2]. Feeding from corn biomass waste (ie straw, cob and klobot); elephant grass and added concentrate feed is expected to increase the productivity of Bali cattle will be improved. Statistical analysis showed that, there was no significant effect (P> 0.05) on the daily weight gain of Bali cows as seen in figure 2.
Figure 2. Daily weight gain of Bali cows at farmers

Figure 3, shows the average daily weight gain of Bali cattle aged 2-3 years in the treatment (S0) with a ratio of 100%: 0% as much as 0.289 kg/head/day. S1 treatment with a ratio (75%: 25%) of 0.263 kg/head/day, and S2 with a ratio (50%: 50%) of 0.255 kg/head/day. Data on body weight of Bali cows in the S0 treatment (100%: 0%), showed a higher daily weight gain compared to those obtained by S1 and S2 treatments. Feed consumption (in DM) of body weight of Bali cows is 2.74% with daily weight gain of 0.19 kg / head / day, resulting in a feed value of 0.02 kg [32]. The dynamic growth of weekly body weights of Bali cows can be seen in figure 4.

Figure 3. Average body weight of Bali cow kg/head/week
Remarks : weighing period every 14 day

Figure 4, shows the longer the feed with corn biomass (straw, cob and klobot), the higher the body weight of Bali cows. Feeding by treating S0 can also be conducted to farmers by ad libitum feeding.

3.10. Economic analysis of Bali cow business
Economic analysis of beef cattle and other livestock businesses, the economic value depend on expenditure and income that can be measured economically at the level of business efficiency. The value of profits can be obtained by farmers from any business expenses that calculated based on the number of livestock kept. The assumption of profit in Bali cow business in farmers can be seen from the productivity of their livestock. The selling value of the cows will be different for each animal.
Different feeding applied will have a significant effect (P<0.05) on body weight of cows. The results of Rusdiana and Soeharsono's research [26] showed that, different feeding strategies can produce different daily weight gain varied from 0.51 to 0.75 kg / day and improve feed conversion ratio (FCR) to more efficiently in Bali cattle. Indrayani et al. [10], said that to achieve optimal production of the cow body weight, farmers need to pay attention to the age of selected heifer at least more than 1 year old. This research shows that in integrated corn and Bali cows, the cows should consume concentrate at least 1% of body weight.

The business of raising Bali cows by providing feed from sweet corn straw added concentrates, can produce a daily weight gain of 0.5 kg/day [2]. Feeding from corn biomass (straw, cob, and klobot) and other forages can influence the weight gain is quite good. Economic analysis can determine whether Bali's cows business will be profitable or loss can be calculated based on a period of one year. The increasing number of cattle will also increase their income. The results of input-output calculation for female Bali cattle businesses need to pay attention to the way of regular feeding that should be in an ad libitum basis because its could be influenced on increasing feed costs and the number of reared cattle and the amount of feed and labor production costs. The additional costs of giving concentrate to female Bali cows need to be carefully calculated. Bali cattle business costs are basically to streamline all costs incurred, both for production costs as well as labor costs and other costs. The assumption of the economic value of the Bali cows business by means of maize crop integration with Bali cows is shown in table 5.

Table 5. Economic analysis of Bali cows business in farmers.

| Description     | S0 (IDR.000)        | S1 (IDR.000)        | S2 (IDR.000)        |
|-----------------|---------------------|---------------------|---------------------|
| Labor costs     | 4.50 ±2.33          | 4.50±2.33           | 4.50±2.33           |
| Production cost | 6.34±3.12           | 6.41±3.16           | 6.39±3.11           |
| Total           | 10.84±4.55          | 10.91±4.64          | 10.75±4.47          |
| Gross income    | 15.62±6.23          | 15.23±6.16          | 14.89±5.78          |
| Net income      | 4.78±1.546          | 4.32±2.415          | 4.14±2.670          |
| R/C             | 1.44±0.34           | 1.40±0.31           | 1.39±0.32           |

Superscript different in the same line shows the significant difference (P<0.05)

Table 5, shows that the increased in body weight of Bali cattle correlates to the level of profit of farmers. The profits from Bali cows business with S0 treatment of IDR.4.78 million/year, R/C of 1.44, S1 treatment of IDR.4.32 million/year, R/C of 1.40 and S2 treatment of IDR.4.14 million/year and R/C is 1.39. Rusdiana et al. [5] results of the Bali cattle business by grazing on oil palm plantations and rubber, farmers' get profits of IDR.3.19 million / year, and B/C value of 1.2. The results of Rusdiana and Soeharsono's research (2017b) of the Bali cattle raising business by providing local feed to farmers, get profit amounted to IDR.2.26 million/period, and B/C value of 1.6 [14]. The level of profit of farmers can get profit in a single fattening period of IDR.5.62 million, and R/C value of 1.16. Financially in every business if the R/C value >1 is declared profitable [33].

According to Widaryati [34] the important step should be able to increase the economic value of higher farmers, is training and business to support farmers needs. Muzayyannah et al., [35] and Adawiyah [36] said that, the more farmers' income will increase the more economic needs of their household be increased too. Integration of corn plants and Bali cow, the number of livestock kept can still be increased to in between 10-20 heads/farmers, because this number will be more economical, effective and efficient, so economically financially feasible.

4. Conclusion

Farmers business in the pattern of integration between corn and Bali cow can be concluded that, corn biomass ie. straw and klobot have been used as much as 97% as Bali cattle feed with daily body weight gain of 0.3 kg/head/day. The net profit of corn farmers with organic fertilizer treatment can reach IDR 6.27 million/harvest; R/C of 1.57 and by inorganic fertilizer farmers income can earn IDR
7.28 million/harvest; R/C of 1.65. The net profits of the farmers in the integration of corn and Bali cattle in the farmers are considered economical, effective and efficient and economically feasible to be tried again.

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