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Competitiveness of the Local Corn 'Manding' Post the 2022 Fertilizer Subsidy Policy Change

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ABSTRACT

The agribusiness of food commodities in the Manding District is dominated by local corn. Over 90% of the farmers in the district regularly cultivate Manding variety corn as an alternative crop, planting it at least once a year. The change in the fertilizer subsidy policy in 2022 caused several problems in the district, including a reduction in the availability of fertilizer for farmers due to purchasing quota limitations. This condition leads to unmet fertilizer needs, prompting farmers to purchase non-subsidized fertilizers to cover the shortfall. Consequently, production costs increase significantly. Another issue is the delay in the distribution of subsidized fertilizer, which can affect crop growth and productivity. This situation can impact the competitiveness of corn commodities. This study aims to analyze the impact of government policies on corn commodities and the competitiveness of local Manding corn, considering comparative and competitive advantages. The study area was selected purposively, and 42 corn farmers were chosen as respondents using purposive sampling. Data analysis was conducted using the Policy Analysis Matrix. Based on the analysis, it was found that the government's fertilizer policy could help save costs. Meanwhile, the pricing policy resulted in farmers receiving lower prices than before. Overall, Manding local corn farming in Manding District maintains both competitive and comparative advantages. This is evidenced by the Private Cost Ratio and the Domestic Resource Cost Ratio, both of which have values less than one.

Keywords: competitiveness, corn, government policy, Manding corn

INTRODUCTION

Corn is considered a multipurpose commodity, commonly referred to as the 4F, indicating its roles as food, animal feed, fuel, and raw material for industry (Melia *et al.* 2023; Manik *et al.* 2023). Domestic corn demand continues to rise to fulfill the needs of livestock feed, the food industry, and human consumption. In 2022, corn demand reached 16.28 million tons, surpassing the 2021 demand of 14.36 million tons (Badan Pusat Statistik 2023). Regarding production, data from the Directorate General of Food Crops indicate that Indonesia's corn production in 2022 was 25.18 million tons. Over the past decade, corn production in 2022 increased by 42.73% compared to 2012, which was 17.64 million tons. National corn production fluctuates but tends to increase, leading to a surplus and opportunities for export.

Indonesia has successfully exported corn for the past 10 years, from 2012 to 2022 (Pratiwi 2023). In 2023, Indonesia ranked 12th among the top 15 largest corn-exporting countries globally, with an estimated production of 12.9 million metric tons (Shahbandeh 2023). This indicates a significant increase in corn exports, with a value of US$49.95 million, a 1,079.3% growth from 2021 when corn exports were valued at US$4.24 million for 2,539 tons (Mahmudan 2022). The increase in corn export quantity is influenced by international market demand, particularly from the growing animal feed and processed food industries (Akdemir *et al.* 2023). Indonesia's ability to sustain corn exports demonstrates the competitiveness of the domestic corn commodity, meeting specific requirements and qualifications in the international market.

The competitiveness of a commodity in the international market can be influenced by various factors, including exchange rates, price comparisons in the national and international markets, domestic production, and government policies (Tossoua *et al.* 2023). Additionally, according to Zhu *et al*. (2022), a commodity's competitiveness can be analyzed from four perspectives: international market share, market price index, trade competitiveness index, and comparative advantage index. Hochuli *et al*. (2021) suggested assessing commodity competitiveness from both comparative and competitive perspectives. In competitive analysis, both private (financial) and social (economic) aspects must be considered (Mantau 2016).

In relation to food commodities, especially corn, the government implements policies to enhance

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productivity, farmer welfare, achieve self-sufficiency, and boost commodity competitiveness (Lestari *et al.* 2020). Two key policies have been established to improve commodity competitiveness: input and output policies (Zhou and Tong 2022). The Indonesian government's input policy includes fertilizer subsidies, while the output policy involves setting reference prices for corn commodities and import tariff policies (Lestari *et al.* 2022). The government's input policy in the form of fertilizer subsidies has been in place since 1970 and has undergone six changes since. The latest change occurred in 2022 through the enactment of the Regulation of the Ministry of Agriculture of the Republic of Indonesia Number 10 of 2022 concerning the Procedures for Determining the Allocation and Highest Retail Price of Subsidized Fertilizers for the Agricultural Sector. As for the output policy to address corn price fluctuations, the government issued Regulation Number 5 of 2022 by the National Food Agency of the Republic of Indonesia on the Reference Prices for Purchases at the Producer Level and Sales Reference Prices at the Consumer Level for Corn Commodities, Chicken Eggs, and Chicken Meat. Additionally, the government issued Regulation of the Minister of Finance of the Republic of Indonesia Number 6/PMK.010/2017 regarding the Determination of the Classification System of Goods and the Imposition of Import Duty Tariffs on Imported Goods.

East Java Province is the largest corn producer in Indonesia, with a total cultivated area of 1.19 million hectares and an annual production of 5.37 million tons (Central Statistics Agency 2023). Madura Island is one of the regions in East Java that contributes to corn production, with 70,279.5 hectares, or 15.4% of its area, considered suitable for corn cultivation (Darmayanti and Sugiarti 2023). According to data from the Agriculture Office of Sumenep Regency (2022), the local total production was 447,143.13 tons, with a cultivation area of 20,841.5 hectares. Corn cultivation in Sumenep involves two varieties: local and hybrid varieties (Sholihah and Saputro 2016). More than 90% of the farmers choose to cultivate the local variety of corn, called Manding (Wati *et al.* 2022). Despite the lower production yield of local corn than that of hybrid corn, the selling price of local corn is much higher (Prasetyo and Fauziyah 2020). This is one of the reasons farmers persist in choosing to cultivate local corn. The advantages of Manding local corn include requiring fertilizer application only twice, a storage period of more than a year, resistance to beetle and caterpillar pests, and resistance to smut disease (Khoiri *et al.* 2021). Another advantage is the shorter harvesting period of approximately 7080 days after planting (Arifin and Fatmawati 2011). In addition, the output of Manding local corn also has a clear market target absorbed by micro, small, and medium enterprises (MSMEs), livestock feed producers, and the public for consumption as a rice mixture (Radiansyah *et al.* 2022).

The change in fertilizer subsidy policy in 2022 led to several issues, including limited quotas for subsidized fertilizer purchases and delays in distribution. The allocated quotas for the Manding District were 2,053,000 tons of urea and 1,540,000 tons of NPK fertilizer. Meanwhile, the farmers' actual needs amounted to 2,930,358 tons of urea and 2,749,204 tons of NPK fertilizer. As a result, production costs have increased, as farmers must purchase part of their fertilizer needs at non-subsidized prices due to insufficient subsidized supply. In addition, according to the head of the farmer group, the availability of urea fertilizer is often untimely, which reduces productivity (Kusriyadi 2019; Zhang *et al.* 2020). High production costs and reduced productivity may negatively affect the competitiveness of local corn production. Therefore, this study aims to analyze the impact of government policies, particularly fertilizer subsidy policies, on the competitiveness of Manding local corn in terms of both comparative and competitive advantage.

METHODS

The research was conducted from September to November 2023 in the Manding District of the Sumenep Regency. The selection of the district was done purposively, considering that Manding District is a center of production for Manding local corn. Three villages were selected as research locations: Gadding, Girung, and Jabaan. The selection of these villages followed the guidance of the Chairman of the Agricultural Extension Agency (BPP) of Manding District, considering that all farmers in these villages cultivate Manding local corn. The population in this study included all corn farmers in the Manding District, Sumenep Regency. The sample size was determined using the Lemeshow formula:

$$n = \frac{Z^2 P(1-P)}{d^2}$$

where:
Z = Standard value (1.96)
P = Maximum estimation value (50%)
d = Margin of error (15%)

Based on the formula above, the research sample size was determined to be 42. The sampling technique used was purposive sampling, with the criterion of having cultivated Manding local corn for a minimum of 5 years. The data used were primary data, including corn production and input data used for corn farming. Secondary data were used to calculate the social prices of inputs and outputs in corn farming. Data collection methods included interviews, questionnaire distribution, and field observations to support the interview findings.

The data analysis used the Policy Analyze Matrix (PAM) to determine the impact of government policies on the Manding local corn commodity's competitive and comparative advantages. PAM analysis uses the terminology of tradable and non-tradable input prices. Tradable inputs were those that can be traded internationally, either for exports or imports. Non-tradable inputs were those produced domestically and not traded internationally (Arfah *et al.* 2017). According to Long (2021), there are three stages involved: (1) determining the input and output prices of Manding local corn farming from economic activities, (2) allocating private and social cost components, and (3) analyzing indicators generated from PAM.

Determination of Indicators for The Impact of Government Policies, Competitive and Comparative Advantages

- **Impact of Policy**

According to Darmayanti *et al*. (2019) and Wanto (2017), three indicators were used to analyze the impact of government policies on Manding local corn: the Nominal Protection Coefficient on Input (NPCI) policy, the Nominal Protection Coefficient on Output (NPCO) policy, and the Effective Protection Coefficient (EPC) input-output policy. The formulation for measuring the indicators of the impact of government policies on Manding local corn is presented in Table 1.

- **Competitive Advantage**

Private gain (individual profit) represents the value of determining competitive advantage using market prices or actual prices (Zuhri *et al.* 2020). Competitive advantage is a tool for measuring the feasibility of activities or private profitability, calculated based on financial analysis (Radiansyah *et al.* 2022). This is in line with the statement by Hochuli *et al*. (2021) that competitive advantage is the financial feasibility of an activity. A commodity with a competitive advantage is financially efficient. Furthermore, financial feasibility can be viewed as the benefit of a project or economic activity from the perspective of the institution or individuals involved in that activity (Devi *et al.* 2020). The measure of financial feasibility is a competitive advantage if it is under actual economic conditions (Wibisono *et al.* 2019). According to Winta *et al*. (2023), the private cost ratio (PCR) becomes an indicator of the ability of the farming system to pay domestic costs and remain competitive.

- **Comparative Advantage**

Social gain (social profit) represents the value of determining comparative advantage using social prices or shadow prices (Hochuli *et al.* 2021). Anwar (2020) suggested that the concept of comparative advantage is a measure of potential competitiveness that will be achieved if the economy experiences no distortion at all. A commodity with a comparative advantage is said to be economically efficient (Zhu *et al.* 2022). Economic efficiency in a commodity means that the allocated resources have been maximally used in farming activities (Haryanto *et al.* 2018). Economic feasibility evaluates an activity for its benefits to society (Sukmaya *et al.* 2016). The domestic resource cost ratio (DRCR) is an indicator of comparative advantage, which was determined by allocating domestic resources efficiently to obtain one unit of foreign exchange (Lestari *et al.* 2022). Table 2 is a formulation used as a basis for calculating comparative and competitive competitiveness in corn farming.

Table 1 Formulation for calculating the impact of government policies on corn commodities

Coefficient	Formula	Description
Private cost ratio (PCR)	C/(A-B)	PCR<1, indicates that farming has a competitive advantage.
Domestic resource cost ratio (DRCR)	G/(E-F)	DRCR<1, indicates that farming has a comparative advantage.
Nominal protection coefficient input (NPCI)	B/F	NPCI<1 indicates the presence of subsidies or protection.
Nominal protection coefficient output (NPCO)	A/E	NPCO>1 indicates protection against output. NPCO<1 indicates the presence of taxes imposed on output.
Effective protection coefficient (EPC)	(A-B)/(E-F)	EPC>1 indicates that the applied policy provides incentives. EPC<1 indicates that government policy hinders efforts to increase production.
Profitability coefficient (PC)	D/H	PC<1 indicates that government intervention makes farmer profits smaller than consumers.
Subsidy ratio to producers (SRP)	L/E	SRP with a positive value indicates that policy distortions can increase profits. SRP with a negative value indicates that policy distortions can decrease profits.

Source: Devi *et al*. (2020).

RESULTS AND DISCUSSION

Competitive analysis using PAM can be done by identifying the use of inputs and outputs, both tradable and non-tradable inputs, in the local corn farm of Manding. The inputs used in farming include corn seeds, urea fertilizer, NPK fertilizer, manure, pesticides (insecticides and herbicides), land rent, labor, and farm equipment (Table 3). In each planting season, farmers, on average, use 17.31 kg/ha of local corn seeds. This seed usage was in accordance with the recommendations provided by the local agricultural extension officers. The use of urea and NPK fertilizers is intended to promote vegetative growth of the plants. The amount of urea fertilizer applied by corn farmers exceeded the recommended dosage of 200 kg/ha. However, the amount of NPK fertilizer applied—aimed at increasing kernel weight (Zuhri *et al.* 2020)—is still below the recommended level of 300 kg/ha. In addition, the use of organic manure was consistently practiced improving soil fertility in terms of its physical, chemical, and biological aspects (Sholihah and Saputro 2016). The pesticides used by corn farmers include insecticides and herbicides. Insecticides were applied to control armyworm infestations, whereas herbicides were used to manage downy mildew and weed problems in corn crops.

The laborers involved were wage laborers who were not family members of the farmers and were paid IDR 70,000 per 8 hours. Most farmers in the Manding Subdistrict farmed on their own land, while others applied a profit-sharing or land rent mechanism. The profit-sharing mechanism divided 70% of the production to the farmer, while the remaining 30% went to the landowner. Meanwhile, the land rent mechanism allowed farmers to pay approximately IDR 2,800,000 within one year with an average of two planting seasons of corn farming. The equipment used by

Table 2 PAM formulation for local corn farming

Description	Revenue (IDR/ha)	Tradable input cost (IDR/ha)	Domestic factor cost (IDR/ha)	Profit (IDR/ha)
Financial value (Private price)	A	B	C	D
Economic value (Social price)	E	F	G	H
Divergence	I	J	K	L

Source: Pratama et al. (2022)

Remarks:

A : Total revenue from local corn farming at private prices, obtained by multiplying the corn production quantity (kilogram) by the selling price in the farmer-level market (IDR currency).
B : Tradable input costs used in local corn farming at private prices are based on actual prices issued by farmers, including the cost of purchasing urea and NPK fertilizers and insecticides (IDR).
C : Domestic or non-tradable input costs at private prices, covering the costs of buying seeds, land rent, equipment, and labor in corn farming, incurred by farmers, where these inputs are not internationally traded, and expressed in IDR.
D : Profits at private prices in local corn farming is calculated by subtracting tradable and non-tradable input costs at private prices from total receipts at private prices.
E : Total receipts in local corn farming at social prices (receipts obtained by multiplying the corn production quantity by the social price of corn). The social price of corn is assumed to be the FOB price of corn plus the cost incurred to send corn products to the port, measured in Indonesian rupiah (IDR).
F : Tradable input costs at social price. These social costs are assumed to be the CIF price plus the operational cost of goods to the research location, measured in IDR.
G : Domestic input costs at social prices, that is, non-tradable input costs covering seeds, land rent, labor, manure, and depreciation. These social costs are identical to the actual costs.
H : Profit at social prices were calculated by subtracting tradable and non-tradable input costs at social prices from total receipts at social prices (IDR).
I : The difference between actual receipts and social receipts is caused by policy impact and/or market distortions.
J : Differences in tradable input costs due to policy and/or market distortions.
K : Differences in domestic input costs due to policy and/or market distortions.
L : Differences in profit due to policy and/or market distortions.

Table 3 Input usage on private price

Input	Unit	Total	Price (IDR)	Value (IDR)
Seed	kg/ha	17.31	11,000	190,410
Urea	kg/ha	261.66	2,250	588,735
NPK	kg/ha	242.41	2,300	557,543
Manure	kg/ha	1150.19	500	575,095
Pesticide	Ml/ha	943.85	691.67	652,830
Labor	Man days/ha	11.2	70,000	784,.000
Land rent			1,400,000	1.400,000
Equipment Depreciation				24,533

farmers to assist their farming activities consisted of hoes, sickles, and hand sprayers, but there was some equipment rented by farmers during land preparation until the harvest season, including hand tractors, corn shellers, and water pumps or drills. The straight-line method was used to calculate the depreciation value of the equipment.

The average market price of the Manding variety was IDR 7,750 per kg of shelled corn, which was shelled using a corn sheller machine. The output of the local corn was absorbed by animal feed manufacturers, MSME actors, and the community to be used as a rice blend. The high market absorption of Manding corn created a high selling price. This is in line with Widyasmita and Suprapti (2020), who explained that the benefits of local corn can increase income because the majority of farmers sell 90% of their farm production. This is because they realize its high selling price compared to that of hybrid corn. In addition to identifying and analyzing the inputs used in corn farming, PAM analysis requires calculating shadow exchange rates (SER). SER is an important factor in determining the social or shadow price of commodities traded at the border price. The border price is divided into two, exported commodities using FOB (free on board) prices and CIF (cost insurance freight) prices for imported commodities (Arfah *et al.* 2017). The SER was calculated by dividing the *t*-year official exchange rate by the *t*-year standard conversion factor (Pratama *et al.* 2022). The SER value in 2023 was IDR 16.419,65 (Table 4).

The social prices of farm inputs for tradable inputs used the SER approach, while social prices for non-tradable inputs were determined using private prices. Tradable inputs consist of urea fertilizer, NPK fertilizer, and pesticides (Table 5). The social price approach for urea and NPK fertilizers used the CIF approach, which was converted into IDR currency using the SER (Lestari *et al.* 2020). Both types of fertilizers used the CIF approach because the raw materials for chemical fertilizers were imported. Fertilizers are categorized as inputs that can be traded internationally. This is in line with Pratama *et al.* (2022), who determined the price of fertilizer using the prevailing price in the international market. Furthermore, the CIF value of the two fertilizers was added to the transport and handling costs. Like fertilizers, pesticides also used the CIF approach, which was known when converted into IDR currency.

The equipment inputs used in corn farming activities included equipment that was not produced in Indonesia; in other words, Indonesia buys or imports agricultural machinery to help farmers' farming activities. Therefore, the prices in calculating the social price of some of the equipment owned by farmers (manual) used private prices, while modern equipment used the CIF method. The social price of corn output was obtained using the CIF approach and converted into IDR currency using the SER. Corn can be exported or imported to other countries as a staple food for rice and as an ingredient in snacks.

However, some inputs were not included in tradable inputs, such as seeds, in which the seeds used in farming activities were local seeds instead of hybrid seeds.

Table 4 SER calculation

Acronym	Expanded Form	Value (IDR)
OER	Official exchange rate	15,669
Tmt	Import tax revenue	35,430,000,000,000
Txt	Export tax revenue	9,012,700,000,000
Mt	Total import value	295,830,720,000,000
Xt	Total export value	2,342,985,570,000,000
Xt + Mt		2,638,816,290,000,000
Xt - Txt		2,333,972,870,000,000
Mt + Tmt		431,260,720,000,000
(Xt - Txt) + (Mt + Tmt)		2,765,233,590,000,000
(Xt + Mt)/(XtTxt) +(Mt +Tmt)		0.95
SER = OER/SCFT		16,419,65

Source: BPS (2023).

Table 5 Input usage at social prices

Input	Unit	Total	Price (IDR)	Value (IDR)
Seed	k/ha	17.31	11,000	190,410
Urea	kg/ha	261.66	5,146	1,346,628
NPK	kg/ha	242.41	10,049	2,436,169
Pesticides	Ml/ha	943.85	1,616	1,525,516
Manure	kg/ha	1150.19	500	575,095
Labor	Man days/ha	11.2	70,000	784,000
Land rent			1,400,000	1,400,000
Equipment depreciation				18,848

Source: BPS (2023) (Processed).

Meanwhile, manure was included in non-tradable or domestic inputs because the raw material for making fertilizer did not require chemicals or other materials, and its limited production was only enough for farmers who own cattle. Other inputs were labor and land rent, both of which were not tradable inputs because they could not be traded internationally. After the values of private and social prices were obtained, the divergent value could be calculated.

Furthermore, to find the divergence that occurs in corn farming activities, a complete and qualified PAM was calculated for each farm (Table 6). This was done to analyze the competitiveness and impact of government policies. The table explains that the farming activities carried out provide positive returns, meaning that the private profitability (PP) of farming carried out with government intervention can provide positive results for the farming activities of the local corn variety of Manding. The results of this study are in line with Arfah *et al.* (2017), who stated that the government provides positive incentives for the profitability of farming a commodity.

Social profit is the profit calculated at the social price level or shadow price, a price level where there is no government policy and market distortion (Wibisono *et al.* 2019). Table 6 shows that social profitability is greater than 0, which is IDR 1,004,288. This means that without any government policy, farmers will experience a profit from this amount. The profit received by farmers is generated by the high social acceptance of corn farming received by farmers. The results are similar to those of Devi *et al.* (2020), that the value of private profit obtained is greater than the value of social profit. This is due to the government's role in setting the output price received by farmers so that the price received is higher than the social price.

The policy's impact on tradable inputs was negative, showing that there has been a saving in the cost of tradable inputs, where at the private price farmers obtain tradable inputs at a lower price. The government supports tradable inputs by subsidizing fertilizer. Positive profit divergence indicates that most corn farms are more profitable under government policies. When comparing the private and social profits received by farmers, the private profit from corn farming is higher than the social profit. This demonstrates that government policies on corn inputs and outputs simultaneously still provide incentives for farmers and have a real effect, so that private profit is higher than social profit.

The input policy issued by the government, in this case, the fertilizer subsidy policy on local corn variety of Manding farms, was measured by the NPCI indicator (Table 7). This formula shows the ratio of tradable input costs at private prices to tradable input costs at social prices (Lestari *et al.* 2020). The NPCI value is known to be 0.34 or NPCI is less than 1. This value indicates that farmers only pay fertilizer costs of 34% of what they would have paid in the absence of government policy. This shows that the costs of urea and NPK fertilizer in the domestic market were lower than those in the international market. The government policy of subsidizing corn farming inputs will make the local corn Manding more competitive. Rahmaniyah and Rum (2020) also stated that corn farming can be competitive because the input factors are subsidized. In line with Haryanto *et al.* (2018), input policies set by the government are considered effective if they generate profits for corn farmers. Thus, the subsidized fertilizer policy implemented through the Regulation of the Minister of Agriculture of the Republic of Indonesia No. 10 of 2022 Concerning the Procedure for Determining the Allocation and Highest Retail Price of Subsidized Fertilizers (2022) has been able to protect the price of tradable inputs.

The output policies issued by the government on corn commodities are base price and import tariff policies. According to Mantau (2016), the NPCO is the ratio of private price revenue to social price revenue. The result of the NPCO calculation is 1.75, which is greater than 1, indicating that government policies related to corn output have a positive impact because the selling price of corn received by farmers in the Manding Subdistrict is higher than the social price. This causes farmers to receive a higher income than they should have. Based on the facts in the field, the base price of corn is IDR 4,200 per

Table 6 PAM analysis of corn farming

	Revenue (IDR)	Tradable input cost (IDR)	Non-tradable input cost (IDR)	Profit (IDR)
Private price	16,272,539,68	1,799,108	2,974,038	11,499,394
Social price	9,280,954,43	5,308,313	2,968,353	1,004,288
Divergence	6,991,585	-3,509,206	5,685	10,495,106

Table 7 PAM impact analysis

Description	Indicator	Value
Input policy	NPCI	0.34
Output policy	NPCO	1.75
Input-output policy	EPC	3.64
Profitability coefficient	PC	11.45
Subsidy ratio	SRP	1.13
Competitive	PCR	0.21
Comparative	DRCR	0.75

kilogram, while the selling price at the farmer level can reach IDR 7,750 per kilogram, and the social price is US$0.27 or equivalent to IDR 4,433 per kilogram. The field conditions showed that corn production reached 25.18 million tons, while exported corn reached 12.9 million tons. The national demand for corn reached 16.28 million tons. Therefore, to cover the shortfall of 4 million tons, Indonesia imported 28.42 thousand tons of corn. This amount has not been able to cover the domestic shortage because the government set an import tariff policy of 5%. Thus, domestic production was protected, and farm-gate prices have increased owing to increased demand. Therefore, the policy set by the government has been effective and favorable to farmers. This is in line with Darmayanti *et al.* (2019), that the domestic output price policy can be controlled and the corn import mechanism has been strictly regulated through the corn import tariff policy. This indicates that government policies regarding corn farming implement output-based incentives. Melia *et al.* (2023) explained that the output policy of a commodity must be comprehensive to improve Indonesia's agricultural sector. Based on this, corn farming in the Manding Subdistrict has indirectly become competitive with the government's output protection.

Government policies on corn inputs and outputs can be observed from the EPC value. The EPC value reflects the extent to which government policies on inputs and outputs protect or constrain domestic production (Darmayanti *et al.* 2019). Based on the analysis, the EPC value is 3.64, which is greater than 1, meaning that government policies are considered to have been able to protect all local corn variety of Manding farming activities. The greater the EPC values, the higher the level of government protection of corn farming commodities is. This is in accordance with Rahmaniyah and Rum (2020), that an EPC value greater than 1 indicates that there is simultaneous intervention by the government on corn farming. In line with Mantau's (2016) results, an EPC value greater than 1 indicates that export opportunities will receive protection from the government. Current government policies strongly support corn farmers in developing corn production, so that farmers receive approximately 364% of their social value.

The production of local corn varieties tends to decrease if not balanced with government policies that favor farmers. Based on the PC analysis of 11.45 or PC greater than 1, meaning that government policies or market distortions in corn farming provide incentives to farmers because they earn higher profits than they should. The SRP value of the Manding local corn commodity is also greater than 1 or 1.13, representing that government policy supports or benefits corn farming because the costs invested by farmers are greater than the added value of the profits received by farmers. A positive SRP means that policy distortions can increase profits; in other words, the current subsidy on input prices provided by the government is profitable for farmers to increase corn production in the Manding Subdistrict.

The PAM analysis can be used to calculate the impact of government policies on the Manding local corn variety, especially its competitive and comparative advantages. A PCR value of less than 1 indicates that corn farming has a competitive advantage. The lower the PCR value, the higher the competitive advantage (Lestari *et al.* 2022). Based on the analysis, the PCR value of local corn farming in Manding is 0.21, meaning that for every unit of private revenue that has been reduced by one unit of tradable inputs, it costs 0.21 units to pay for non-tradable inputs (domestic inputs). Thus, corn farmers still receive a profit of 0.79. Economically, the production of the local corn of Manding can pay for the cost of domestic inputs at the private price, making corn farming in this subdistrict financially efficient or having a competitive advantage. Similar to the finding by Arfah *et al.* (2017), it takes less than one unit of additional domestic factor costs to obtain one unit of value-added output at private prices.

Meanwhile, based on the DRCR analysis, the value of the local corn of Manding farm is 0.75 or DRCR is less than 1, indicating that if the social revenue that has been reduced by the cost of tradable input is one unit, then it can still pay the cost of non-tradable input by 0.75 units. Thus, farmers still receive a profit of 0.25. This is an indicator that the local corn of Manding is economically efficient in utilizing resources and thus has comparative competitiveness. In other words, producing added value at the social price requires lower domestic resource costs (Sukmaya *et al.* 2016). These results indicate that it is more economically profitable to increase domestic production than to import from abroad. This is in line with Setiawan *et al.* (2014), that comparative advantage can encourage increased domestic production and reduce the number of imports.

CONCLUSION

From the study, it can be concluded that the government policy of subsidizing fertilizer inputs is beneficial for farmers of the local corn variety of Manding. In this case, corn farmers only pay 34% of the cost of fertilizer (if there are no market distortions). Output-side policies of price and import tariffs have also protected farmers. The PCR and DRCR calculations conclude that after the fertilizer subsidy policy change in 2022, the farmers of the local corn of Manding farmers still hold a competitive and comparative advantage.

For policy implications, this study suggests that the government continues to subsidize fertilizer inputs to maintain competitiveness and improve the fertilizer subsidy distribution mechanism so that the delays experienced by farmers in receiving fertilizer are not repeated. The government can maintain programs that protect and encourage corn farmers to grow corn.

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