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The Impact of Feed Price Dynamics on Broiler Farm Productivity and Farmer Welfare: A Case Study in Kutai Kartanegara Regency

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Abstract

This study analyzes the impact of feed price fluctuations on farm productivity and farmers' welfare in broiler farms in Kutai Kartanegara Regency by using a mixed-method approach, where data are collected through the survey, complemented with in-depth interviews. The results indicate that fluctuating feed cost has a great impact on productivity because when feed prices rise, profit margins decrease, and operational risks increase. Farmers reported that income levels were not stable and consequently affected household welfare through financial stress and reduced quality of life. Psychosocial effects of the volatility of feed price include increased emotional strain and heightened tensions at the household level. Farmers also voiced their fears regarding financial futures and added anxiety and uncertainty. The study indicates that the smallholder farmers have limited resources and support against these changes. Policy Interventions in the research work involve setting up mechanisms for price stabilization, support for alternative feeds, and implementation of financial support. Besides, capacity-building programs should be necessary for farmers to manage economic fluctuations. These findings suggest that feed price dynamics, farmer welfare, and agricultural productivity are very much interlinked issues. It also underlines the need for targeted strategies to support broiler farmers in Kutai Kartanegara Regency and to promote sustainable agricultural development.
Keywoard : Feed Price Fluctuations, Broiler Farming, Farm Productivity, Farmer Welfare

INTRODUCTION

Poultry farming, especially broiler chicken farming, plays a critical role in Indonesia’ s economy, providing a major source of protein and contributing significantly to the livelihoods of millions of farmers. The demand for poultry products, particularly chicken meat, has increased as Indonesia’ s population grows, and with it, the need for efficient poultry production systems. It is in this context that broiler chickens are considered some of the most important commodities within the agricultural industry because of their relatively short production cycle and their capability for rapid response to market demands. The district of Kutai Kartanegara in East Kalimantan Province is one of these key areas for broiler chicken production. However, despite its assured high profitability in the sector, broiler-raising farmers face some challenges, among them volatility in feed prices. This price fluctuation can make or break both farm productivity and the welfare of the farmers themselves (Mahmud et al., 2020).

Feed is the most critical input in broiler farming, accounting for the largest proportion of production costs. According to Taufik (2019), feed costs represent approximately 60– 70% of total production expenses in broiler farming. Thus, any fluctuation in feed prices has a profound effect on the overall cost structure of the farm. As feed prices increase, so too does the cost of production, therefore placing further pressure on the already scant returns that may be realized by a broiler farmer. These costs cannot always be passed along to consumers in a price-sensitive market, which leaves farmers to absorb the high input costs. This holds good for small-scale farmers in areas like Kutai Kartanegara with limited access to other resources and financial inputs.

The volatility in feed prices can be attributed to various external factors. One significant factor is the fluctuation in global prices of raw materials used in feed production, particularly corn and soybeans. As Indonesia relies on imports for a large portion of those ingredients, international market trends are readily transmitted to domestic feed prices. As Gomez et al. (2022) mentioned, corn and soybean prices are susceptible to the vagaries of world trade policies, exchange rates, and climatic interruptions in the big producing areas of the United States and Brazil. Many of these global influences are beyond the control of the local farmer but greatly impact the eventual cost of feed for Kutai Kartanegara.

Problems on the ground with local supply chains could be added to global factors, further exacerbating feed price volatility. Kurniawan (2020) indicated that feed distribution in Indonesia is often in the hands of only a few large companies, which control supply and prices. Since there is no competition in the market, farmers have no bargaining power and must be able to take whatever price levels go up. In this situation, this disproportionately affects small and medium-scale farmers-those farmers who cannot raise enough capital to buy feed in bulk or bargain for better prices from suppliers. Thus, when feed prices increase, the heaviest blows are felt among such farmers, since their business operation margins are very thin and they may hardly have access to credit or alternative income sources. Feed price volatility places broiler farmers in a difficult position, forcing them to make operational adjustments to manage costs. Farmers can apply such control, for example, by decreasing the number of chickens they raise or making use of poor and cheap feed. While such a move may reduce the cost to some extent, it often contributes to poor productivity and feed conversion rate, hence poor quality and quantity of chicken meat produced in the process. While the productivity is lower, it not only decreases farmers' incomes but, on the other hand, reduces their competitive power in the market. In this way, changes in feed prices directly impact the long-term sustainability of broiler farms in Kutai Kartanegara and other similar regions.

Various studies put forward the volatility of feed prices and their impacts on farm productivity. Mahmud et al. (2020) recorded, from a study across Southeast Asia, a decline in poultry productivity by 5% with every 10% increase in feed costs. This is evidence of how poultry keeping can be sensitive to changes in input costs, especially in those areas where feed costs take the lion's share of the means of production. As stated by Rosen (2021), when farmers face rising feed prices, they "are often forced to use lower-quality feed, which leads to poorer growth rates and eventual decline in productivity. The impact of feed price volatility does not stop at farm productivity but spills over to farmer welfare. A farmer's welfare is considered multidimensional, as the concept encompasses income stability, access to vital services such as health and education, and the general economic well-being of farming households. Kurniawan (2020) points out that income instability from shifts in feed prices forces many broiler farmers to seek other ways of survival aside from farming. This can shift attention and resources away from the farm, further reducing productivity. Farmers may be compelled, in certain instances, to sell off assets or reduce their investments in the farm infrastructure to cope with rising feed costs, thereby undermining the long-term viability of the operations.

Feed price uncertainty affects investment decisions on the farm by farmers. According to Mulyono (2019), most broiler farmers in Indonesia do not want to invest in farm infrastructure development or buy high-quality chicks, or new technology if the price of feed is undependable. Such unwillingness to invest holds them back from increasing productivity and innovating within the sector. The small scale of capital investment in broiler farming, therefore, leads to the opposite extreme that may entrap many farmers, such as those in the Kutai Kartanegara region, into a vicious circle characterized by extremely low levels of investment and marginal growth.

Government policies are considered one of the most important means of reducing negative impacts caused by feed price volatility on broiler farmers. Many governments in various developing countries have continued to provide a feed subsidy and price controls while encouraging the usage of alternative feed sources to stabilize the poultry industry. For example, Schmidt (2019) showed that policies for feed price stabilization in countries such as Brazil and

India have been quite effective so far in protecting farmers against the worst whims of international markets. In Indonesia, government interventions have also had more limited impacts, especially when looking at very rural areas like Kutai Kartanegara. As noted by Kurniawan (2020), though the Indonesian government has taken various initiatives to assist farmers by providing numerous forms of subsidies and other supporting programs, smallholder farmers in faraway areas usually get fewer shares compared to farmers in more developed regions.

Given the challenges, it is interesting to look into some alternatives that could help broiler farmers in Kutai Kartanegara reduce the risks associated with feed price volatility. One promising strategy involves the use of alternative feed ingredients that could be available locally and, therefore, more inexpensive than imported raw materials. Taufik (2019) thus argued that the incorporation of locally available agricultural by-products, such as rice bran or palm kernel meal, into broiler diets will minimize feed costs without seriously compromising productivity. There is, however, still a need for more research to be done to ensure that such feed resources meet the nutritional requirements of broilers and do not result in adverse growth performance and meat quality.

The background of the study has shown how vital feed price dynamics are to shaping productivity and welfare among broiler farmers in Kutai Kartanegara. Generally speaking, unstable feed prices, resulting from global market forces, are made worse by inefficient supply chains locally, hence posing a big challenge to farmers, especially the small- and medium-scale producers who cannot absorb the rise in costs. This research will, therefore, seek to analyze the impacts of feed price fluctuation on productivity and farmer welfare at the broiler farms in the Kutai Kartanegara Regency. The research also identifies some policy interventions or alternative feeding strategies that can reduce the adverse impacts of feed price volatility on the poultry sector in Indonesia. Addressing these will contribute to developing more viable and resilient poultry farming systems supportive of the livelihood of farmers and national food security.

MATERIALS AND METHODS

This study, titled The Impact of Feed Price Dynamics on Broiler Farm Productivity and Farmer Welfare: A Case Study in Kutai Kartanegara Regency, adopts a mixed-method approach, combining quantitative and qualitative research methods. This combination allows for a better understanding of how changes in feed price affect the productivity of broiler farms and farmers' welfare by studying both the numerical relationships of variables and the lived experiences and coping mechanisms of farmers. The method also allows triangulation-increasing the reliability of the findings through cross-referencing of data collected from multiple sources. According to Bryman (2016), mixed-method approaches in exploratory research are useful for complex social and economic phenomena.

Research Design

The study uses a descriptive and correlational research design. Descriptive research was employed because the prevailing condition of the broiler farms in the district of Kutai Kartanegara is systematically recorded, especially on feed price fluctuations. According to Sandelowski (2015), descriptive research would apply when research is supposed to outline the profile of any certain phenomenon, like how fluctuations in the price of feed affect performance on the farm or the livelihood of the farmers. The correlational aspect focuses on the relations among the key variables-feed price fluctuations, broiler farm productivity, and farmer welfare. This correlational design has been chosen because it provides a way of seeing how one variable affects another without the need for manipulation of the environment. In this paper, we consider the degree to which feed price volatility predicts variation in production by measures of feed conversion ratio daily weight gain, and farmer welfare, described as income stability and general living conditions.

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The research was conducted in three main districts within Kutai Kartanegara Regency: Tenggarong, Samboja, and Muara Jawa. These are all high-proportion contributors to broiler production in this area. Each district reflects various farm intensities, ranging from smallholder farmers to more commercialized farming. Selection is done in such a way that a full spectrum of broiler farming practices and experiences is captured to enhance the generalization of the findings.

Data Sources and Sampling Techniques

The data sources adopted for this research study are primary and secondary. These primary data were collected using structured surveys, in-depth interviews, and direct field observations. In the context of secondary data, regional statistics regarding feed prices and the farm outputs of broilers from local agricultural agencies include the Department of Agriculture of Kutai Kartanegara and reports by the Ministry of Agriculture of Indonesia. Data collection in this study was done using a stratified random technique to obtain data that is representative and reliable. Stratified sampling is relevant in the case when the population of interest is heterogeneous, as different subgroups should be proportionately represented; an example includes farms of differing sizes. The stratification of the population took three categories: small-scale, medium-scale, and large-scale farming operations. A total of 180 broiler farms from these strata were selected to participate in the survey with equal distribution between categories. For the qualitative part, purposive sampling was used in the selection of key informants including feed suppliers, agricultural officers, and experienced broiler farmers. Patton(2015), adds that purposive sampling can be effectively used in an in-depth qualitative exploration when particular knowledge or insight from certain groups is required. Key informants in this study were selected based on their long-time experience in the industry and deep involvement either in the feed supply chain or broiler farming.

Data Collection Methods

A structured survey was designed to collect quantitative data from the selected broiler farmers. The survey included both closed-ended and open-ended questions that covered a range of topics, including Historical data on feed prices and farm inputs, Productivity metrics such as feed conversion ratio (FCR), average daily weight gain, and mortality rates, Economic outcomes like farm revenue, profitability, and farmer household income, Experiences with feed price volatility, including adjustments in feeding practices and scale of operation. This survey was pretested for clarity and relevance on 20 farmers because pretesting is a major important activity in quantitative studies; it will enable the researcher to detect misunderstandings of the instrument that are necessary for capturing required information. After the pre-testing, minor adjustments were made to the survey instrument to enhance its effectiveness. Data collection was done through direct interviews, with the assistance of well-trained enumerators who were conversant with the language spoken locally and the farm-level practices. This method was preferred over self-administration to minimize response bias and to make sure that accurate data is collected (Dillman et al., 2016).

Semi-structured interviews with 30 key informants were also conducted to complement the quantitative data. In such a format, flexibility is allowed to explore emerging topics during the conversation, while making sure that all key themes are covered. This approach is particularly useful in exploratory studies where the aim is to gain rich, contextual insights (Kvale & Brinkmann, 2015). The interviews focused on farmers' perceptions of feed price volatility, the strategies they use to cope with price fluctuations, and the support (or lack thereof) they receive from government or industry bodies. Additionally, feed suppliers were interviewed to understand the broader supply chain dynamics that contribute to price instability, such as global market trends and local logistical challenges. The interviews were audio-recorded upon participants' consent and later transcribed for thematic analysis. Thematic analysis is an approach that is rather flexible and widely used in identifying patterns within qualitative data;

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Braun & Clarke (2016). NVivo software was utilized to organize and analyze the large volume of interview data, and this thus supported the systematic identification of key themes on feed price dynamics and impacts on farm productivity.

A field visit was done to 25 broiler farms across the three districts, where physical conditions of farms, feeding, and farm management strategies were observed. Observational data are particularly useful in agricultural research since they provide real-time information on practical problems and changes that farmers would adapt based on a change in outside factors, such as feed prices. During the visits, detailed monitoring of farm infrastructure, quality and quantity of feed used, as well as symptoms relating to productivity problems such as stunted growth or high mortality rates, was carried out. Such details cross-checked the data collected through survey questionnaires and interviews, increasing the reliability of the findings.

Data Analysis Techniques

a. Quantitative Data Analysis

The quantitative data obtained from structured surveys were analyzed by using descriptive and inferential statistics. Descriptive statistics were used to summarize the key characteristics of the data, including average feed price productivity measures and income levels across the sample population. Means and medians, as measures of central tendency, and standard deviations as a measure of variability, were computed to outline the distribution of data. Therefore, Pearson's correlation coefficient was considered for finding feed price fluctuations, productivity of farms, and farmer welfare. According to Gujarati & Porter (2017), Pearson's correlation is appropriate since the study will test the strength and direction of linear relationships between continuous variables. This research has been used to ascertain whether feed price increases are significantly related to the various key productivity measures, such as the feed conversion ratio and average daily gain, respectively. A multiple regression analysis was also carried out, analyzing the predictors of farmer welfare. Farmer income has been taken as the dependent variable, while feed price volatility, farm size, and measures of productivity have been used as independent variables. It allows quantification of the magnitude of feed price changes, while other variables are held constant (Creswell & Creswell, 2018).

b. Qualitative Data Analysis

Data from the interviews and field observations were analyzed thematically. Thematic analysis is an important but quite generic qualitative method to identify, analyze, and report patterns/themes within the data (Braun & Clarke, 2016). The actual analysis started with open coding: identification of key phrases and ideas within interview transcripts. These codes were then grouped into broader categories, such as “ coping strategies,” “ perceptions of risk,” and “ government support.” After the initial coding, axial coding was used to establish connections between the themes, enabling a more nuanced understanding of the data (Kvale & Brinkmann, 2015). For example, the theme of “ coping strategies” was linked to specific actions taken by farmers, such as reducing flock size or switching to lower-cost feed ingredients, while the theme of “ government support” highlighted the limitations of current policy measures in addressing feed price volatility. The findings from the qualitative analysis were used to contextualize the quantitative results, providing a richer and more comprehensive understanding of the impact of feed price dynamics on broiler farming.

Limitations of the Study

This study acknowledges several limitations. First, the reliance on self-reported data from surveys and interviews may introduce recall bias, as farmers may not accurately remember past feed prices or productivity levels. Efforts were made to mitigate this through the use of cross-referenced secondary data from government sources. Additionally, the study is geographically limited to Kutai Kartanegara Regency, which may affect the generalizability of the findings to other regions in Indonesia. Future research could expand the geographic scope and incorporate longitudinal data to assess the long-term impacts of feed price dynamics on broiler farm

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RESULTS AND DISCUSSION

Feed Price Dynamics in Kutai Kartanegara Regency

Grappling with fluctuating feed prices, as are most regions in Indonesia, is similarly true with the broiler industry in the Kutai Kartanegara Regency. An industry as feed-intensive as broiler farming has to take in stride any global and local market changes that adversely affect the price of its feed components-especially corn and soybean meal. These two ingredients are the most important for poultry diets and hold more than 60-70% of the total feed composition in poultry foods (Hartono et al., 2021). Variation in feed prices is therefore determined for Kutai Kartanegara Regency as an interacting function of world commodity markets, local inefficiencies in the supply chain, transport cost, and government policy.

The major determinants of changing feed prices in Kutai Kartanegara are global market trends. Prices of corn and soybean meal, mostly imported from countries like the United States, Brazil, and Argentina, depend on production levels in those countries and global policies on trade, tariff, and currency variations. Drought or trade restrictions that raise international prices automatically increase the price of imported feed ingredients, which in turn drives feed prices up in local markets (FAO, 2020). Geopolitical events like trade wars and disrupted global supply chains linked to the COVID-19 pandemic have further worsened the situation. COVID-19 has resulted in reduced shipping capacity, delayed importation, etc., causing a price increase. With the more than 20% rise in global soybean meal prices in 2021, broiler feed price increases have swept across Indonesia (Olumide et al., 2022). The added cost of feeds has brought tremendous financial stress to broiler farmers in Kutai Kartanegara, particularly for those with smaller scales of operations.

Local supply chain inefficiencies also play a key role in magnifying feed price dynamics in Kutai Kartanegara. Infrastructure within the region, especially in the rural areas, is mostly not conducive to facilitating efficient feed transportation. The state of the roads, especially during the rainy season, significantly hinders the timely delivery of feed ingredients to farms. When farms are remotely situated, the feed price is usually higher due to higher logistics costs passed on from the feed supplier (Situmorang et al., 2020). Such inefficiencies make local feed markets more volatile and less predictable. Besides, at present, when the lack of local feed production capacity is a fact, farmers have no other alternative than to purchase feed ingredients from imports or feed produced in other parts of Indonesia. This sets up another contributory factor for the broiler farmers in Kutai Kartanegara as a result of the expensive transportation cost from the main feed-producing centers in Java and Sumatra. The eventual effects of these price increases are that the smallholder farmers, who have less bargaining power with reduced levels of capital reserves, are the most vulnerable; they cannot buy feed in bulk or stock it up during periods when the prices are lower (Tisdell, 2019).

Government policies also provide critical input to the dynamics in feed prices of Kutai Kartanegara, especially regarding subsidies, tariffs, and price controls. Traditionally, the Indonesian government has tried to stabilize the prices of feed by giving subsidies for its imports and stimulating national production of both corn and soybean meal. However, the efficiency of such policy actions has been varied. Whereas subsidies might alleviate part of the burden in such high-priced periods for farmers, they are rarely sufficient to offset cost increases

driven by global market dynamics (Sari et al., 2021). This has also raised calls on the part of the government to increase spending on rural infrastructure to reduce transport costs and raise capacity for local feed production. In 2022, the Ministry of Agriculture announced plans to reduce dependence on imports through increasing domestic corn production. However, all these initiatives will take some time to materialize, and during the short run, farmers from regions such as Kutai Kartanegara are still experiencing huge challenges due to the rise in feed costs.

The volatile nature of feed prices in Kutai Kartanegara has profound implications for broiler farmers. Rising feed costs have led to reduced profit margins, especially for smallholder farmers who are less able to absorb price increases. Many farmers have reported a decline in productivity as they resort to using cheaper, lower-quality feed alternatives, which negatively impacts the growth rates and health of their broilers (Widodo et al., 2020). In extreme cases, some farmers have been forced to reduce their flock sizes or halt production altogether due to unsustainable feed costs. Larger farms, on the other hand, tend to be more resilient to feed price fluctuations due to economies of scale and better access to financial resources. These farms can purchase feed in bulk and negotiate better prices with suppliers, allowing them to maintain profitability even when feed prices rise. However, even large farms are not immune to prolonged periods of high feed costs, and many have called for more consistent government intervention to stabilize feed prices and ensure the long-term viability of the broiler industry in Kutai Kartanegara (Muslim et al., 2022).

The feed price dynamics in Kutai Kartanegara Regency are shaped by a combination of global market forces, local supply chain inefficiencies, seasonal variations, and government policies. The heavy reliance on imported feed ingredients, combined with inadequate infrastructure and transportation challenges, has made broiler farmers in the region particularly vulnerable to feed price volatility. While larger farms are better positioned to withstand these fluctuations, smallholder farmers face significant challenges in maintaining profitability and productivity in the face of rising feed costs. To mitigate the impact of feed price volatility, there is a need for targeted interventions at both the local and national levels. Investing in rural infrastructure, improving local feed production capacities, and providing more robust financial support to smallholder farmers could help stabilize feed prices and ensure the sustainability of the broiler farming industry in Kutai Kartanegara.

Impact on Broiler Farm Productivity

Feed price dynamics play a critical role in determining the productivity of broiler farms, especially in regions like Kutai Kartanegara Regency. As feed accounts for nearly 60-70% of the total production costs in broiler farming (Hartono et al., 2021), fluctuations in feed prices can significantly affect farm operations, output, and overall sustainability. The rising and unpredictable nature of feed prices, particularly in Indonesia, poses challenges for both small-scale and large-scale broiler farmers. In this context, it is essential to explore the various ways in which feed price dynamics impact broiler farm productivity, focusing on aspects such as cost management, feed quality, growth performance, and farm profitability.

a. Increased Production Costs

A direct impact of rising feed prices on the efficiency of a broiler farm is reflected in increased production costs. With an increase in feed prices, farmers would have to spend more of their budgets buying feed. These increases tend to quickly deplete the profit margins of many farmers, most of whom are small-scale and operate on meager capital. According to Muslim et al. (2022), many smallholder broiler farmers in Indonesia have complained that increased feed prices have raised their financial burdens, although some cannot afford other operational expenses like labor, maintenance, and utilities. Economies of scale somewhat cushion large-scale farmers, as they manage to purchase feed in bulk at more favorable prices. With a sharp rise in feed prices, however, larger farms see their profit margins shrink, especially when the price hike is prolonged. Larger farms are also more resilient to such feed cost increases since

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credit lines and financial buffers available to them are not typically extended to the smaller farmers (Olumide et al., 2022).

b. Decreased Feed Quality and Nutritional Value

Due to the rise in feed prices, farmers tend to purchase poor-quality feed or re-blend the feed formulation themselves in order to minimize expenditure on feed. This would save a certain amount of money for short-term purposes but damages the growth performance of broilers and the productivity of the farm in the long run. Poor feed or poor formulation of feeds, according to Widodo et al. (2020), is manifested through bad feed efficiency, a condition that translates into poor weight gain and generally poor health status among broilers. It negatively impacts broiler growth rates by extending production cycles and reducing yields per flock. The consequence of such conditions is that it prolong the time taken by broilers to achieve market weight, as well as shortening their life span due to poor health conditions and susceptibility to diseases. Under a competitive market setting, broiler farmers are constrained to maintain a consistent output to be able to remain in business profitably. Any disruption in growth performance under such a situation, therefore, leads to massive losses in productivity (Sari et al., 2021). These effects are usually worse with local supply chain conditions that further reduce accessibility to good quality feed ingredients.

c. Impact on Growth Performance and FCR

The study found that feed price fluctuations have a direct impact on broiler farm productivity. The average feed conversion ratio (FCR) across the farms surveyed was 1.80, meaning that 1.8 kilograms of feed are required to produce 1 kilogram of live broiler weight. However, farms that reported facing more frequent feed price increases showed a deterioration in FCR, with some reaching an FCR as high as 2.2. This decline in feed efficiency is attributed to farmers switching to cheaper, lower-quality feed alternatives during periods of price surges. According to Widodo et al. (2020), poorer feed quality typically results in lower digestibility and nutrient absorption, reducing broiler growth rates. Similarly, the average daily gain (ADG), a critical measure of broiler growth performance, was significantly lower in farms affected by price increases. While the ADG averaged 60 grams/day for the farms considered in the current study, farms that changed to cheaper feeds had ADGs as low as 52 grams/day. This finding supports work done previously by Olumide et al. (2022), where it was reported that feed substitution due to price changes creates nutrient imbalances that compromise growth rates.

Feed quality and homogeneity are very important regarding broilers' growing performance, particularly about Feed Conversion Ratio. The FCR is an important index for indicating how well the broilers can use their feed efficiently to convert into body mass; hence, it relates directly to the cost and quality of feed. When feed prices increase, farmers sometimes minimize the amount or frequency of feed given to broilers, which, in turn, adversely affects the FCR, or they switch to a feed of lower quality. According to Simanjuntak et al. (2020), this only works to the detriment of the FCR. This means that, with a higher FCR, broilers would have to be fed more to achieve the same weight and thus result in increased costs per kilogram of meat. This would equate to a loss not only in productivity at large but also in profitability, as a farmer needs to use more resources to achieve the same level of output. Hartono et al. (2021) indicated that for those broiler farms in Kutai Kartanegara that faced feed price increases, the average rise in FCR was within a range of 15-20%, thus substantially reducing productivity and profitability.

d. Farm Profitability and Sustainability

The impact of rising feed prices on profitability is very serious, particularly in the case of smallholder farmers. As the price of feed increases, there is a further decline in the ability of farmers to maintain profitable operations. In most cases, reducing the size of the flock or ceasing production for some time during periods of high feed prices is usually the only solution (Baliyan & Marumo, 2018). This strategy, although mitigating short-run losses, will have long-

term implications on farm sustainability. Prolonged production stops can lead to the deterioration in farm infrastructures, loss of skilled labor, and less market presence, all of which impede a farm from getting back into business once feed prices stabilize. Economies of scale and financial reserves may greatly reduce the impact on profitability for larger-scale farms. However, prolonged periods of high feed prices may decrease investment in infrastructure, research, and development that help further growth and sustainability in farming. As Tisdell (2019) mentioned, large-scale broiler producers in Southeast Asia, even, under conditions of sustained feed price hikes, show reduced profitability that hence limits opportunities for expansion and innovation in production.

e. Coping Mechanisms and Adaptation Strategies

The increase in feed prices has brought new challenges to broiler farmers in Kutai Kartanegara and other parts of Indonesia, who have developed coping mechanisms and adaptation strategies. A common approach involves the use of alternative feeds or locally sourced feed ingredients because they are cheaper to use than imported feed components such as corn and soybean meal. Other productive ways in which farmers may consider feeding are phase feeding or precision feeding to optimize feed use and minimize feed waste. Olumide et al. 2022 add that most of these strategies have usually been partly effective due to the available alternative feed ingredients. Locally sourced feed ingredients are inexpensive, though not as nutritious as conventional feed components, hence compromising growth performance and productivity. Besides, the adoption of improved feeding practices requires technical knowledge and resources not available to all smallholder farmers. Farmers have also attempted to diversify their sources of income through other agriculture-based activities or off-farm employment to supplement their incomes when feed prices are high. However, this will further reduce the concentration and resources toward broiler production, thus reducing farm productivity, although it may provide temporary financial relief.

Effects on Farmer Welfare

The fluctuations in feed prices have significant effects on the welfare of broiler farmers, particularly in regions like Kutai Kartanegara Regency, where agriculture remains a primary source of income for many. Farmer welfare encompasses various aspects, including financial stability, access to resources, quality of life, and the ability to maintain sustainable farming operations. The volatility in feed prices can create financial stress, reduce profitability, and negatively impact the overall livelihood of broiler farmers.

a. Income Stability

Income for the broiler farmers in Kutai Kartanegara Regency is closely related to the feed prices, given that the feed costs cover approximately 70%-75% of the production cost. It was observed from these farmers, who suffered considerably due to price fluctuations for feeds, that their income decreased by about a month, by up to 30% during the price spikes. To the smallholder farmers, this mostly meant negative margins, which forcibly led some to scale down or temporarily stop production altogether. A report by the Food and Agriculture Organization (FAO) (2019) finds that price volatility, in general, hits small-scale farmers disproportionately because their very limited financial buffers make them highly susceptible to various economic shocks. About feed prices, farmers' perception was largely negative due to concerns over long-term sustainability. Many farmers also claimed that they had taken out loans to meet such high costs, and again this weakened their financial position. The role of government subsidy support was also considered, as only 12% of the farmers acknowledged receiving any form of financial support. Situmorang et al. (2020) suggest that the failure of adequate government intervention in feed price regularization or the issuing of direct subsidies to farmers makes farming more economically vulnerable.

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Unpredictable income streams are a result of fluctuating feed costs for farmers. The prices of feed could make up a high percentage of the costs of production, at times up to 70%, and if such feed costs go up, farmers could often not raise the selling price proportionately because of market competition. It creates pressure on profit margins due to increases in costs associated with the high prices of feed, leading to unpredictable levels of income. This could lead to up to a 50% monthly fluctuation in income, which impacts seriously their ability to meet both their operational costs and family needs. Increasing feed prices raises operation risks because farmers need to make compromising decisions on essential inputs such as high-quality feed, veterinary care, and proper broiler housing. These trade-offs mean lower productivity and a higher mortality rate, further destabilizing their income. This can reduce overall broiler growth and further eat into the potential margins. To manage income instability, most farmers in Kutai Kartanegara diversify their sources of income. For example, secondary agricultural activities related to crop farming produce a cushioning effect in periods of high feed costs. This strategy may balance the finances, but it will also spread the farmer too thin and may weaken his focus on optimizing broiler productivity. The income stability of the broiler farmers in Kutai Kartanegara Regency is highly affected by feed price volatility. Such an inability to sustain a steady level of income due to fluctuating costs buries them in financial uncertainty, raises operational risks, and corners them into mere survival strategies that could undermine long-term growth.

b. Household Welfare and Coping Mechanisms

Directly linked with farm income, the decline impacts farming households' welfare. Representatives of many farming households mentioned that they needed to reduce household expenditures, particularly on non-essential items such as education and healthcare. Others also claimed that they have been forced to sell household assets, including motorcycles and livestock, just to compensate for farm operating expenses. As farming is the major or only source of income for the majority of households in rural farming communities, according to Haryanto and Sudirman, agricultural price fluctuation sharply alters household welfare. About feed price increases, farmers had different coping strategies. These include reducing the number of production cycles per year, decreasing flock sizes, and using cheaper feed ingredients. These, however, more often than not led to decreased productivity and profitability, thus leading to a self-reinforcing cycle of financial insecurity. Indeed, a very similar set of coping strategies emerges from research by Muslim et al. (2022), who find that farmers operating in more price-unstable environments tend to frequently make costly management decisions that further weaken their financial resilience.

Increased feed cost results in reduced farm profitability, thereby cutting into household income. For smallholder farmers, with already increased feed costs, tight margins normally result in significant cuts in household expenditure on basic needs like food, health, and education. Many of these farmers have to make a choice between operationalizing the farm or the household. Some families are forced to sell property, take out credit, or fall into debt for them to keep their farms operable during these extended periods of high feed prices. Economic pressures such as these often result in reduced quality of life, as households cut back on nutritious food and consequently suffer poorer health outcomes, especially among children. The burden required to keep their farms running on the financial front also takes its toll on the family dynamics, causing stress and instability within the household. Over time, these stresses can erode long-run welfare as families have fewer resources to invest in children's education or health, thereby foreclosing opportunity loops that trap families in poverty.

In light of these economic burdens, coping measures are used by broiler farming households. One common method employed is income diversification: most families obtain additional revenue through off-farm employment or other agricultural pursuits, such as crop cultivation or animal husbandry. In this way, the effect of the volatile prices of feed on households is cushioned by the existence of other sources of income when things get tough. The

second most frequent coping behavior is the decrease in household expenditure. Families usually curtail unnecessary expenditures, which include postponed purchases, a decrease in healthcare expenses, and a reduction in educational spending. This may alleviate temporary burdens but can be accompanied by persistent side effects, such as decreased health and reduced levels of education of the children (Muslim et al., 2022).

c. Psychosocial Impacts

Besides these economic effects, the study revealed that farmers are reeling under psychosocial stress. Many expressed anxiety and uncertainty regarding their operations' sustainability in light of oncoming feed costs. The above assertion is rightly considered in the work of Simanjuntak et al., where it has been documented that the farm inputs' price volatility usually subjects farmers to high levels of stress and deterioration in mental well-being. This situation is further aggravated by the complete absence of social safety or, for that matter, any form of government support, which would leave farmers with feelings of abandonment and without support in times of economic downturn.

Feed price fluctuations have considerably affected the psychosocial aspect of broiler farmers in Kutai Kartanegara Regency. Accordingly, if feed prices go up, farmers become stressed due to the financial uncertainty that such a rise presents. It is common to see heightened anxiety and depression resulting from such uncertainty and pressure to sustain a living. Farmers are concerned about whether they can continue the business and feed their families emotionally and mentally. Situmorang et al. (2020) added that an increase in feed prices heightens stress within the farm family. Conflicts arise with disagreements about financial priorities, such as whether investments must be made in farm needs or household necessities. This is because of marital conflict and tension within the home, where stress has been further heightened. The children from these families also suffer, especially when financial constraints deny them school or health opportunities.

Concerning the community context, feed price volatility could break down the social fabric of farming communities. Farmers who struggle financially may also retreat from active social life and become isolated from social networks that have some advantages in terms of support. Besides, there could be economic divisions between those who could stand the increase in feed prices and those who could not, thus nurturing resentment and competition, with a possibility of breakdown of the sense of community solidarity that generally characterizes rural farming communities. This breakdown in social bonds can make the sharing of resources and strategies in farming more and more difficult, adding to the psychological challenges.

Policy Implications and Recommendations

The volatility of feed prices poses significant challenges for broiler farmers in Kutai Kartanegara Regency, impacting their productivity, welfare, and psychosocial well-being. To mitigate these issues, it is essential for policymakers to implement effective strategies that support farmers and stabilize feed costs. This section outlines key policy implications and recommendations aimed at enhancing the resilience of broiler farmers and promoting sustainable agricultural practices.

a. Price Stabilization Mechanisms: One of the primary recommendations is the establishment of price stabilization mechanisms for feed. Governments can consider implementing subsidies or price controls during periods of extreme volatility to shield farmers from drastic price hikes. This approach would help maintain affordable feed prices, thereby protecting farmers' profit margins and ensuring their economic viability (Widodo et al., 2020).
b. Support for Alternative Feed Sources: Encouraging research and development of alternative feed sources is crucial. Policymakers should invest in the exploration of locally available materials that can serve as substitutes for traditional feed ingredients. This not only reduces dependence on external feed sources but also enhances food

security and supports local agriculture. Educational programs that provide farmers with knowledge about alternative feed options can further facilitate this transition (Muslim et al., 2022).

c. Financial Assistance and Risk Management Programs: Introducing financial assistance programs, such as low-interest loans or grants, can help farmers manage the financial pressures associated with fluctuating feed prices. Additionally, implementing risk management tools, like crop insurance and futures contracts, can enable farmers to hedge against price volatility. These financial instruments would provide a safety net, allowing farmers to plan for the future with greater confidence (Tisdell, 2019).
d. Capacity Building and Training: Investing in capacity building and training programs is essential for enhancing farmers' resilience. Educational initiatives focused on financial literacy, effective farm management practices, and coping strategies for dealing with price volatility can empower farmers to make informed decisions. Training on diversified farming practices can also help farmers create additional income streams, reducing their vulnerability to feed price fluctuations (Sari et al., 2021).
e. Community Support Initiatives: Promoting community support initiatives can enhance social cohesion among farmers. Establishing cooperative societies or farmer groups can facilitate resource sharing, knowledge exchange, and collective bargaining power when purchasing feed. Strengthening social networks can mitigate some of the psychosocial impacts of financial stress by fostering a sense of solidarity and support within farming communities (Situmorang et al., 2020).

CONCLUSION

The study on "The Impact of Feed Price Dynamics on Broiler Farm Productivity and Farmer Welfare: A Case Study in Kutai Kartanegara Regency" presents the interpretation of the problem faced by broiler farmers in view of changes in feed prices. It shows that an increase in feed costs, which lowers farm productivity and hence profit margins and raises operational risks. Income is barely stable for farmers; hence, financial stress is sharper, and the welfare of the household is lowered. The psychosocial effects of feed price volatility include increased emotional strain, household tensions, and weakened community cohesion. Farmers express anxiety and uncertainty about their financial futures, complicated by an inability to make informed decisions and invest in long-term improvements. The study indicates that these challenges require commodity-specific policy interventions. In this respect, such interventions may include price stabilization mechanisms, research support for diversification of feed sources, and provision of finance and risk management instruments. Such capacity-building programs at the farm level, together with community support programs, would also enable farmers to adjust to these economic vagaries and gain greater resilience. Overall, the strong linkage of feed price dynamics to farmer welfare and agricultural productivity is highlighted in the research. Such policies and support systems would go a long way in enabling the stakeholders to play their roles in support of broiler farmers' efforts to improve their livelihoods in Kutai Kartanegara through sustainable livelihoods.

SUGGESTION

This research can be expanded through several recommendations relevant to the issues addressed. One potential direction is the analysis of feed price stabilization policies to mitigate the impact of price fluctuations on productivity and farmer welfare. Additionally, research on the development of alternative, locally sourced, and more cost-effective feed materials can offer practical solutions to reduce reliance on commercial feed. Developing financial support mechanisms, such as subsidies, microcredit programs, or agricultural insurance, is also essential to help farmers manage economic risks caused by price instability. Furthermore, training and

capacity-building programs for farmers, particularly in financial management and risk mitigation, can enhance their ability to cope with price volatility. Studies on the psychosocial impacts of economic instability are also necessary to design interventions that support mental health and household well-being. Community-based approaches, such as forming farmer cooperatives for collective feed procurement, may provide a strategic solution to reduce cost burdens. Technology-driven research, such as the use of digital applications for price monitoring and farm management, as well as comparative analysis with other regions facing similar challenges, could provide additional insights. Thus, this research has the potential to generate comprehensive solutions that support the sustainable development of the poultry farming sector in Kutai Kartanegara Regency.

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