

The Integrated Farming Model Characteristics Of Maize And Cattle In Lima Puluh Kota Regency

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Abstract

This study aims to identify the characteristics of integrated maize and cattle farming. This research used a descriptive method, which was carried out in 50 Kota Regency. The choice of search area was made deliberately. Determination of the research sample using the snowball sampling method. Data collection used interview method using questionnaire to get primary data and documentation method to get secondary data. Data analysis methods use qualitative and quantitative descriptive analysis using triangulation techniques that test the accuracy of data through methods, sources and assumptions. The results show that the characteristics of corn and livestock integrated agricultural types include: 1) Corn crops have: Land area of 0.2-0.50 hectares, with land ownership and rent levels; seeds used by pioneers; Fertilizers used include: manure, compost, UREA, SP-36 and Ponska NPK; using grain waste in the form of leaves and sticks that are fed directly to livestock; 2) Characteristics of cattle, including: Simmental and Brahman cattle and a total of 2-5 cows; The products of cattle are calves, fodder, labor and medicine. The main ingredients of cow manure are: cow dung, leather, bran, EM-4, and sugar.

Keywords: Characteristics, integrated farming, maize, cattle.

INTRODUCTION

The new strategy for agricultural development is to improve the quality and skills of human resources as active workers in integrated agricultural development. Agricultural development in this new system must increase people's purchasing power which will be a motivator for growth in the non-agricultural sector. Linkages between the agricultural and non-agricultural sectors will accelerate if economic infrastructure is available to support agricultural economic activities in rural areas.

239



Integrated agriculture is an agricultural activity that combines two or more fields (food crops, horticulture, forests, livestock and fisheries) that provide benefits between crops, livestock, and fisheries carried out on one land, many lands, or in a region or area by utilising agricultural waste in the form of leaves, fruits, flowers, stalks, livestock feces, fish waste for maintenance purposes, and increasing production and productivity so that farmers' income and production results are more, good livestock conditions. Integrated farming has many advantages, namely: (a) the ability to increase household income; (b) reducing the risk of crop failure; (c) providing more employment opportunities for families; (d) increasing the efficiency of resource use; (e) being able to provide family food availability; (f) increasing land productivity; and (g) improving the welfare of farming families (Prajitno, 2009).

Integrated farming system (IFS) as a concept of farming system that combines two or more farms (Massinai, 2012; Walia & Kaur, 2013; Jaishankar et al., 2014) where there are input-output linkages between commodities and biological recycling processes (Changkid, 2013; Massinai, 2012; Thorat et al., 2015), which use low external inputs (Nurcholis & Supangkat, 2011; Hilimire, 2011) and utilise resources efficiently (Balemi, 2012 and Soputan, 2012), and apply various techniques so as to increase production, productivity and income of farmers and sustainably (Gupta et al., 2012; Manjunatha et al., 2014; Thorat et al., 2015).

Integrated crop-livestock systems are one of the many technologies currently being developed as part of a sustainable production process (Mukhlis et al., 2018). One form of integrated agriculture and livestock is integrated rice and cattle farming (Mukhlis et al., 2019b). Inputs or inputs in the integrated farming system of rice and cattle have internal inputs and external inputs (Mukhlis et al., 2019a). Integrated rice and cattle farming must consider many production factors, namely: paddy fields, cattle pens, rice seeds, seeds/feed, organic fertiliser, inorganic fertiliser, animal feed, pesticides, medicines and vitamins, labour and capital (Mukhlis et al., 2022).

According to Marjaya (2015), maize production in the maize-cattle integration farming system in Kupang Regency is influenced by several production factors, namely: land area, seeds, manure, Urea fertiliser, SP-36 fertiliser, KCL fertiliser, pesticides, and labour. Meanwhile, beef cattle production is influenced by calves, corn stover, straw, other forages, medicines, vitamins and maize production.

Income from intercropping maize and upland rice is higher than from maize monoculture (Sution et al., 2020). According to (Sayuti et al., 2022), the profitability of maize cultivation in Bengkulu region is positively related and correlated with land area (LL). Meanwhile, factors that have a significant effect and are negatively correlated are pesticide prices (HPC) and male labour wages (UTKP). But the negative and



insignificant effect is the price of Phonska fertiliser (HP). This study aims to describe the characteristics of the integrated farming model of maize and cattle.

RESEARCH METHOD

This research uses descriptive research methods. According to Wirartha, (2006), descriptive research is research that describes and relates various conditions, situations or various variables. Then, analyse and present facts systematically so that they are easier to understand and conclude.

This research was conducted in Lima Puluh Kota Regency. The research was conducted for 6 months, starting from Agustus - November 2022. The selection of research locations was carried out deliberately (Sugiono, 2013). Selected 4 (four sub-districts namely Payakumbuh sub-district, Harau sub-district, Guguak sub-district and Mungka sub-district, this is based on the fact that the selected sub-district has not been done the same research.

The sampling method used is the snowball sampling method. This sampling method can be used if population data does not exist, making it impossible to make a sampling frame. With this method, the researcher first looks for respondents who match the predetermined criteria, then the respondent will invite his other friends to be used as respondents, and so on until the sample size is representative enough to fulfil the analysis. Therefore, the sample size for this study cannot be determined at the beginning of the study (Rianse & Abdi, 2013). Snowball sampling is one of the most popular methods of sampling in qualitative research, central to which are the characteristics of networking and referral. The researchers usually start with a sample, who fit the research criteria and are invited to become participants within the research (Parker et al., 2020).

The snowball sampling method can be used if the researcher has difficulty finding or determining the population and the number cannot be determined accurately. The snowball sampling method is a survey research method used if the sample is obtained through a rotation process from one respondent to another (Neuman, 2014).



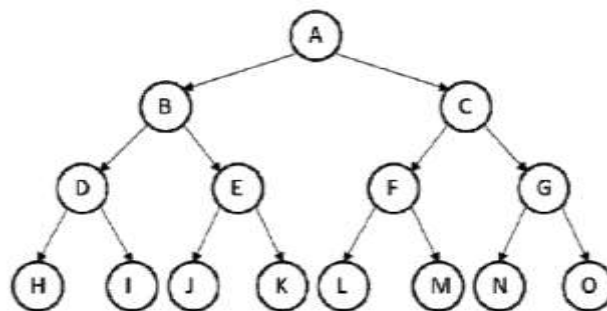


Figure 1. Snowball sampling technique chart

The snowball sampling method is suitable for this study because the population data of rice and livestock farmers is not accurate and it is difficult for researchers to find the population in the research location. Data collected were primary data and secondary data. Primary data was obtained from respondent farmers or sample farmers using the interview method based on a list of questions that had been prepared previously. Secondary data were obtained from various related agencies, as well as information from various sources.

Data analysis methods were used to describe the production of integrated maize and cattle farming using descriptive statistics. The methods and data analyses were: 1) Reduction: From the data/information that has been collected, selected information that is appropriate and not in accordance with the research problem, focus on simplicity, abstraction and transfer of raw data in the notes from the field; 2) Presentation: After the information is selected according to the research needs, the results are presented in the form of tables or explanations; 3) Conclusion: Conclusions are the process of obtaining interpretations of data that aim to understand the overall context of the problem. Data analysis uses 5 W (who, what, where, when, why) + 1 H (how).

Based on the survey results in this study, the findings obtained are the characteristics of the integrated farming model of maize crops and cattle. The results of this study are divided into 2 (two), namely: 1) Characteristics of maize integrated farming, and 2) Characteristics of integrated cattle farming.

Characteristics of Integrated Maize Farming

The research results found from the characteristics of integrated maize farming are age of the maize farmer, education of the maize farmer, farming experience, number of family members, number of workers in the family, land/land, maize seed, fertiliser, pesticides, labour and maize straw. For more details on the research results, see Table 1.

Table 1. Characteristics of Integrated Maize Farming

No	Variable	Characteristics
1	Farmer age	37 – 61 years
2	Education	SD - SMP
3	Farming experience	15 – 42 years
4	Number of family members	3 – 4 people
5	Family Labour	2 people
1	Land Area	0.2 - 0.5 hectares with an average of 0.46 hectares
2	Maize Seed	3 - 30 kg/acre or 7 – 15 kg/acre, seed price IDR 80,000/kg.
3	Fertiliser : Manure UREA SP-36 PONSKA	250 - 300 kg 30 - 100 kg 50 kg 20 kg
4	Pesticide	Decis, 2 litres
5	Labour	1 TKP and 1 TKW, 1 unit of threshing machine
6	Corn straw	Stalks and fresh corn leaves

Characteristics of Beef Cattle Integrated Farming

The research results found from the characteristics of integrated cattle farming are the age of the cattle farmer, education of the cattle farmer, experience in cattle farming, number of family members, number of labourers in the family, seedlings/calves/ calves, cattle feed, labour, medicines and cattle/feces waste. For more details of the research results can be seen in Table 2.

Table 2. Characteristics of Beef Cattle Integrated Farming

No	Variable	Characteristics
1	Farmer age	37 – 61 years
2	Education	SD - SMP
3	Farming experience	15 – 42 years
4	Number of family members	3 – 4 people
5	Family Labour	2 people
6	Breeds/calves/ calves	Breed of Simmental cattle, Brahman cattle and Balinese cattle Number of seedlings 1 - 135 heads
7	Cow feed	Combination of fresh grass/grass and fermented straw

8	Labour	2 TKP, skilled and productive workforce
9	Medicines	Deworming and vitamins
10	Cattle waste/Cow faeces	Cow manure can also be mixed with other organic materials, ie: 150 kg cow dung, 40 kg husk, 10 kg bran, 200 ml EM-4 and 150 grams of sugar

DISCUSSION

Characteristics of Integrated Maize Farming

Based on the research results above, it can be described that all variables have different characteristics. Each variable has a different function in describing the conditions and specifications of maize and cattle farming in the maize-cattle integrated farming model.

Land Area

Land size indicates how much land the farmer owns for maize farming in the maize-cattle integrated farming model. Land ownership status is private land and leased land. Maize is generally planted on dry land, but some are planted on paddy fields during the dry season. Maize is usually planted twice a year depending on weather conditions. Land rent is from IDR 25,000 to IDR 1,400,000/acre. According to Rusdiana et al (2019), maize plants in integrated farming systems of food crops with beef cattle can grow well on several types of soil, namely andosol, latosol, grumusol, and sandy soil.

Maize Seed

Maize seeds describe the quantity, quality and price of maize seeds used. The seeds used by farmers are superior seeds, namely pioneer seeds. Farmers use high-grade seeds because they are disease-resistant, have high growth potential, high production and are more profitable. Farmers usually obtain maize seeds by buying at their own expense from local farm shops and some farmers receive seed subsidies from the government (Dinas Pertanian Tanaman Pangan dan Hortikultura). Seeds are still expensive at IDR 80,000 per kilogram with direct and cash payment methods. Farmers can get seeds anytime in the required size and quality. The cost to purchase seeds is IDR 80,000 - IDR 1,200,000.

Fertiliser

Fertiliser describes the type, dosage, purchase price of the seeds used and the method of fertiliser application. Fertilisation is done by applying it around the plants, usually applying organic fertiliser once before planting and inorganic fertiliser twice at



the age of 15 or 25 HST and 45 HST. The fertiliser doses are: 250 - 300 kg of cow feces manure at Rp 6,000/kg, self-raised and self-purchased animal feed; 30 - 100 kg of Urea fertiliser at Rp 90,000 - 230,000, 50 kg of SP-36 at Rp 135,000, 20 kg of NPK Ponska at Rp 70,000. Fertilisation costs Rp 20,000 to Rp 280,000. Maize fertilisation is done by making a hole in the left or right side of the maize plant about 10 cm from the base, then covering it with soil along with weeding and fertilisation.

Pesticide

Pesticides used to maintain the maize crop against pests are in the form of insecticides. The insecticide used is decis at a dose of 2 litres at Rp 20,000/litre. Ant control is done by spraying the grass and plants infested with ants using a knapsack sprayer. The cost of purchasing the insecticide was IDR 20,000 with the labour cost required being IDR 35,000.

Labour

Labour explains how much labour is needed, what the skills are. The labour used in maize cultivation is male labour (TKP) and female labour (TKW) as well as labour in the form of threshing machines. The labour that farmers want is easy to obtain whenever farmers want it, namely the average surrounding community who work as farmers, so that when farmers provide work to plant corn they want it, especially when they are currently unemployed. In planting maize, farmers do not need professional labour because every job is easy to do and can be done by anyone. The wage for each job is the same for both male and female workers. The wage cost for workers is IDR 70,000 per day. The wage for mechanical labour is Rp 150/kg.

The capital owned by maize farmers is cash which is personal money, loans and maize grinding machine tools. Farmers have their own capital, government subsidies and loans. In general, farmers' capital is used for: land rent; buying agricultural inputs; renting or buying maize shellers; and paying wages.

Corn straw

Corn straw in the form of fresh corn stalks and leaves which is the waste of corn crop harvest, used in the form of raw straw is used as cattle feed. Fresh harvested straw is brought directly to the barn and given directly to the cattle.

Characteristics of Beef Cattle Integrated Farming

Breeds or calves

Breeds or calves are divided into self-owned, investor-owned and government-subsidised. Seed is a key factor that plays an important role in ensuring the success



of beef cattle farming. Efforts to use good seedlings are crucial in obtaining better yields, which will determine the success of cattle farming. With the adoption of new technology and artificial insemination, farmers can produce cattle with higher productivity, thus providing higher income to farmers.

Cattle Feed

The best feed for cattle is a combination of fresh grass/forage and fermented hay. Fresh forages are grasses, grains and other green plants. The source of fermented hay comes from the farm itself, and the shortage comes from other sources, while forage is obtained from grass cutting (grazing). Every day, cattle should be fed about 10% of their body weight and other feeds should be added at 1% to 2% of their body weight.

Labour

Labour for cattle rearing requires skilled and productive labour in cattle rearing and can utilise organic waste. Thus the animals grow healthy, so production can be increased.

Medicines

Medicines are used to control diseases so that cattle grow healthy, the medicines used are wormers and vitamins. The use of drugs is a simple and effective way of cattle farming, and with the use of drugs it is expected that cattle growth will be better because it produces more satisfactory meat.

Utilisation of Cow Faeces Waste as Organic Fertiliser

Cow manure can also be mixed with other organic materials to speed up the composting process and improve the quality of the compost. It can be seen that the nutritional potential of organic fertiliser is very large, so that in the corn and cattle farming system, fertiliser needs can be met from the cattle waste itself which is converted into compost. The stages of making cow faeces organic fertiliser are as follows:

- The ingredients are: 150 kg cow dung, 40 kg husk, 10 kg bran, 200 ml EM-4 and 150 grams of sugar. What is needed to make organic fertiliser is 200 kg;
- All the ingredients (cow dung, husk and bran) are mixed well;

Then the mixture is sprinkled with microbial solution combined with EM-4 and sugar, stirred until 30-40% wettability, then the mixture is placed in a mound 15 cm high and covered with plastic. Then stirred every 3 days to maintain a temperature of 40-50oC. After 14 days, organic fertiliser can be applied.



CONCLUSION

Acquiring Characteristics of maize crops in the integrated farming model of maize crops and cattle include: Land area is 0.2 - 0.50 hectares, with ownership status of own land and leased land; Seeds used are Pioneer superior seeds; Fertilisers used include: manure, compost, UREA, SP-36, and NPK Ponska fertilisers; Utilisation of corn waste in the form of leaves and stems given directly to livestock. Characteristics of cattle in integrated farming of cocoa crops and cattle, including: Simmental and Brahman cattle breeds with the number of cows 2 - 5 heads; Production factors of cattle farming are seeds, feed, labour and medicine; Materials in making cow feces organic fertiliser consist of: cow faeces, chaff, bran, EM-4 and sugar.

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