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ANALYSIS OF BUSINESS OPPORTUNITIES FOR DUCK BONE WASTE MEAL AS AN ALTERNATIVE FEED ADDITIVE FOR LAYER CHICKENS

Analisis Peluang Usaha Limbah Tepung Tulang Itik Sebagai Aditif Pakan Alternatif Untuk Ayam Petelur

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ABSTRACT

Nasu palekko, made from duck meat, is one of the typical dishes of Sidenreng Rappang Regency.The amount of duck bone waste produced has increased due to the rising demand for this product.The business potential of duck bone meal; the livestock feed production process, which includes production inputs, receipts, and revenue; and the added value generated from processing duck bone meal.This study was conducted in Sidenreng Rappang Regency from June to November 2022.Qualitative and quantitative descriptive analysis of the production process and its inputs, income and profit analysis, and the Hayami method for calculating added value were used in this research.According to the research results, the duck bone flour industry has a lot of potential.The production capacity of duck bone meal per day is 4,400 kilograms with a margin of Rp15,168,000.Meanwhile, the added value per production according to the Hayami technique is Rp5,603,000.

Keywords: Duck Bone Meal, Livestock Feed, Value Added (Hayami Method)

ABSTRAK

Nasu palekko, yang terbuat dari daging bebek, adalah salah satu makanan khas Kabupaten Sidenreng Rappang. Jumlah limbah tulang bebek yang diproduksi meningkat sebagai akibat dari peningkatan permintaan akan produk ini. Potensi bisnis tepung tulang bebek; proses produksi pakan ternak, yang mencakup input produksi, penerimaan, dan pendapatan; dan nilai tambah yang dihasilkan dari pengolahan tepung tulang bebek. Studi ini dilakukan di Kabupaten Sidenreng Rappang dari Juni hingga November 2022. Analisis deskriptif kualitatif dan kuantitatif terhadap proses produksi dan inputnya, analisis pendapatan dan laba, dan metode Hayami untuk menghitung nilai tambah digunakan dalam penelitian ini. Menurut hasil penelitian, industri tepung tulang bebek memiliki banyak potensi. Kapasitas produksi tepung tulang bebek per hari adalah 4.400 kilogram dengan margin Rp15.168.000. Sementara itu, nilai tambah per produksi menurut teknik Hayami adalah Rp5.603.000.

Kata kunci: Nilai tambah (metode Hayami), Tepung Tulang Itik, Pakan Ternak.

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INTRODUCTION

Competitiveness of the nation. A national development policy direction with a new paradigm is required to preserve and enhance national competitiveness in order to achieve sustainable development. Since 1998, the established reform era has brought forth several changes in a variety of industries. As the financial and monetary crises have subsided, so too has the concentration of national economic power in one particular group. Economic development, which prioritizes the people's economy, has replaced the economic development paradigm, which was originally primarily focused on large-scale industrial growth. The financial recovery process has been impacted by this paradigm change, as evidenced by a number of economic indices (1).

Particularly in smallholder, land-based production, livestock products usually show great demand elasticity and low supply elasticity. Rising per capita earnings, increasing urbanization (and shifting consumer habits), and population expansion in many countries are all contributing to an increase in the demand for animal products. Because of this demand pattern, it has been argued that livestock development tends to benefit high-income segments of society solely, excluding prospective donors and neglecting to take into account the full supply-side advantages (2).

Agroindustry plays a significant role in agricultural development, particularly for expansion in the future. Agroindustry's contribution to national development will grow in tandem with agriculture's position as a key industry. Stated differently, agroindustry must be developed towards a strong, advanced, and efficient agricultural sector in order to achieve a strong, advanced, and efficient agricultural sector and to become a staple sector in national development. (3).

Opportunities for agricultural businesses are currently growing in tandem with the quick advancement of technology and the advancement of millennials' thought processes. Biodiversity, which is widespread and abundant throughout Indonesia, is the potential for a farming industry in the Indonesian economy. Currently, an increasing number of Indonesians, both in rural and urban areas, are operating agricultural businesses, particularly crop, plantation, and livestock businesses (4). Additionally, because animal products—which are primarily food—are essential to human needs, the livestock industry offers excellent entrepreneurship chances. Thus, there will always be customers in the livestock industry. Furthermore, the majority of Indonesians work in the production of livestock products, which are also the country's main food source (5). Especially in Sidrap Regency, culinary businesses are increasing from year to year according to data from the Central Statistics Agency (BPS) of Sidrap Regency, as many as 353 culinary businesses throughout 2018-2022. This indicates that the Sidrap community is more interested in culinary businesses as a source of income. Culinary whose main menu is traditional cuisine, where the location is on the edge of a rice field with a rural feel that prepares traditional Bugis menus that have their own flavors such as palekko itik.

For broiler production, the proportion of flocks with moderate to severe FPD lesions ranged from 0 to 71.5%, with an average of 11.0% (6). Indeed, in the United States and Europe, the prevalence of FPD is increasingly utilized as an audit criterion to evaluate the welfare of chicken production systems (7). Recent increases in FPD in broodstock ducks in China have resulted in lower reproductive performance and substantial mortality (about 20–30%). Numerous risk variables, such as stocking density, flock

management, bedding type and quality, and diet, contribute to the complicated etiology (8). However, from the perspective of the livestock industry, it is inextricably linked to the animal feed industry. One of the key components of a farm's success is animal feed. Breeders' success in the livestock industry is significantly influenced by the availability of high-quality livestock feed and affordable meal costs. As a result, the livestock and animal feed industries need to be directly proportionate (9).

Hydrolyzed feather meal, intestinal mucosa meal, blood meal, high-protein whey powder, insect meal, fish paste and fish meal, bone meal, bone and flesh meal, chicken by-product meal, overcooked chicken offal, and egg waste are examples of animal feeds. Animal products can be combined with other vegetarian protein sources or used as the only source of protein in the diet [10]. Simultaneously, animal byproducts, including feed, must be used in accordance with EU regulations [11–12]. Eliminating the use of animal products in feed production can have serious negative effects on the environment, the economy, and society. These effects include waste of resources from slaughterhouses, degradation of natural ecosystems, and increased costs for feed production as a result of the increased demand for value-added components [13].

The production of animal feed is one agro-industry in Sidenreng Rappang Regency with promising futures. It is supported by the potential that now exists. In the Sidenreng Rappang district, specifically, duck bone waste and household trash have not been used, and no handler is concerned about contaminating the environment. Therefore, it uses it to manufacture duck bone meal, which is one of the primary elements for manufacturing chicken feed, and turns it into something economically worthwhile. Future farmers may benefit from alternative feed generated from duck bone meal, which is anticipated to have economic worth. They have a monetary worth and are readily available as possible raw materials. This supports the viewpoint of Barbieri et al. (14) Phosphorus, calcium, and alkaline oxides are abundant in animal feed. Duck bone waste is one source of calcium that hasn't been used up to this point. Despite the great selling value of this duck bone meal for manufacturers of animal feed, food innovation items, etc.

Viewpoint According to Eniza and Saleh (15), bone meal's mineral content—particularly that of calcium and phosphorus—allows it to be utilized as animal feed. Numerous mineral salts, including 58.3% calcium phosphate, 1.0% calcium carbonate, 2.1% magnesium phosphate, and 1.9% calcium chloride, are present in bone meal. According to Teory's Murtidjo (16), the body needs calcium and phosphorus for bone production and metabolic processes. There are 5,227,123 laying hens in Sidenreng Rappang Regency, and their annual production capacity starts at 75,793 tons. Every livestock company aspires to maximize profits while maintaining low production costs and high production efficiency. Given these circumstances, the authors would want to carry out a study titled "Analysis of Duck Bone Meal Business Opportunities as an Alternative Feed Additive for Laying Hens." According to this description, the study's issue statement asks how profitable duck bone meal is and how much value is added to animal feed in Sidenreng Rappang Regency. This study aims to determine the potential for an animal feed business using duck bone meal, which is not widely used in Sidenreng Rappang Regency.

MATERIALS AND METHODS

Materi Place And Time

The Sidenreng Rappang Regency is where this study was carried out. The livestock entrepreneur in Sidenreng Rappang Regency is the subject of the study. The creation of research proposals, data gathering, data processing, and final report writing were the first steps of this five-month study, which ran from June to December 2024.

Types Of Data and Data Collection Techniques

Both qualitative and quantitative methods are employed, along with a literature review research methodology. A written analysis of original works and other sources on a chosen subject is known as literature review study. A review may comprise a variety of sources, such as books, government papers,

scientific journal articles, websites, and more. Each source is described, summarized, and evaluated in a literature review. This article offers a thorough assessment and analysis of the body of research on agricultural agroindustry as a business opportunity in order to compile current information, pinpoint particular industries, and determine future research objectives.

Primary and secondary data are the two categories of data. Direct interviews with respondents utilizing a questionnaire were used to collect primary data. Respondent identity information, such as age, education, and work experience, is one of the primary variables collected. Data on production inputs, such as the use of manpower, raw materials (duck bone meal), and information on equipment ownership. The publishing of research-related agencies provided secondary data. This study's main methodology is descriptive, which focuses on finding solutions to present issues before compiling, elucidating, and analyzing the data that was gathered (17).

Data analysis

Qualitative analysis was employed in this study. An overview of the state of the duck bone meal business opportunity—one of the primary materials used to make animal feed—was obtained through qualitative study. The value added of duck bone meal as a substitute feed was assessed quantitatively using the Hayami method (18).

The value-added analysis quantifies the number of job possibilities generated by agro-industrial entrepreneurs and aids in estimating the compensation earned by business players in the agro-industry (19).

Table 1. Analysis of the value added of the Hayami method

Variable	No	Sub Variable	Description
Output input	1	Output (kg)	(1)
Price and price	2	Raw material input (kg)	(2)
	3	Labor input (JKO)	(3)
	4	Conversion Factor	(4) = (1): (2)
	5	Labor coefficient (JKO)	(5) = (3) : (2)
	6	Output price (IDR)	(6)
	7	Labor wages (JKO)	(7)
Revenue and Profit	8	Raw material input prices (IDR/kg)	(8)
	9	Contribution of other inputs (IDR/kg) (IDR/kg)	(9)
	10	Output value (IDR/kg)	(10) = (4) × (6)
	11	A. Value added (IDR/kg)	(11a) = (10) – (8) – (9)
		B. Value added ratio (%)	(11b) = (11a) / (10) × 100
	12	A. Labor income (IDR/hour)	(12a) = (5) × (7)
		B. Labor share (%)	(12b) = (12a) / (11a) × 100
	13	A. Profit (IDR/kg)	(13a) = (11a) – (12a)
		B. Profit rate	(13b) = (13a) / (10) × 100

Cost

The costs of the duck bone agroindustry are both fixed and variable. Prices for soybeans, outside family labor (TKLK), diesel, firewood, duck bones, tamarind, and transportation are all considered variable costs. The loss of production and construction equipment, as well as family labor costs (TKDK), are examples of fixed costs. Total variable costs (TVC) and total fixed costs (TFC) make up the total cost. The following is the formula for the total cost:

TC = TFC + TVC
Remarks:
TC = Duck Bone Agro-Industry Business Total Cost (IDR/Month)
TFC = Total Fixed Costs (IDR/month) of the Duck Bone Agro-Industry Business
TVC = Duck Bone Agro-Industry Business's Total Variable Costs (IDR/month)
The straight-line approach is used to determine the equipment depreciation cost, and the formula is as follows:
(HP-NS)/n = depreciation
Details:
HP = is the acquisition price.
NS =stands for residual value.
n = Production yield estimate (unit).

Revenue

The amount of duck bone production generated (sold) multiplied by the price of duck bones yields the entire revenue of a business. Revenue is expressed mathematically using the method:
$TR = P\ x\ Q$
Where:
TR = Total revenue from duck bone agro-industry business (IDR/month)
P= Price of duck bone per kilogram (IDR)
Q=total production. Mathematically, the profit is written by the formula:
$\pi = TR - TC$
Description:
π = Profit (IDR/month)
TR = Total Income (IDR/month)
TC = Total Cost (IDR/month)
Profitability
Profitability is the ratio between profit from selling feed and the total cost of making feed expressed as a percentage. Mathematically, it can be formulated as follows:

$$\text{Profitability} = \frac{\pi}{TC} \times 100\%$$

Description:
π = Profit of duck bone agro-industry business (IDR/month)
TC = Total cost of duck bone agro-industry business (IDR/month)
According to Gasperz's theory the criteria used in assessing profitability are:
1 Profitability > 0 means that the duck bone agro-industry that is cultivated is profitable.
2. Profitability = 0 means that the duck bone agro-industry that is cultivated experiences a Break Even Point (BEP).
3. Profitability < 0 means that the duck bone agro-industry that is cultivated is not profitable.
Business efficiency analysis the business
The efficiency calculation used is the Revenue Cost Ratio (R/C Ratio). R/C Ratio is the comparison between revenue and costs. Mathematically, it can be written as follows:
Where:
If R/C > 1 then agro-industry business is profitable to cultivate.
If R/C < 1 then duck bone agro-industry business is not profitable to cultivate.
If R/C = 1 then the duck bone agro-industry business breaks even, namely the business provides the same amount of revenue as the amount issued.

RESULTS AND DISCUSSION

Bagian The Role of Agro-Industry Agriculture in business opportunities and Indonesia's Economic Recovery After the Covid-19 Pandemic

In many Asian countries, the focus on reducing rural poverty was in the form of comprehensive policies, including rural industrialization. However, these efforts have yet to be entirely successful because they have not been into rural development in general. Agriculture is the main economic activity of the country. Therefore, the form of rural industrialization is the existence of an essential link between the production of agricultural raw materials, animal husbandry, and industry (livestock industry). The livestock production industry can provide the resources needed to produce meat, milk, eggs, animal feed, etc. If livestock products, which are livestock raw materials, can meet industrial needs, then the feedforward function will be used.

The new discourse that has developed after the pandemic, the need for the development of agricultural, livestock, and other industries in line with economic reconstruction, seems to want to answer criticism of the implementation of agricultural development in its development strategy. The New Order prioritized the rice self-sufficiency program, in line with the industrial sector's emphasis on the import substitution industrialization (ISI) strategy, which needed protection. It addresses the topic of economic globalization and the need for global market-oriented export (exit) promotion that requires high efficiency in all areas. That way, the agricultural sector, livestock with all its sub-sectors have the opportunity to internationalize, such as the processing industry, feed industry, and other companies. It was mainly marketed internationally by livestock commodities that can be.

Therefore, an agribusiness development strategy is critical to answering this question. This industrial approach has various implications for the development of agricultural enterprises and livestock itself and for necessary institutional reforms, livestock, government reforms, and the integration of development administration. The main entities of the livestock industry system, especially the feed industry, are economic actors such as the business world, farmers/breeders, cooperatives, state-owned enterprises, and private enterprises. The government acts as an adviser, director, and coach to create a business environment. In developing agricultural and livestock businesses, special attention must be given to aspects of regional development according to the integrated linkages between agroecosystems and market opportunities, business size, and subsystems of the agricultural and livestock industry systems.

The laying hen industry can carry out an integration which has backward links in the form of an upstream industry, which includes procuring production facilities such as feed, equipment, vaccinations, and medicines. The actions of many laying hen industries to integrate by establishing feed factories can directly support the supply of cheap feed and the continuity of its availability. Several feed industries have utilized available local resources to create efficiencies and empower the available potential around laying hen breeding centers (20).

Product processing activities (animal feed industry) generally rely heavily on mastery of processing techniques in handling by providing refrigerated warehouses close to markets. Feed ingredients such as bone meal are generally highly perishable and valuable in Value-added process, etc. Ideally, ideal feed industry activities should also direct the demand or potential market. In today's era of intense global competition, the principle of supply creates unique demands or directions that only pursue production goals (production approach). Marketing activities are an important goal for producers to act efficiently in the production process and achieve high profits by utilizing waste. People rarely use it due to a lack of information and knowledge in utilizing this waste.

Moreover, that is the weakness of the average product manufacturer. From an internal point of view, this depends on the market intelligence/manufacturing business level. That is, the strategy is to take advantage of the regional potential, such as in the Sidenreng Rappang district, by utilizing domestic waste, namely duck bone meal, as a substitute for the bone meal, which is the primary ingredient for making animal feed, with a focus on decentralization, regional potential this is in line with opinion Qisti (21) In comparison to SNI for duck bone meal and other bone meal, this study finds that the results of chemical analysis obtained are moisture, protein, fat, crude fiber, ash, calcium, and phosphorus content (P2O5), which are 2.01%, 33.33%, 12.38%, 2.78 %, 41.66%, 2.53%, and 6.24%, respectively. It was also discovered that duck bone meal has the potential to be used as much as possible to produce products made from duck bone meal by performing multiple treatments to enhance its quality.

Value added and Product Benefits

The following is the result of calculating the value of duck bone meal in animal feed using the Hayami method.

Table 2. Result of Calculation of Value added of Hayami Method

Variable	No	Sub Variable	Value	Unit/ Item	Information
Output, Input and Price	1	Output	4,400	kg/month	1
	2	Input Raw Material	10,000	Kg/month	2
	3	Labor Input	20	HKO/month	3
	4	Factor Conversion	0.4		4 = 1/2
	5	Coefficient of Labor	0.0020	JKO	5 = 3/2
	6	Output Price	57,200,000	IDR	6
	7	Labor Wages	2,000,000	JKO	7
	8	Raw Material Input Price	10,000,000	IDR/kg	8
	9	Other Input Donations	9,565,000	IDR /kg	9
	10	Output Value	25,168,000	IDR/kg	10 = 4 x 6
	11	A. Value Added	5,603,000	IDR/kg	11a = 10-8-9
		B. Value Added Ratio	56,030,000	%	11b= 11a/10x100
Receipt and profit	12	A. Labor Income	4,000	IDR/hour	12a = 5 x 7
		B. Labor share	0.0713903	%	12b = 12a/11a x100
	13	A. Profit	5,599,000	IDR	13a = 11a-12a
		B. Profit rate	22	%	13b = 13a/10 x 100
	14	Margin	15,168,000	IDR	14 = 10 -8
		A. Labor Income (%)	0.000263713	%	14a= 12a/14 x 100%
		b. Contribution of Other Inputs (%)	1	%	14b= 9/14 x 100%
		c. Company Owner Profit (%)	21,231,408,000		14c = 13a/14 x 100%

Source: Primary data that has been processed, 2024

Table 2 demonstrates how the daily input of duck bone flour is influenced by the availability of raw duck bone materials. The production waste of a typical Sidrap restaurant, nasu palekko, provides a sufficient amount of raw material for duck bone flour. The quantity of workers required for production is known as labor. The production process requires the availability of workers. On average, 20 HKO of labor are needed for production each day. Eight hours of adult labor equals one HKO. The labor contribution required to

process one kilogram of duck bone flour is shown by the labor coefficient's value. Products made from bone flour typically retail for IDR 13,000 per kilogram. The price of the bone flour product is mostly determined by the quality and purpose of the raw material.

As the raw material for duck bone flour, the average value added in the processing of duck bone flour is IDR 5,603,000, according to the value added calculation obtained from the processing of duck bones into duck bone flour. In order to provide information to animal feed entrepreneurs looking to expand their businesses, the value added calculation attempts to ascertain the amount of value added in 10,000 kg of duck bone following its processing into duck bone flour. expenses incurred, such as the effort to buy raw materials for IDR 0/kg since they are useless waste, and contributions from other inputs totaling IDR 10,000,000. These expenses determine the value contributed. All variable costs, with the exception of labor wages and raw material costs, are considered other input contributions. The components of other input contributions in the study region are described in Table 2.

When processing duck bone flour, the value added ratio of duck bones per production step is 56%. The ratio of value added to output is known as the value added ratio. Every time duck bone meal is created, it can yield a profit of IDR 1,599,000. This is because the average profit from the production process is IDR 5,599,000/time of production, or 22% of the product is value added.

The agro-industry will boost economic growth if the profit level (in percentage) is high. Assume that there is a high worker compensation to value added ratio (in percentage). In that scenario, the agro-industry contributes to its employees' income, making it more important in addressing the issue of unemployment by distributing employment possibilities fairly (22). The added value criterion (23) states that processing duck bones adds value if the added value (NT) is more than 0; if the NT is less than 0, processing does not add value.

According to (24) Sidrap Regency's egg-laying chicken farmers look forward to the arrival of locally manufactured chicken feed since it can boost worker productivity and enable them to make more money from the selling of their eggs. Additionally, because the grown hens have adequate nutrition and are more disease-resistant, feed availability can lower the amount of losses brought on by chicken mortality.

CONCLUSIONS AND IMPLICATIONS

1. Integrating livestock production with the agricultural and industrial sectors is essential for overall rural development. The livestock industry, especially the feed industry, provides meat, milk and animal feed resources. Therefore, it is important to have a clear strategy for developing agricultural and livestock businesses, including carrying out institutional reforms and integrating development administration. This integrated approach is needed to maximize the potential of the agricultural and livestock industries and encourage regional development.
2. Production margin 15,168,000 rupiah and production capacity 4,400 kg per day
3. The value added obtained from the calculation of the Hayami method is IDR. 5,603,000/ times the production

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