

CONTRIBUTION OF BALI CATTLE BUSINESS OF INTEGRATED BUSINESS PATTERN WITH CROP AND PLANTATION FARMING BUSINESS IN PUBLIC LIVESTOCK IN SOUTH KONAWA REGENCY, INDONESIA

La Ode Arsad Sani¹, Usman Riense², Harapin Hafid¹, dan Bahari²

¹Lecturer, Faculty of Husbandry Halu Oleo University, Kendari-Southeast Sulawesi (arsadni@yahoo.com1).

²Professor, Faculty of Agriculture, Halu Oleo University, Kendari-Southeast Sulawesi, Indonesia.

Abstract-Integrated business pattern Bali cattle husbandry business along with crop and plantation farming business tend to give great opportunities in improving food security and public income of farmers. In order to respond to the argument, it is conducted a research in South Konawe Regency, Southeast Sulawesi Province, Indonesia taking 10 sub districts out of 25 sub districts as the samples by stratified random sampling based on the number of cow farming population with low, medium and high levels. It had samples by 250 respondents taken from 670 units of farmer households growing Bali Cattle integrated with crops and plantation. Qualitative data is tabulated into values of percentage and described descriptively, meanwhile, quantitative data related to farmer family income and contribution of animal and agricultural farming business is analyzed using a formula: $\pi = TR - TC$; $TR = Y \times Py$; and $TC = FC + VC$ (Soekartawi, 2005 and Soeharno, 2009). Contribution percentage of Bali cattle business on total of family income is formulated from Tulle (2005) namely: $Ks = \frac{\pi}{\pi + tc} \times 100$. Results of the research show that: (1) average farmer family income produced by Bali cattle farming business is smaller compared to the income from agricultural yields, both crops and plantation; (2) Income contribution of Bali cattle farming by integrated business pattern with crops (paddy and corn) is 35.58%, meanwhile, contribution of Bali cattle farming through integrated management with plantation yields (cacao, pepper, cashew and coconut) is only 18.55%; (3) Income contribution of Bali cattle farming by integrated business pattern with each of crops namely paddy, corn, cacao, cashew, pepper and coconut consecutively is 35.44%, 36.45%, 32.32%, 55.28%, 6.94%, and 62.95%.

Index Term: contribution, crops, plantation, integrated bali cattle.

1 INTRODUCTION

Integrated farming system on livestock production is a policy for development of agricultural sectors to be supported by all aspects of agribusiness, namely management, marketing, funding, technology innovation and science and technology institution as well as other supporting sectors (Bachrudin, 2006). Current paradigm of livestock farming development strategies is oriented to development of areas based on commodity of superior cattle, development of institution, improvement of farming business and industry, optimizing local natural resource utilization, development of broader partnership as well as development of appropriate and environmental friendly technology.

Bali cattle are ruminants that produce meat as a source of animal protein, which its whose demand is rapidly increasing along with increasing number of population, increasing public purchasing power and increasing public awareness of the importance of fulfilling balanced nutrition. However, people cattle farming in villages in Southeast Sulawesi areas is still run traditionally semi-intensive or extensive with the number of livestock ownership is still relatively small ranging from 2-5 animals. There are also other constraints faced by farmer households to develop their livestock business, namely: (1) there is still relatively limited business capital ownership; (2) there is yet any optimal farmer's work productivity; (3) there is yet availability of superior forage feed in large quantities in a sustainable manner; (4) farmer group institutions are not running optimally; (5) family labor wages have not been assessed as a factor of production costs; (6) cattle farming is only

considered as savings; (7) cattle business is still used as a side business while the main business is farming, so that the time spent on raising cattle is only the remaining time after completing the farming work.

Southeast Sulawesi is one of the potential provinces for the development of beef cattle, especially Bali cattle. In 2017, there were 370,772 beef cattle population. The distribution of the total population of the cow was 74.3% which is concentrated in 5 regencies, namely: South Konawe Regency by 67,746 animals (18.27%), Muna Regency by 56,795 animals (15.32%), Bombana Regency by 60,121 animals (16.22%), Konawe Regency by 49,321 animals (13.30%) and West Muna Regency by 41,565 animals (11.23%), while the remaining of 25.7% is distributed in 12 other regencies / cities in Southeast Sulawesi (BPS Sultra, 2018). Konawe Selatan Regency is the main center for the development of beef cattle business with the highest population in Southeast Sulawesi Province. The was increasing number of cattle population in 2014-2017, each of which 60,915 animals, 62,616 animals, 65,434 animals and 66,746 animals with an average growth of 3.1% (BPS. South Konawe Regency, 2018).

The efforts to increase productivity of the Bali cattle business is also related to the socio-economic factors of the farmers' households and productivity of families in the farmers' households so that there will be development of business diversification in an integrated and sustainable management. One of the sustainable management models of cattle businesses in order to support short-term life insurance is integrated

management with crops and plantation farming units (rice, corn, pepper, cocoa, cashew, and coconut). Cattle business by an integrated management with types of farming such as crops and plantations will be more profitable both economically, technically and environmentally. According to Hamdani (2008) and Kusnadi (2007), a livestock business management system combined with integrated farming can reduce the risk of crop failure, dependence on one commodity, and save production costs. According to Suryana (2007), there will be livestock development by diversification of cattle with paddy fields, plantations, and ponds.

Farmers' households in the rural areas of South Konawe Regency, Southeast Sulawesi Province generally obtain economic resources from the management of cattle business through integrated business patterns with farming. This means that local community has not only a livelihood as Bali cattle farmers, but also as farmers of crops and corn rice and plantations of coconut, cocoa, pepper and cashew with the main purpose to meet the economic needs of the households. However, farmer households have not have any proper understanding on the details of the amount of income obtained by the household or the contribution of each cattle business and farming yields under their management.

The management of the Bali cattle business through an integrated business pattern with crops and plantation (business diversification) is expected to minimize the risk of business failure and increase public income of the farmer households, both in the short and long term. Therefore, it is conducted a research with a title of "Contribution of the Bali Cattle Business of Integrated Business Pattern with Crops and Plantation Farming in Smallholder Farming in South Konawe Regency, Southeast Sulawesi Province, Indonesia". This study aims to provide answers and explanations for: (1) the income of Bali cattle business by an integrated business pattern with crop and plantation farming; (2) the income contribution of Bali cattle business by an integrated business pattern with crop and plantation farming to the income of the farmer household.

2 RESEARCH METHOD

This research was conducted in March until November 2018 in South Konawe Regency, Southeast Sulawesi Province, Indonesia. Determination of South Konawe Regency as the study location was by purposive sampling by considering that the area was the center of development with the highest population of cattle farmers in Southeast Sulawesi Province.

The determination of the sub-district area as the location of the study was by stratified random sampling based on the criteria of the number of cattle population, namely low, medium and high levels. The equation model to determine the level of cattle population level from each sub district of the study location is: (1) Low level = [(Min) to $(\bar{X} - STDEV - 1)$]; (2) medium level = [$(\bar{X} - STDEV)$ to $(\bar{X} + STDEV)$]; (3) High level = [$(\bar{X} + STDEV + 1)$ to (Max)]. Notes: \bar{X} = the average cattle population of all districts; STDEV = Standard deviation; Max = the highest cow population; Min = the lowest cow population; to = Up to. The study location based on the number of cattle population results of the equation above was in 10 sub districts, namely:

(1) low level (<1,171 animals) East Kolono and North Moramo sub districts; (2) medium level (1,172 - 4,168 animals) Buke, Baito, Laeya, Wolasi, Landonono and Mowila Sub Districts; (3) high level (> 4,169 animals) represented by Tinanggea and Palangga Districts.

The farmer household unit in the research location conducting the cattle business management by an integrated business pattern with crop and plantation farming is 670 people. This data is based on the information by local farmers and Field Extension Officers (PPL) at the district level which was obtained from the results of preliminary research surveys. The number of respondents in the farmer household units taken in this study was calculated based on a formula by Yamane (1979): $n = \frac{N}{N(d)^2 + 1}$. Note: n = Minimum number of samples; N = Number of population; d = Precision of deviation degree from sample characteristics to the population.

Based on the calculation of the minimum number of samples, it is taken 250 respondents from 10 sub districts so that each sub district has about 25 respondents. Each subdistrict area was taken by three sample villages with the highest cattle population. The respondents were farmers' household units running cattle business by an integrated manner with crops (rice and corn) or farmers running cattle business with plantation crops (coconut, cocoa, pepper, and cashew).

Qualitative data were tabulated into percentage values and described descriptively, while quantitative data related to farmer household incomes and livestock and farming business contributions were analyzed according to the formula: $\pi = TR - TC$; $TR = Y \cdot Py$; $TC = FC + VC$. π is the number of farmers' income, TR = Total Revenue, TC = Total Cost, FC = Fixed Cost, VC = Cost Variable, Y = number of cattle / farming business production, Py = price y. (Soekartawi, 2005 and Soeharno, 2009). Percentage of cattle farming contribution to total household income is formulated by Tulle (2005) namely: $Ks = \frac{\pi s}{\pi s + \pi t} \times 100$; Ks = contribution of cattle business income to total household income (%), πs = cattle business income (Rp. Year⁻¹), πt : farming income (Rp. Year⁻¹).

3 RESULTS AND DISCUSSION

Characteristics Of Bali Cattle Farmer Households

Characteristics of Bali cattle farmers by integrated business pattern with crop and plantation farming on smallholder farming in Konawe Selatan Regency, Southeast Sulawesi Province, Indonesia were identified based on farmers' age, education level, experience, number of family dependents, and number of productive family members.

The results showed that based on the interview with 250 farmers as the respondents, there were 79.2% of farmers with age ranging from 15 years old to 54 years old and 20.8% of other farmers is > 54 years old. This shows that Bali cattle farmers by integrated business pattern with crops and plantation farming are still in the productive age category. Based on the education level, there is 42.4% of the farmers having elementary school level as their education background; there is 28.8% of the farmers having junior high school level as their education background; there is 28% of the farmers having senior high school level as their education background and there

is only 0.8% of the farmers have educated at university. This condition shows that the level of education of farmers in the research location is still relatively low, due to the economic conditions in the past which it was not supported to achieve higher education. Indrayani and Hellyward (2015) explained that the problems often faced by farmers in implementing their business is a lack of knowledge on production procedure, because generally they only want high level of production, but by paying less attention to production procedure. Also, Chavas et al. (2005), stated that farm production can be improved rationally and achieve maximum benefits if it includes education variable in analyzing household and farming characteristics.

Experience of livestock or farming is one of the factors that influence on the success of farming and livestock businesses. Long work experience can make breeders have a better ability to conduct production and business development activities compared to farmers who are less experienced. Distribution of experience of cattle farmers by integrated business pattern with crop and plantation farming in Konawe Selatan Regency shows that there is 38.4% having more than (>) 10 years experience there is 24.4% having 5-10 years of experience, and there is 36.4% having less than 5 years of experience. Soekartawi (2005) argued that long experience of farming makes farmers more mature and more careful in making decisions about their farming. Past failures have been seen as lessons for the farmers to be more careful in their actions, while inexperienced farmers are generally having careful consideration in decision making since they are more willing to take risks.

In addition to experience, the number of family dependents also influences on the level of achievement by the farmers. More number of family dependents will lead to more willingness to increase work productivity for higher achievement, because by higher work productivity or achievement, there will also be higher level of wages or salaries. A high level of wages can guarantee fulfillment of nutrition and health for the farmers' family so that it can motivate the family to improve their work productivity in a better manner. Posadas-Domínguez et al. (2014) emphasized that family labor serves as a very important factor in increasing profitability and competitive characteristics of a small-scale livestock business.

Most of the cattle farmers running an integrated business pattern with farming in South Konawe Regency have family dependants of 4-6 people or around 62.8%. A great number of family dependents lead to higher burden on the cost of living for the farmers' families; in another way, a great number of family dependents can also motivate household members to carry out activities, creativity and a number of new innovations to increase household income. According to Hostiou et al. (2015), workload is greatly related to availability of labor, technical choices, and delegation of certain jobs to workers beyond the field of animal husbandry. Portillo et al. (2015), stated that family labor and low use of inputs are the main components in reducing production costs in livestock businesses.

Based on the research results with 250 respondents, the number of cattle farmer household members consisting of husbands, wives, children and close relatives who live in a

house totally is 989 people and there are 904 people belong to the category of productive workforce. This situation illustrates that in a cattle household, there are enough productive family labors available which can be utilized in the management of cattle farming as well as crop and plantation farming in South Konawe District. From the productive labor availability in farmer households, there is 46.57% having permanent employment in cattle farming there is 45.91% in farming, and there is 7.52% having permanent jobs as office workers. Hostiou et al. (2015), confirmed that the work organization depends on personal choice of each farmer, so that there is a unique job management for each farming.

Rearing System and Number of Bali Livestock Ownership

The cattle rearing system at the research site is generally conducted semi-intensively, which is a combination of intensive and extensive maintenance systems. Cattle are kept intensively in cages so it is easier to supervise their reproductive cycles, mating season, feeding, drinking, and controlling diseases. However, cattle are herded at any time around the agricultural area or other areas outside the agricultural area having a lot of forage.

The research results show that the average ownership of Bali cattle in each farmer household in the study location is 3 animals. This finding is in accordance with results of a research by Sani2et al. (2018) that majority of beef cattle ownership in smallholder farming in Southeast Sulawesi ranges from 1-5 animals. Also (Sani, 2010; Sani et al., 2010; Sani, 2011) stated the average scale of beef cattle ownership in South Konawe Regency was 1-4 animals. Hosen dan Jastra (2012), stated livestock farming scale was still small, namely 0.3-0.4 ha / head of family for farming and beef cattle was by 1-3 animals. Samkol et al. (2015), the majority of farmer families in various agro ecological zones in Cambodia was by 1-3 beef cattle. According to Jimmy et al. (2014), cattle business is a side business that is required to increase family income and as a merchantability asset at any time to meet any urgent needs. Results of this study indicate that the number of cattle ownership in the research location is still relatively low so that cattle farming by farmers is still used as a part-time work and has not been categorized as a main business.

Based on the socio-economic characteristics of Southeast Sulawesi community, the dominant rearing cattle is semi-intensive system and the nursery pattern is the main objective compared to the fattening pattern. Beef cattle business is more profitable as the main business if there is minimally 10 cattle owned by farmers. The results show that the percentage of female cattle ownership is higher than male cattle. Results of this study illustrate that farmers are more motivated to grow parent cattle in order to obtain calves (baby-cow) so that they retain female cattle and tend to sell male cattle because the price is relatively expensive. According to results of the research by Sani1et al.(2018) dan Sani2et al.(2018), the population of female cattle in smallholder farming in Southeast Sulawesi is higher than male ones and Sani et al. (2015), reported the ratio of female and male cows reaching 63.2% and 36.8% respectively. Sodiq and Bodiono (2012), confirmed that beef cattle rearing in livestock farmer groups in the countryside is

intended to produce calves and cow-calf operation as well as fattening.

Contribution of Farming and Cattle Farming Incomes

Income is the difference between the amount of income from the sale of agricultural and livestock products with production costs for one year during the management of farming and cattle. Results of this study indicate contribution of income from farming and Bali cattle by an integrated pattern management for one last year in farmer households in South Konawe Regency, Southeast Sulawesi Province. The average income and contribution of Bali cattle by an integrated business pattern with crop and plantation farming in farmer households in South Konawe Regency, Southeast Sulawesi Province are presented respectively in Table 1-8.

Table 1 Average Income of Farmer Households in Bali Cattle Farming by An Integrated Business Pattern with Crop Farming

No	Sources of Income	Acceptance (Rp year ⁻¹)	Cost (Rp year ⁻¹)	Income contribution	
				(Rp year ⁻¹)	(Percent)
1	Cattle	20,251,434	11,755,099	8,496,335	35.58
2	Crop farming	30,220,226	14,839,714	15,380,512	64.42
	Total	50,471,660	26,594,813	23,876,847	100.00

Table 1 shows that average income from the Bali cattle business by an integrated business management with farming on smallholder farming in South Konawe Regency is Rp. 8,496,335 years-1 with a contribution of 35.6% to the total income of farmer households. While the farmer's household income taken from crop farming (paddy and corn) reaches Rp.15,380,512 year-1 with a contribution of 64.4% to the total income of the farmer households. This study illustrates that the cattle business is only used as a side business, while crop farming serves as the main livelihood. Farmers use the cattle as their savings (investment), while yields of crop farming serve as the main source of income to support daily household needs. Farmers in the research location tend to maintain the number of cattle by an average of 3 while the average area of rice and corn farming land owned by each farmer household is 0.9 ha with productivity of 4-5 tons ha-1.

Table 2 Average Farmers' Household Income in Bali Cattle Business by An Integrated Business Patterns with Plantation Farming

No	Sources of Income	Acceptance (Rp year ⁻¹)	Cost (Rp year ⁻¹)	Income contribution	
				(Rp year ⁻¹)	(Percent)
1	Cattle	18,015,611	11,214,082	6,801,529	18.55
2	Plantation farming	42,099,222	12,241,171	29,858,052	81.45
	Total	60,114,833	23,455,253	36,659,581	100.00

Based on Table 2, the average income from the Bali cattle livestock products on smallholder farming in South Konawe Regency is only Rp. 6,801,529 year-1 with a contribution of 18.55% to the total income of farmer households. While the farmers' household income from the yields of plantation farming reaches Rp.29,858,052 year-1 with a contribution of 81.45% of the total income of farmer households. This study illustrates that the contribution of Bali cattle farming by an integrated business pattern with plantation farming seems to be very small. Sani (2011), the contribution of cattle business income in

South Konawe Regency is still smaller than the contribution of farming. Taufel et al. (2005) reported results of a research in the eastern part of Indian Himalayas showing that ruminants managed by households were cattle, goats, buffaloes and sheep and there was 20% livestock contribution to household income.

This condition is possible because cattle business by integrated management pattern with plantation farming includes cacao, cashew, pepper and coconut farming. If the farmer has 1-4 cattle and 1 ha of cocoa farms, then the cocoa yield will be more than the cattle livestock products. If the farmer has 1-5 cattle and <1 ha of cashew garden, then the livestock yield is more than the cashew plantation business. If the farmer has 1-5 cattle and <1 ha of pepper garden, then the pepper yield is much more than the cattle business. Conversely, if the farmer has 1-5 cattle and <1 ha of coconut plantation, then the cattle yield is much more than the coconut business.

Calculation of costs spent for cattle business includes initial capital for purchasing livestock, depreciation of cages, drugs / vaccines, depreciation of equipment and labor costs. While the costs of plantation farming are costs for seedlings, fences, copra processing houses, fertilizers, labor, depreciation of equipment and transportation costs. The highest cost in cattle business is the initial capital of purchasing livestock while the highest cost of plantation farming is the cost of maintaining labor and post-harvest processing.

Furthermore, the average income and contribution of Bali cattle business with ownership of 1-5 animal by an integrated business pattern with 1 hectare of paddy rice crop farming, can create productivity of 4-5 tons per hectare in farmer households in South Konawe Regency, South Sulawesi Province as presented at Table 3.

Table 3 Average Farmer Household Income in Bali Cattle Business by An Integrated Business Pattern with Rice Farming

No	Sources of Income	Acceptance (Rp year ⁻¹)	Cost (Rp year ⁻¹)	Income contribution	
				(Rp year ⁻¹)	(Percent)
1	Cattle	20,279,046	11,781,287	8,497,759	35.44
2	Paddy farming	31,238,606	15,760,520	15,478,086	64.56
	Total	51,517,652	27,541,807	23,975,845	100.00

Table 3 shows that the contribution of the Bali cattle business by an integrated business management with paddy farming for one year in South Konawe Regency is only 35.4% and it is lower than the contribution of paddy farming (64.6%). This comparison of income contribution is influenced by differences in the structure of production costs for each type of operated business. The structure of production costs in paddy farming in South Konawe Regency consists of seed, fertilizer, equipment rental, land management, planting, maintenance, harvesting and marketing with an average annual production cost of Rp15,760,520. The most common paddy varieties to be planted are Mekongga and Ciharang with yields of 4-5 tons / ha, and some of which are Inpari varieties of 30, 33, 40 and 43 with higher productivity. The price of dried unhusked paddy at the time of the study reached Rp.4,700 per kilogram, and the price of medium rice was around Rp.9,600 per kg. While the cost structure in the cattle business consists of capital for livestock purchases, cage cost, forage gardens (HMT), labor

family, equipment and livestock maintenance costs which are carried out semi-intensively with an average production cost of Rp. 11,781,287.

The low contribution of Bali cattle business to the paddy farming is caused by farmers who are more focused on working in the fields since it is expected to give more yields because they have an average land area of 1 ha so they pay less attention to the Bali cattle livestock. In this case, Bali cattle business is only used as a side business or investment, while paddy rice farming activity serves as the main business. According to Suwandi (2005), the application of paddy farming and cattle farming with Crop-Livestock System (CLS) pattern increases the paddy production by 23 , 6% and profits by 14.7% which is higher than non-CLS.

However, the integrated management system between cattle businesses and paddy farming for farmers still provides positive benefit value since it utilizes rice straw as additional food for cattle, both provided in the form of fresh forages or processed products. Yanuartono et al. (2017) also reported that byproducts of paddy plants namely straw and small-scale farmers in developing countries such as Indonesia make use of paddy straw as ruminant feed and fertilizer crop production because of its abundant presence. Samkol et al. (2015), stated a cattle management system that is commonly used in various agro ecological zones in Cambodia is grazing with additional feed using paddy straw and grass cut during rainy season.

The cattle business in South Konawe Regency is not only managed in an integrated pattern with paddy crop, but also with corn plants. The benefit value of average income and contribution of the Bali cattle business with an average ownership of 3 animals by an integrated business patterns with corn farming with a land area of 0.5-1 hectares, producing 4-5 tons per hectare in farm households in Konawe Selatan Province Southeast Sulawesi is presented in Table 4.

Table 4 Average Farmers' Household Income in Bali Cattle Business by An Integrated Business Patterns with Corn Farming

No	Sources of Income	Acceptance (Rp year ⁻¹)	Cost (Rp year ⁻¹)	Income contribution	
				(Rp year ⁻¹)	(Percent)
1	Cattle	20,086,957	11,599,106	8,487,851	36.45
2	Corn farming	24,154,226	9,354,917	14,799,309	63.55
Total		44,241,183	20,954,023	23,287,159	100.00

Table 4 shows that the contribution of the Bali cattle business by an integrated management pattern for one-year corn farming is only 36.4%, while the contribution of corn plants reaches 64.6%. This is possible since farmers still consider the corn garden more beneficial to provide a guarantee of meeting their daily needs with a relatively short harvest period, which certainly lead to faster yield products, compared to cattle business which requires relatively long rearing period for production so it is more common only used as a side business or savings. Additional benefit of corn farming for cattle is to create corn straw as an additional food in the form of fresh forages and processed products.

In addition to making cattle as a source of income (savings), South Koname Regency area also has cocoa, cashew, pepper and coconut which are managed by an integrated pattern as an anticipatory to reduce risk of business failure from

its livestock and farming businesses. The average income and contribution of cattle business by an integrated business pattern with cocoa farming in farmer households in South Konawe Regency, Southeast Sulawesi Province are presented in Table 5.

Table 5 Average Farmer Household Income in Bali Cattle Business by An Integrated Business Pattern with Cocoa Farming

No	Sources of Income	Acceptance (Rp year ⁻¹)	Cost (Rp year ⁻¹)	Income contribution	
				(Rp year ⁻¹)	(Percent)
1	Cattle	15,642,857	10,197,929	5,444,928	32.32
2	Cacao farming	25,644,143	14,243,393	11,400,750	67.68
Total		41,287,000	24,441,322	16,845,678	100.00

Table 5 illustrates that Bali cattle business is managed in an integrated pattern with cocoa farming. The income contribution of the Bali cattle business is relatively small compared to one year of cocoa farming. The contribution of the Bali cattle business is only 32.3% (Rp.5,444,928 year-1), while the cocoa plant reaches 67.7% (Rp.11,400,750 year-1). Results of this study are possible since there are only owned 2 cattle per farmer households, while the ownership of 1 hectare of cocoa plantation per household with a productivity of around 0.48 tons ha-1 year-1 is higher than the productivity of cocoa from national community plantation which is only 0.39 tons ha-1 year-1. Rusdin dan Z. Abidin (2018) stated the average production of side-grafting cocoa plants is 0.38 tons ha-1 year-1. However, some farmers have used pods of chopped and fermented cocoa as an additional feed for cattle. The main problem in the research location is the low productivity of cocoa due to plant age of more than 15 years old. While the price of unfermented cocoa with ± 7% moisture content varies ranging from Rp.24,000 to Rp.27,000 per kilogram.

In addition to cocoa, pepper and coconut plantation, there are also many people who manage an annual plant, namely cashew plantation as one of the typical annual crop yield farming by the people in Southeast Sulawesi, especially people in South Konawe Regency. The average income and contribution of cattle farming by an integrated business pattern with cashew plantation farming in farmer households in South Konawe Regency, Southeast Sulawesi Province are presented in Table 6.

Table 6 Average Farmer Household Income of Bali Cattle Business by an Integrated Business Pattern with Cashew Farming

No	Sources of Income	Acceptance (Rp year ⁻¹)	Cost (Rp year ⁻¹)	Income contribution	
				(Rp year ⁻¹)	(Percent)
1	Cattle	19,250,000	11,046,850	8,203,150	55.28
2	Cashew farming	14,946,600	8,309,750	6,636,850	44.72
Total		34,196,600	19,356,600	14,840,000	100.00

Table 6 shows the contribution of income from the Bali cattle business is relatively high compared to cashew farming for one year. The contribution of Bali cattle business reaches 55.28% (Rp.8,203,150 year-1), while the contribution of cashew is only 44.72% (Rp.6,636,850 years-1). Results of this study are possible because there are only 3 ownership of cattle by farmer household, while the ownership of cashew garden land <1

hectare per household with cashew productivity is around 0.35 tons ha-1. The low income of cashew farming compared to cattle is caused by most of cashew plant age is more than 20 years with a relatively small land area so that productivity is low. Based on such condition, farmers raise cows by using grass and legumes around the cashew gardens to feed cattle.

The acceptance of Bali cattle business and cashew plantation farming is all income revenue generated from the sale of livestock and cashew seeds for one year. The level of cashew production is influenced by area of land, productivity and plant age. Differences in the level of production, area of land, plant age and price of production unit in cashew farming and cattle produce different income value for farmer households. Meanwhile, price of cashew nuts still varies ranging from Rp.15,000 per kilogram at the farm level and Rp.17,000 per kilogram at the inter-regional level, while the price of super cashew nuts is marketed ranging from Rp.145,000 to Rp.165,000 per kilogram.

Table 7 Average farmer household income in Bali cattle business by an integrated business pattern with pepper farming

No	Sources of Income	Acceptance (Rp year ⁻¹)	Cost (Rp year ⁻¹)	Income contribution	
				(Rp year ⁻¹)	(Percent)
1	Cattle	17,293,906	12,265,924	5,027,982	6.94
2	Pepper farming	79,481,625	12,107,206	67,374,419	93.06
	Total	96,775,531	24,373,131	72,402,401	100.00

Average cattle ownership (cows) = 3; Average ownership of land farming (ha) = 0.5; Farm productivity (kg / ha) = 500

The average contribution of farmer household income in Bali cattle business by an integrated business pattern with pepper plantations as seen in Table7, is relatively small at 6.94% (Rp.5,027,982 year-1) compared to pepper farming income for one year reaching 93.06% (Rp.67,374,419 year-1). Results of this study are possible since the number of cattle ownership is relatively small, namely an average of only 2 cattle per household, while the ownership of plantation land ranges from 0.5-1 ha per household with productivity around 0.7-0.8ton ha. Data BPS shows that the area of productive pepper land farming in South Konawe Regency in 2017 reached 2,248 ha and the non-productive one were 979 ha. (BPS Kab. Konawe Selatan. 2018).

Increased income taken from pepper in South Konawe Regency is caused by the price of pepper reaching Rp. 120,000 per kg. However, there are always not stable fluctuating pepper prices and decreased one to Rp.45,000 kg-1 at the level of producer farmer and Rp.70,000 kg-1 at the retailer level. The cost structure of pepper production consists of land processing costs, planting, fertilizer, harvest costs, post-harvest and marketing costs.

Table 8. Average Farmer Household Income in Bali Cattle Business by An Integrated Business Pattern with Coconut Farming

No	Sources of Income	Acceptance (Rp year ⁻¹)	Cost (Rp year ⁻¹)	Income contribution	
				(Rp year ⁻¹)	(Percent)
1	Cattle	24,500,000	11,027,881	13,472,119	62.95
2	Coconut	22,855,000	14,926,475	7,928,525	37.05
	Total	47,355,000	25,954,356	21,400,644	100.00

Table 8 shows that the contribution of cattle business income is 62.95%, while coconut farming is only 37.05% of the total household income. The value of the contribution shows that the cattle business income has more contribution than the coconut farming if the two businesses are managed in an integrated patten in South Konawe Regency. This result is possible because the average ownership of Bali cattle per farmer is relatively large, namely 4 animals while the average coconut plantation area for each farmer is only 0.5ha. The management of coconut plantation is still traditional and the age of coconut plants has been more than 30 years so there is decreased productivity. Low level of income is not only due to low crop productivity, but also due to fluctuating prices for coconut products. At the time of research, the copra price was Rp.6,000 per kg at the producer farmer level, Rp.6,500 at the collector trader level and Rp.7,000 per kg at inter-regional traders. The price of dried coconut seeds also varies depending on the size ranging from Rp. 1,500 to Rp. 3,000 per seed at the level of producer farmers and traders. Ishak et al. (2016) stated that based on conditions in Khyber Pakhtunkhwa Province (Pakistan), livestock business served as the main source of income (62% of respondents) followed by agriculture (21% of respondents) and there are obstacles obstructing farmer productivity namely lack of infrastructure supports and weak financial facilities.

4 CONCLUSION

Based on the research results, it can be concluded that: (1) The average farmer household income on Bali cattle business is smaller than the income taken from farming, both crops and plantation; (2) Contribution of income of Bali cattle business by an integrated business pattern with food security (paddy and corn) is 35.58%, while the contribution of Bali cattle business by an integrated management pattern with plantation farming (cocoa, pepper, cashew and coconut) is only 18.55%; (3) The contribution of income on the Bali cattle business by an integrated business pattern with paddy, corn, cacao, cashew, pepper and coconut farming, each of which is 35.44%, 36.45%, 32.32%, 55.28%, 6.94%, and 62.95% consecutively.

REFERENCES

- [1] Bachruddin, Z. 2006. Integrated Farming System Based on Animal Husbandry. Opportunities and Obstacles. Speeches and Public Lectures on Master and Doctoral Programs at the UGM Post-Graduate School, Faculty of Animal Husbandry. Yogyakarta.
- [2] BPS South Konawe Regency. 2018. South Konawe Regency in Figures. Central Konawe Regency Statistics Agency. Andoolo.
- [3] Chavas, J. P; R. Petrie and M. Roth. 2005. Farm household production efficiency: Evidence From the Gambia. American Journal of Agricultural Economics. Vol 87 (1): 160-179.
- [4] Hamdani, M. 2008. Integrated farming system to increase land productivity and welfare of farmers. Paper. Technology Workshop for Communities. Serang-Banten.
- [5] Hosen, N. and Y. Jastra. 2012. Potential and obstacles of developing integrated farming system at livestock production center in Agam Regency, West Sumatra. Embryo Journal Vol. 5 (2): 98-105.
- [6] Hostiou, N., N. Cialdella, V. Vazquez, A.G. Müller, and P.Y. Le Gal

- PY. 2015. Work organization on smallholder dairy farms: a process unique to each farm. *Tropical Animal Health And Production*, (Oct. 2015) 47 (7): 1271-8. DOI 10.1007/s11250-014-0753-8. Publisher: Springer; PMID: 26032001.
- [7] Indriyani I. and J. Hellyward. 2015. Optimizing production and profit maximization of beef cattle business with integrated cattle-oil system in Dharmasraya Regency. *Indonesian Animal Husbandry Journal*, 17 (3): 18-25.
- [8] Ishaq, M., A. Hassan, A. Farooq, L. Xiangsen. 2016. Survey Of Live-stock Production And Management In Khyber Pakhtunkhwa Province Of Pakistan. *Pakistan Journal of Agricultural Sciences*; (Jun 2016), 53 (2): 473-481. DOI: 10.21162/PAKJAS/16.2689.
- [9] Jimmy C.H, Tumber, A. Makalew, A.H.S Salendu, and E.K.M. Endoh. 2014. Analysis of the benefits of cattle rearing in Suluun Tareran Subdistrict, South Minahasa Regency. *Zootek Journal*, 34 (2): 18-26.
- [10] Kusnadi, U. 2007. Livestock technology innovation in crop and live-stock integration systems (SITT) to support meat self-sufficiency in 2010. Speech of Professor Inauguration of Research of Agricultural Research and Development.
- [11] Portillo, B.A., S. Rebollar-rebollar, A. García-martínez, R. Rojo-rubio, F. Avilés-nova, and C.M. Arriaga-Jordan. 2015. Socioeconomic and productive characterization of dual-purpose farms oriented to milk production in a subtropical region of Mexico. *Tropical Animal Health and Production*; Dordrecht (Mar 2015), 47(3) : 519-523.
- [12] Posadas-Domínguez, R.R., C.M. Arriaga-Jordán, and F.E. Martínez-Castañeda. 2014. Contribution of family labour to the profitability and competitiveness of small-scale dairy production systems in central Mexico. *Tropical Animal Health and Production*; Dordrecht (Jan 2014), 46 (1): 235-240.
- [13] Rusdin dan Z. Abidin. 2018. Analysis of income and determinants of side-grafting cocoa production in Konawe Regency. *Mega Assets Journal*, 7 (2): 72-80.
- [14] Samkol, P., K. Sath, M. Patel, P.A. Windsor, and K. Holtenius. 2015. Survey of smallholder beef cattle production systems in different agro-ecological zones of Cambodia. *Tropical Animal Health And Production*, (Oct. 2015) 47 (7): 1299-1306. DOI 10.1007/s11250-015-0863-y, Publisher: Springer; PMID: 26055891.
- [15] Sani, L. A., U. Rianse, H. Hafid dan Bahari. 2015. Socio-Economic Analysis and Productivity of Bali Cattle Farmers in Southeast Sulawesi. *Proceedings. National Seminar on Food Self-Sufficiency. "Indonesia Towards Food Self-Sufficiency in the Next Three Years, Conceptual, Theoretical and Empirical Reviews"*. Unhalu Press Kendari. p. 301-307.
- [16] Sani, L.A. 2010. Factors Affecting the Outpouring of Transmigrant and Local Family Workers in Beef Cattle Rearing in South Konawe Regency. *Agriplus*, 20 (01): 48-56.
- [17] Sani, L.A. 2011. Productivity of transmigrant and local family workers in rearing beef cattle in South Konawe Regency. *Agriplus*. Vol. 21 (02): 08-17.
- [18] Sani, L.A., K.A. Santosa and N. Ngadiyono. 2010. Outflow of Transmigrant and Local Workers in Beef Cattle Rearing in South Konawe Regency, Southeast Sulawesi. *Animal Husbandry Bulletin*, 34 (03): 194 - 201
- [19] Sani1, L.A., L. Ba'a, M. Abadi dan T. Ali. 2018. Financial Analysis of Combination of Bali Cattle Business, Plantation and Horticulture in Tinanggea Subdistrict, South Konawe Regency. *Proceedings. National Seminar on Animal Husbandry Technology Innovation in Supporting the Establishment of National Food Security*. Faculty of Animal Husbandry, UHO, Kendari pp. 393-400.
- [20] Sani2, L. A., U. Rianse, H. Hafid, Bahari, and W. Kurniawan. 2018. Household Economy of Bali Cattle Farmer with Different Farming Combination in Konawe Selatan Regency of Southeast Sulawesi Province. *Proceeding International Seminar. IPB International Convention Center*, p: 28-30. Bogor, 28-30 August 2018.
- [21] Sodik. A dan M. Budiono., 2012. Beef cattle productivity in rural livestock farming groups. *Agripet Journal*, 12 (1): 28-33.
- [22] Soeharno. 2009. *Microeconomic Theory*. Andi Publisher, Yogyakarta.
- [23] Soekartawi. 2005. *Agribusiness. Theory and Application*. Grafindo Persada, Jakarta.
- [24] Suryana, A. 2007. The policy direction of agricultural research and development bodies in the penalization of agricultural technological innovations. *Proceedings of the National Seminar and Exposure to Accelerating Location Specific Technology Innovations Supporting the Independence of Village Communities in Papua*. The Indonesian Center for Agricultural Technology Research and Development in collaboration with the Government of the Papua Province, ACIAR-ESEAPCIP. Jayapura, 5-6 June 2007 p. 5-12.
- [25] Suwandi. 2005. Sustainability of integrated farming of integrated beef-paddy-rice pattern in Sragen Regency: RAP-CLS Approach. *Dissertation*. Bogor Agricultural University Postgraduate Program. Bogor.
- [26] Taufel, N; K. Kuettner and C. Gall. 2005. Contribution of Goat Husbandry to Household Income in the Punjab: A Review. *University of Hohenheim In: Small Ruminant Research, Band 28 Helf 2*. [http://ContributionofGoatHusbandrytoHousehold\(30-8-2018\)](http://ContributionofGoatHusbandrytoHousehold(30-8-2018)).
- [27] Tulle, D.R. 2005. Analysis of motivation and income in household scale pig farming business in Padang City. *Thesis. Post-Graduate program*. Gadjah Mada University, Yogyakarta.
- [28] Yamane. 1979. *Mathematic for Economics and Elementary*. Englewood Cliff. New Jersey.
- [29] Yanuartono, H. Purnamaningsih, S. Indarjulianto, dan A.Nururrozi. 2017. The potential of straw as a ruminant feed. *Journal of Husbandry Science*, 27 (1): 40-62.