PROFITABILITY AND COMPETITIVENESS OF CORN FARMING IN GOWA REGENCY, SOUTH SULAWESI PROVINCE, INDONESIA

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ABSTRACT

Corn is a multifunctional crop that is useful for food, feed, fertilizer, and biofuel. The increasing demand for corn commodities requires an increase in profitability and competitiveness, so that corn farming will be sustainable. The purpose of this research was to examine the profitability and competitiveness of corn farming in Bontonompo District, Gowa Regency. The survey method was employed in this investigation. Data collection methods include observation and interviews. The sampling technique used was purposive sampling, namely deliberately selecting farmers who were trying to plant corn in paddy fields in the second planting season (MT2), and farmers who were active in farmer group activities, so that a sample of 45 respondents was obtained. There are two types of research data: primary data and secondary data. Profitability analysis and PAM (Policy Analysis Matrix) are two data analysis methodologies. According to the findings of this study, the private profit or financial profit of corn farming in Bontonompo District, Gowa Regency, is Rp 7,731,314.10 per hectare, while the social profit or economic profit is Rp 8,924,460.07 per hectare. Corn farming has a financial feasibility ratio of 2,531, whereas it has an economic feasibility ratio of 2,453. Corn growing in Gowa Regency has a reasonably high level of competitiveness, as evidenced by a private cost ratio (PCR) of 0.333 and a domestic resource cost ratio (DRCR) of 0.293.

Keywords: *competitiveness, corn, farming, profitability*

BACKGROUND

Corn is a food crop that has an important and strategic role in increasing national food production. The advantage of the corn commodity is that it is multipurpose, both for direct consumption, as the main raw material for the feed industry and food industry, as well as as a bioenergy raw material. Corn in Indonesia is not only used for food, but is also used for seeds and feed. To protect the livestock and feed industry in Indonesia, efforts to provide corn raw materials from within the country are very necessary through efforts to increase corn productivity (Agung et al., 2021). The corn plant is a multifunctional plant because all parts of this plant can be useful for various purposes, including food, animal feed, compost, biofuel and various other industrial raw materials. The need for corn as a raw material for the animal feed industry continues to increase along with the increase in the livestock industry. In 2021 in Indonesia, the need for corn commodities for direct consumption will be 231,231 tons, for feed will be 9,717,002 tons, for seed needs will be 83,947 tons, and for non-feed industrial raw materials will reach 3,400,372 tons. On the other hand, the

availability of corn production in Indonesia in 2021 will reach 16,230,893 tons (Pusat Data dan Sistem Informasi Pertanian, 2022).

Increasing competitiveness is the main agenda of the government in the free trade. The challenge of increasing competitiveness is the increasing prevalence of domestic imported products as an alternative to cost savings (efficiency) in corn production. In facing these challenges, it is necessary to understand the concept and measurement of competitive performance, including competitive advantage and comparative advantage. Competitive advantage refers to the efficiency of agricultural production in achieving competitiveness at the international level, while comparative advantage refers to the comparison of advantages for commodity development under changing conditions such as government policies and market distortions (Haryanto et al., 2019).

Corn export performance in 2022 shows a decrease in export volume compared to last year. The export volume in 2022 was 12.67 thousand tons, a decrease of 6.74% from 2021. However, the export value rose 6.49% to USD 5.76 million. The volume of corn imports showed an increase of 21.18%, while the value of imports rose 59.37%. Corn imports in 2022 will be 310.05 thousand tons or the equivalent of USD 112.72 million. Corn exports and imports are differentiated according to form, namely fresh and processed. Indonesian corn exports are dominated by the processed form while imports are dominated by the fresh form. In 2021, the export volume of processed corn was 82,772 tons (growing 19.83%), with an export value reaching USD 32,674 thousand (growing 66.54%) (Ministry of Agriculture, 2022). The increase in corn exports opens up great opportunities for agribusiness in this sector (Gandakusumah & Marta, 2020).

Indonesia's corn production in 2021 was 23.04 million tons. Analysis of Indonesia's corn trade performance in 2021 shows that Indonesia depends on fresh corn imports of 4.14% with a self-sufficiency rate of 95.87% (SSR value). Indonesia's corn commodity does not yet have a comparative advantage in world trade (Kementerian Pertanian, 2022). The corn harvest area in South Sulawesi Province in 2022 reached 348,078 hectares, with a production of 1,833,902 tons and a productivity of 5.27 tons per hectare (Kementerian Pertanian, 2023). Gowa Regency, which is one of the districts in South Sulawesi Province, has a corn harvest area of 59,625.65 hectares, with production reaching 368,798 tons and a higher productivity of 6.2 tons per hectare (BPS-Statistics of Gowa Regency, 2023). Gowa Regency, a district that is directly adjacent to the provincial capital, namely Makassar City, has important potential and prospects for the development of corn agribusiness.

Increasing agricultural competitiveness is an important aspect of facing global trade, especially shelled corn, which is a commodity with various benefits that can be processed into feed, industrial raw materials, and ethanol fuel (Pratama et al., 2022). Corn farming competitiveness can be interpreted as the ability of farmers to produce quality corn commodities in the domestic and world markets and provide positive agricultural benefits by allocating resource costs. Competitiveness is distinguished by comparative advantage and competitive advantage (Rahmaniyah & Rum, 2020). Corn commodities in the Gowa Regency area have been studied a lot in terms of profitability, but from the study of the competitiveness of corn farming is still poorly studied. This study aims to analyze the profitability of corn farming and the competitiveness (competitive and comparative advantage) of corn farming in Bontonompo District, Gowa Regency.

RESEARCH METHODS

This research was carried out in South Bontobirang Village, Bontonompo District, Gowa Regency, South Sulawesi Province, Indonesia. This location was chosen purposively, on the grounds that this area is one of the centers of corn production. The population in this study were farmers who tried to grow corn, totaling 393 people. The sampling technique used was purposive sampling, namely deliberately selecting farmers who were trying to plant corn in paddy fields in the second planting season (MT2), and farmers who were active in farmer group activities, so that a sample of 45 respondents was obtained. The data collection techniques used were observation and interviews. The types of data for this research are primary data and secondary data. Primary data was obtained through interviews using a questionnaire, while secondary data was obtained from related agencies including the Central Statistics Agency, Ministry of Agriculture and the Agricultural Agency. The research was carried out from October to December 2022. The data analysis utilized in this study are profitability analysis and PAM (Policy Analysis Matrix). Farm profit is the difference between total revenue (TR) and total cost (TC). To analyze the profitability of corn farming, a formula as follows is used (Soekartawi, 2016).

$$\pi = TR - TC$$
$$TR = P \times Q$$
$$TC = TFC + TVC$$

Information:
π : Profit
TR   : Total Revenue
TC   : Total Cost
TFC   : Total Fixed Cost
TVC   : Total Variable Cost

To analyze the competitiveness of corn farming, the Policy Analysis Matrix (PAM) is used. According to Pearson et al. (2005), measuring competitive advantage can be done by calculating private profits, and measuring comparative advantage can be done by calculating social profits. Private prices and social prices are used in PAM analysis. Private prices are the actual prices received by farmers, while social prices are prices that occur in perfectly competitive market conditions, but it is difficult to find markets with these conditions, so it is assumed that trade in international markets is perfectly competitive, thus prices for traded inputs and outputs can be considered to be the shadow price.

Farming inputs in the PAM analysis are divided into tradable and non-tradable inputs. Tradable inputs are inputs that are traded on international markets, while non-tradeable inputs are domestic inputs. The allocation for the use of tradable inputs in corn farming includes: corn seeds, urea fertilizer, TSP fertilizer, and NPK fertilizer, while the allocation for the use of non-tradable corn farming inputs includes: land rent, labor wages, and farming equipment. The Policy Analysis Matrix (PAM) model with the formulation can be seen in Table 1.

Table 1. Policy Analysis Matrix (PAM)

Description	Revenues	Costs		Profits
		Tradable Inputs	Domestic Factors	
Private prices	A	B	C	D = A – B – C
Social prices	E	F	G	H = E – F – G
Divergences	I = A – E	J = B – F	K = C – G	L = D – H = I – J – K

Sources: Pearson et al. (2005)

Information:
A : Private revenue   G : Social non-tradable input cost
B : Private tradable input costs   H : Social profits
C : Private non-tradable input costs   I : Output transfer
D : Private profits   J : Transfer of tradable inputs
E : Social revenue   K : Transfer factor
F : Social tradable input costs   L : Net transfer

Based on the PAM matrix in Table 1, it can be seen that the first row of the PAM matrix is calculated using private prices. In the profit analysis, it consists of private profits and social profits. Private profits are the difference between revenues and the costs actually paid by farmers. Social profit is the difference between revenue and costs calculated by social prices. In the third row of Table 1 is the difference between private prices and social prices. The next analysis calculates comparative advantage (Domestic Resource Cost Ratio/DRCR) and competitive advantage (Private Cost Ratio/PCR). Corn farming has a comparative advantage if it has a DRCR value smaller than 1 (DRCR < 1), and corn farming has a competitive advantage if it has a PCR value smaller than 1 (PCR < 1). Domestic Resource Cost Ratio (DRCR) is G/(E-F), while Private Cost Ratio (PCR) is C/(A-B).

RESULT AND DISCUSSION

Corn Farming Profitability

Corn farming in Bontonompo District, Gowa Regency has an average production of 3.4 tons per hectare per planting season. The productivity of corn farming is lower than the average productivity at the Gowa Regency level, which reaches 6.2 tons per hectare. The low productivity of corn crops is triggered by the lack of availability of production facilities when farmers need them, especially the availability of subsidized fertilizer. The average price of shelled corn at the farmer level is Rp 3,575.11 per kilogram. Farming costs are one of the important variables that determine the level of profitability of corn farming. Farming costs consist of the costs of agricultural production facilities (seeds, fertilizers, pesticides), labor costs, and fixed costs. The highest cost of corn farming is labor costs, which reach an average of 64.51% of the total costs, while the relatively high cost of production facilities is the cost of fertilizer, which reaches an average of 16.99% of the total costs.

The profitability of corn farming in this research is seen from two aspects, namely private profits (financial profits) and social profits (economic profits). The profitability of corn farming is determined by the size of the difference between total revenue and total costs. In Gowa Regency, Bontonompo District, farmers cultivate corn in the first dry season or second planting season (MT2) in rice fields. Rahmaniyah & Rum (2020) state that farming profits include financial profits and economic profits. Private profit is revenue minus farming costs which are based on private prices,

while social profit is revenue minus farming costs which are based on social prices. Analysis of private profits and social profits in corn farming in Gowa Regency can be seen in Table 2.

Table 2. Financial Profits and Economic Profits of Corn Farming per Hectare in Gowa Regency

Description	Quantity (units)	Private Value (Rp)	Social Value (Rp)
1. Production (kg)	3,400.03	12,380,662.20	14,715,570.91
2. Variable Cost (VC):			
a. Seed (kg)	18.32	324,260.27	324,260.27
b. Urea (kg)	217.01	482,260.14	1,256,944.19
c. TSP (kg)	23.29	48,743.99	206,601.01
d. NPK (kg)	110.37	259,056.13	626,052.88
e. Pesticides (liter)	5.35	428,329.61	428,329.61
f. Labor (day person work)			
1) Land preparation	7.04	504,434.97	477,901.69
2) Planting	9.48	683,864.85	647,893.56
3) Plant protection	8.94	642,562.12	608,763.36
4) Harvesting	16.18	1,168,664.09	1,107,192.36
3. Fixed Cost (FC):			
a. Tool depreciation		67,169.21	67,169.21
b. Tax		40,002.71	40,002.71
4. Total Cost (TC)		4,649,348.10	5,791,110.84
5. Income		7,731,314.10	8,924,460.07
6. R/C ratio		2.53	2.45

Source: Primary Data Analysis (2023)

The financial profit indicator for corn farming can be seen from the private profit value, which is based on the actual price or the price received by farmers. Private profit from corn farming measures the level of profit based on actual input and output prices (Darmayanti et al., 2019). The financial profit from corn farming in Gowa Regency is Rp 7,731,314.10 per hectare, while the economic profit from corn farming reaches Rp 8,924,460.07 per hectare. The level of financial feasibility of corn farming as measured by the R/C ratio value is 2.531, while the economic feasibility of corn farming is 2.453. Financial feasibility means that every rupiah of private costs for corn farming will receive a revenue of 2.53 rupiah, while economic feasibility means that every rupiah of social costs for corn farming will receive a revenue of 2.45 rupiah. The economic profit of corn farming has a higher value than the financial profit, but conversely the level of financial feasibility of corn farming is higher than the level of economic feasibility. This phenomenon can occur due to differences in private prices and social prices for tradable inputs and outputs in corn farming. So far, social prices tend to have a higher value than private prices. This situation shows that corn farming has financial feasibility and economic feasibility, so that corn farming in the Gowa Regency area will be profitable to develop with a high economic scale.

In line with the research results of Lisanty et al. (2023) which shows that corn farming income using conventional tillage systems in Patianrowo District, Nganjuk Regency of East Java Province is Rp 7,565,964.00 per hectare per planting season, with a corn farming feasibility level (Revenue Cost

Ratio/RCR) reaching 1.691. Corn farming in Kemusu District, Boyolali Regency is Rp 9,366,501.00 per hectare per planting season, with a farming feasibility level reaching 2.13 (Wahyuningsih et al., 2018). In Tempurejo District, Jember Regency, corn farming has an income of Rp 9,003,81.00 per hectare per planting season (Febrianti & Kusmiati, 2022). Supported by the results of research by Zuhri et al. (2020) in Grobogan Regency, which shows that the results of the private RCR analysis show a value of 2.5, which means that every Rp 100.00 spent on corn farming costs will generate revenues of Rp 250.00. This shows that corn farming is profitable for farmers and worthy of development.

The results of this study are also in line with Devi et al. (2020) in Tanah Laut Regency which proves that corn farming has financial feasibility and economic feasibility, which respectively have an RCR of 2.06 and 1.61, meaning that corn farming is feasible both at private prices and social prices. This indicates that by using social prices (without subsidies), corn farming is still feasible. This difference is due to the private price of inputs such as urea fertilizer, phonska and fuel oil being lower than the social price, due to government subsidies. Lestari et al. (2022) stated that the profits from corn farming in South Lampung Regency at private prices were Rp 7,216,177.00 per hectare, and profits at social prices were Rp 2,132,562.00 per hectare.

Competitiveness of Corn Farming

The competitiveness of corn farming in Gowa Regency is measured through two indicators, namely competitive advantage, which is measured by the value of the private cost ratio (PCR), and comparative advantage, which is measured by the value of the domestic resource cost ratio (DRCR). According to Zuhri et al. (2020), the competitive advantage of a commodity is determined by the value of private profits and the value of the private cost ratio (PCR). The prices used in this analysis are market prices (actual prices) that occur at the farmer level (market prices have been influenced by government intervention). Competitive advantage can also be seen from the PCR value, where this value describes the financial efficiency of a farming system. PCR is the ratio between domestic input costs and added value or the difference between revenues and tradable inputs at the actual price level. Rahmaniyah & Rum (2020), PCR is an indicator that shows the ability of corn farming to pay domestic costs. Haryanto et al. (2019), comparative advantage reflects the efficiency of using domestic resources, which uses the domestic resource cost ratio (DRCR) indicator. Rahmaniyah & Rum (2020), DRCR is an indicator to determine the amount of domestic resource savings to produce one unit of product.

The results of the PAM analysis on corn farming in Gowa Regency show negative divergence values, including in the value of revenue, tradable input costs and profit. This indicates that the private price received by farmers is lower than the social price. The difference between private prices and social prices for inputs indicates government intervention or policy regarding inputs. Determining the price of non-tradable inputs or inputs that are not traded internationally is by using a private price and social price approach (Sahrul et al., 2022). The complete PAM analysis for corn farming in Gowa Regency can be seen in Table 3.

Table 3. Results of Policy Analysis Matrix of Corn Farming in Gowa Regency

Description	Revenues (Rp/ha)	Costs (Rp/ha)		Profits (Rp/ha)
		Tradable Inputs	Domestic Factors	
Private prices	12,380,662.20	790,060.26	3,859,287.84	7,731,314.10
Social prices	14,715,570.91	2,089,598.08	3,701,512.77	8,924,460.07
Divergences	-2,334,908.71	-1,299,537.82	157,775.07	-1,193,145.97

Source: Primary Data Analysis (2023)

The private profit obtained from corn farming in Gowa Regency is Rp 7,731,314.10 per hectare per planting season. In line with the research results of Zakaria et al. (2019) which shows that private profits in corn farming in the first planting season (MT1) in Lampung Province are Rp 5,569,475.13 per hectare per planting season. Corn farming in Belu Regency has a private profit of Rp 6,616,192.00 per hectare per planting season (Setiawan et al., 2022). These private profits indicate that corn farming in Gowa Regency has competitiveness from the aspect of competitive advantage. Private profits that have a positive value mean that corn farmers earn profits above normal and are financially feasible. Thus, corn farming in the Gowa Regency area is worthy of expansion, because it has a private profit value above normal, so that in the long term it will be more profitable.

The social profit obtained from corn farming in Gowa Regency is Rp 8,924,460.07 per hectare per planting season. The research results of Zakaria et al. (2019) shows that the social profit or economic profit in first planting season (MT1) corn farming in Lampung Province is Rp 8,085,449.91 per hectare per planting season. Corn farming in Belu Regency has an economic profit of Rp 9,317,797.00 per hectare per planting season (Setiawan et al., 2022). Social profit which has a positive value means that corn farmers make a profit, and it is economically feasible. Social profit is an indicator of comparative advantage, meaning that there is efficiency in corn farming even though there are no subsidies or government intervention. Thus, the results of this analysis show that corn farming carried out by farmers in the Gowa Regency area has a comparative advantage, and is efficient even without government assistance or intervention.

Table 4. Indicators of Corn Farming Competitiveness in Gowa Regency

Indicator	Value
Private Cost Rasio (PCR)	0.333
Domestic Resources Cost Ratio (DRCR)	0.293

Source: Primary Data Analysis (2023)

Competitive advantage analysis is used to measure the financial feasibility of corn farming. The competitive advantage of a commodity can be seen based on indicators of private profitability (PP) and private cost ratio (PCR). This indicator shows the level of financial profit and the level of efficiency in resource use. The PCR value for corn farming in Gowa Regency was obtained at 0.333, meaning that the corn farming production system has a competitive advantage. The corn farming system is becoming more competitive and able to finance its domestic factors at private prices and this ability will increase. Corn farming in this region has a level of resource allocation efficiency, which means that for every rupiah (Rp 1.00) earned from corn farming income, it only requires domestic input costs of 0.333 rupiah (Rp 0.33). With a PCR value of less than one, corn farming is

financially efficient and has a competitive advantage, because in these conditions farmers are considered able to finance their domestic factors at private prices.

Comparative advantage can be seen from the DRCR indicator which is the ratio between domestic costs and the difference in revenue minus foreign costs at social prices. A farming business will be economically efficient if the DRCR obtained is less than one, the smaller the DRCR value, the greater the comparative advantage it has, and if the DRCR is more than one, it indicates a waste of domestic resources. Corn farming in Gowa Regency has a DRCR value of 0.293, which indicates that corn farming is economically efficient and has a comparative advantage. With the DRCR value obtained, corn commodities are more efficient if produced domestically compared to imports, so they will have higher export opportunities.

Corn farming in Gowa Regency has strong competitiveness, this is shown by a PCR value of 0.333 and a DRCR value of 0.293, which means that corn farming has a competitive advantage and comparative advantage. This is realistic because Gowa Regency is one of the corn production centers in South Sulawesi Province which has high intensification in farming. Agree with the research results of Devi et al. (2020) that corn farming in Tanah Laut Regency has competitiveness both competitively and comparatively with a private cost ratio value of 0.27 and a domestic resources cost ratio value of 0.32. Sahrul et al. (2022) shows that corn farming in West Muna Regency has competitive capabilities, both based on the competitive advantage indicator with a PCR value of 0.29 and based on the comparative advantage indicator with a DRCR value of 0.07. Agustian (2022) concluded that corn farming in Lampung Province has good competitiveness, this is shown by the DRCR coefficient value of 0.53 and the PCR value of 0.64. Corn farming in Gowa Regency is efficient both economically and financially, with comparative and competitive advantages, so it has strong competitiveness. Thus, this strong competitiveness will be able to encourage self-sufficiency in corn, and minimize dependence on corn imports.

Gowa Regency is an area that directly borders Makassar City, the capital of South Sulawesi Province, so this area is very vulnerable to conversion of agricultural land. The area of rice fields in Gowa Regency in 2022 will be 32,903 hectares, while the area of non-rice fields will be 107,554.9 hectares. This existing situation is very supportive for the development (expansion) of corn farming that is more competitive and capable of supporting corn self-sufficiency. The competitiveness of corn farming in various regions in Indonesia has varying values, including: South Lampung Regency has a PCR value of 0.54 and DRCR value of 0.80 (Lestari et al., 2020), Dairi Regency has a PCR value of 0.80 and DRCR 0.76 (Situmorang (2022), Bangkalan Regency has a PCR value of 0.99 and DRCR 0.48 (Rum et al., 2020), Grobogan Regency has a PCR value of 0.38 and DRCR 0.84 (Bowo & Nurayati, 2016), and Kubu Raya Regency has a PCR value of 0.5 and DRCR 0.6 (Hidayah et al., 2021). Thus, Gowa Regency has relatively strong competitiveness compared to various regions in Indonesia, because it has high competitive advantage and comparative advantage values.

CONCLUSION AND SUGGESTION

Corn farming in Gowa Regency is efficient both financially and economically. The economic profit of corn farming in this area is higher than the financial profit. This difference can occur mainly due to the higher tradable output price factor. Corn farming in this region has competitive advantages and comparative advantages, so that the level of competitiveness of corn farming is relatively strong. Thus, corn commodities are more efficient if farming is developed in the Gowa Regency area

compared to corn imports. The government should continue policies on input prices (seed and fertilizer subsidies) and output prices (highest price & base price) which are more profitable for corn farmers.

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