

Impact of Government Policy on the Improvement of Maize Competitiveness

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Abstract: *Indonesia has a tropical climate and fertile soil that is suitable for maize growth. However, the average of maize productivity in each district is only about 3.5 to 5 tons per hectare. The problem of low productivity of maize is suspected to be closely related to the problem of efficiency in using inputs. High competitiveness is reflected by good price and quality. But this will cause problems if the commodity produced are not able to compete. Comparative and competitive advantages of a commodity depend on key factors such as market performance. In addition, government intervention in the form of policy will influence the comparative and competitive advantage of a commodity system. Data and information on comparative and competitive advantages is one of the considerations in formulating policies and their implementation. This study aims to (1). Analyze the profitability level of maize farming financially and economically, (2). Analyze the competitiveness (competitive and comparative advantage) of maize farming, (3). Analyze the impact of government policy on inputs and outputs in maize farming development, (4). Analyze the sensitivity level of maize commodity competitiveness as the impact of change of input and output price variable. This research was conducted at Center of Maize Development. This research uses Policy Analysis Matrix (PAM) as analysis tool. The data used in this study are primary data and secondary data, both quantitative and qualitative. The method used to collect data is by interviewing farmers as respondents by using structured questionnaires. The results showed that maize farming in South Sulawesi was profitable and feasible in both financial and economic analysis, also have both competitive and comparative advantages. Competitiveness is very sensitive to changes in tradable input prices. Government policy on the price of tradable inputs (subsidized seed and fertilizer) has a positive impact on the competitiveness of maize commodity, while government policy on output prices does not exist. Output price is formed due to market mechanism, not due to government intervention.*

Keywords: Policy, Government, Competitiveness, Maize

1. Introduction

Maize is a strategic commodity because it is widely used for several purposes such as animal feed (direct or processed), staple food for some tribes (also potential for wider society), snacks, industrial raw materials (corn flour, sugar, processed food), and energy (bioethanol). Half of the current usage is as main material for the animal feed industry. Approximately, 51 percent of maize requirement is designated as the main raw material for animal feed industry, other uses include direct food, raw material for non-cholesterol vegetable oils, low-calorie sugar, maize flour, and snack (Ditjentan, 2010).

South Sulawesi Province has 4,547,143 ha of agricultural land, dry land area which is potential for maize cultivation is around 2,312,167 ha but until now is not maximally utilized. Of that number, only 274,046 hectares is utilized, with total maize production as 1,250,204 tons, and average productivity only reached 4.5 t / ha (BPS, 2016).

Various efforts made by the agriculture ministry to boost production is by issuing various policies such as policy in subsidizing some of production input especially seed and fertilizer. Using high yielding seeds that adaptive to the local environment will optimally benefit farmers from energy savings, low maintenance costs, and abundant crop yields.

To find out how far the role of government in increasing the competitiveness of maize commodity, the government policy analysis will be conducted based on input and output

of maize farming and by analyzing the comparative advantage and competitive advantage.

2. Review of Literature

2.1 Overview of Indonesian Maize Economy

Indonesia's strategic position with tropical climate and fertile land make Indonesia classified as a maritime agrarian country and should place agricultural products as the main force. One of the agricultural products that should be developed is maize. In addition to being one of the main ingredients for several tribes, vast land becomes one of the things that should be a factor in increasing national maize production (Directorate General of Trade 2012).

Given the important role of maize, it is reasonable to prioritize the development of domestic maize production by improving the efficiency of farming. In addition to fulfil domestic demand, if the farming of this commodity has high power and competitiveness, then Indonesia has the opportunity to become maize exporter. Therefore, national maize farming competitiveness must be continuously improved. With the target of self-sufficiency of maize in the last three years beginning in 2015, the focus of efforts to increase maize production should be on sustainably improving farming competitiveness.

2.2 Competitiveness Theory

According to Simatupang (2005), the competitiveness of a

farm, in this case can be defined as the ability of an effort to remain privately feasible (financial) on the existing and upcoming conditions of farming technology, economic environment and government policies. In an open economy system, the competitiveness of a commodity means the ability of the domestic commodity business to remain financially viable at the condition of the input price and the tradable output in accordance with the price of its import parity.

One of the determinants of agricultural commodity competitiveness is production efficiency. The competitiveness of a commodity is often measured using a comparative and competitive advantage approach. The comparative advantage, also called *Domestic resource cost ratio* (DRCR), describes competitiveness in efficient market conditions (undistorted), while the value of PCR (Private Cost Ratio) describes competitiveness in actual market conditions. (Hadi et al., 2005).

2.3 Government Policy

2.3.1 Policy on inputs

Policies on tradable inputs can be manifested as taxes, subsidies, and trade barriers. The impact of the policy can be explained through IT (Input Transfer), NPCI (Nominal Protection Coefficient on Input) and TF (Transfer Factor). Input Transfer (IT) is the difference between private tradable input costs and social tradable input costs. The value of IT shows government policies applied to private and social tradable inputs. The negative IT score indicates the government's policy of subsidizing tradable inputs, the subsidies given by the government lead to less private profitability than if there were no policies, the opposite would happen if IT was positive.

2.3.2. Policy on output

The policy on output will cause the shadow price of goods, quantity of goods, consumer surplus and surplus of producers to change, this can be explained by using Output Transfer (OT) and Nominal Protection Coefficient on Output (NPCO). Output Transfer is the difference between private (financial) revenue and social (economic) revenue. Output Transfer (OT) shows the policy applied to outputs resulting in different private and social output prices. A positive OT value indicates the amount of public incentive or the consumer should buy at a higher price than it should be. If the OT is negative, then the public or consumer should buy at a lower price than it should be.

2.3.3. Policy on input-output

The overall impact of the policy on input-output seen from the value of Effective Protection Coefficient (EPC). Effective Coefficient of Protection (EPC) is a combined analysis of Nominal Protection Coefficient on Output (NPCO) with Nominal Protection Coefficient on Input (NPCI). The EPC value describes the direction of government policy toward tradable inputs whether it is to effectively protect or inhibit the production.

3. Materials and Methods

This research was conducted at Maize Development Center

in Takalar and Bantaeng districts, South Sulawesi Province. Selection of this location is done intentionally (purposive) at Maize Development Center. This research was conducted in February - April 2018.

This research uses a quantitative approach that emphasizes its analysis on the data (numerical), based on primary data and secondary data that includes; direct observation, surveys and interviews, and data collection from BPS, BI, Ministry of Trade, Ministry of Industry, Department of Agriculture, and other related institutions that can support this research. Data is processed and analyzed based on the analytical tools that used in achieving the research objectives. Here is the table of Policy Analysis Matrix method (PAM);

Table 1: Components of Policy Analysis Matrix

Components	Revenue	Production Factor Cost		Income
		Tradable	Non-tradable	
Private price	A	B	C	D
Social price	E	F	G	H
Divergences	$I = A - E$	$J = B - F$	$K = C - G$	$L = D - H$

Source: Monkedan Pearson (1995)

Annotation:

- | | |
|-----------------------------------|-----------------------------------|
| A: Private Revenue | G: Cost of Domestic Social Input |
| B: Cost of Tradable Private Input | H: Social Profits |
| C: Cost of Domestic Private Input | I: Output Transfer |
| D: Private Profits | J: <i>Tradable</i> Input Transfer |
| E: Social Revenue | K: Transfer Factor |
| F: Cost of Tradable Social Input | L: Net Transfer |

The PAM method can help policy-makers to examine three central issues of agricultural policy analysis. First issue, whether an agricultural system has competitiveness at the existing level of price and technology, agribusiness actors benefit at the actual price level. The second issue, knowing the efficiency of the farming system by measuring the level of social benefits. The third issue, the impact of new investments in the form of research or agricultural technology on the efficiency of farming systems whether it can increase the income or lower the costs (Pearson et al., 2005).

Financial analysis in the calculation of profitability using market price (prevailing market price), while the economic analysis to calculate the economic profitability using the economic price (the price where there is no distortion in the market). The economic price is also called the shadow price or commonly called as the price in a perfectly competitive market that represents the true cost of social equilibrium.

Gittinger et al., (1993) defines the social price or shadow price as the price that will occur in an economy if the market is perfectly competitive and balanced. In reality this condition is difficult to achieve because of frequent disturbances due to government policies, such as; subsidies, taxes, and wage rates. For tradable commodities, the inputs and outputs of businesses in export groups are approximated by the FOB price (Free on Board), which is the price of the goods at the export port. While the shadow price in the import groups are approximated by the CIF price (Cost Insurance Freight), which is the price of the goods at the

import port.

4. Results and Discussions

4.1. Profitability Analysis of Maize Farming

The result of PAM analysis indicates that maize farming in Bantaeng and Takalar districts is financially and economically profitable. This indicates that maize farming, which is a strategic sector, is very feasible to run. The total cost incurred can be covered by the total revenue received at the level of production that is achieved and the prevailing price level. The profitability of farming is financially higher than economic profit. It can be seen in the following table.

Table 2: Policy Analysis Matrix (PAM) analysis of maize farming in Bantaeng and Takalar districts, 2018

Description	Output Revenue	Tradable Input	Domestic Input	Profitability
Bantaeng:				
a. Private	18.613.851	407.867	3.842.600	14.363.384
b. Social	22.788.750	8.483.770	5.171.450	9.755.934
Divergences	-4.174.899	-8.075.903	-1.328.850	4.607.450
Takalar:				
a. Privat	18.613.851	357.867	3.594.925	14.661.059
b. Social	24.829.710	7.440.005	5.932.600	11.457.106
Divergences	-6.215.859	-7.082.138	-2.337.675	3.203.953

Source: Primary data after being processed, 2018

The value of private profits obtained by Bantaeng district is Rp.14.363.384 / ha, and by Takalar district is Rp. 14.661.059 / ha. The social profit of Bantaeng district is Rp. 9.755.934 / ha, and Takalar district is Rp. 11.457.106 / ha. The private profitability of the two districts is higher than their social profitability, indicating a difference between the actual price and the efficiency price that resulting in divergence value. A very high divergence value exists in the used tradable input costs, this is caused by government assistance to maize farmers in the form of fertilizer and maize seed.

4.2. Competitiveness Analysis

Analysis of maize competitiveness in South Sulawesi can be seen from comparative advantage and competitive advantage. A commodity can be said to have a comparative advantage if it has a value of Domestic Resource Cost Ratio (DRCR) <1 and has a competitive advantage if it has a PCR value <1. The results of competitiveness analysis (DRCR and PCR) is shown in table 3.

Table 3: Competitiveness analysis (comparative advantage (DRCR) and competitive advantage (PCR) of maize in Bantaeng and Takalar districts, 2017

Competitiveness indicator	Bantaeng district	Takalar district
Domestic resource cost ratio (DRCR) Comparative Advantage describes competitiveness in perfect market conditions (undistorted)	0,322	0,351
PCR (Privat Cost Ratio) Competitive Advantage describes competitiveness in actual market conditions	0,211	0,197

Source: Primary data after being processed, 2018

The results show that the DRCR value of Bantaeng district is 0.322, and Takalar district is 0.351. The value of DRCR <1, it means the economic activity is using domestic resources efficiently. In other words, the demand fulfillment of a domestic commodity is more profitable if it is produced domestically.

PCR Value of Bantaeng district is 0,211, and Takalar district is 0,197. The PCR value <1, it means that the maize farming system in both districts are able to pay the cost of domestic resources and remain competitive.

4.3. Government Policy Analysis

In principle, every economic policy undertaken by the government must be aimed at the good of the community, including improvement of overall economic performance. Where possible, all components of society are positively benefited from the policy. If it is expected that the policy will give negative impact at a certain circumstance, the impact should be minimized.

4.3.1 Government policy on inputs

Government policies on tradable inputs can be detected using Input Transfer (IT) indicators to indicate the amount of subsidies that governments need to provide to producers. If IT is negative, it indicates a presence of government policy towards a tradable input (there is a subsidy). However, if IT is positive, it indicates the absence of government policy towards the tradable input (no subsidy).

Table 4: Government policy on maize farming inputs in Bantaeng and Takalar districts, 2017

Policy Impact Indicators	Bantaeng district	Takalar district
Input Transfer (IT)	-8,075.903	-7.082.138
Nominal Protection Coefficient of Input (NPCI)	0,05	0,05

Source: Primary data after being processed, 2018

The result shows that the IT value is negative; in Bantaeng district is -8.075.903 and Takalar district is -7.082.138. These values mean that there are implicitly subsidies to tradable inputs, whether seeds or fertilizers provided by the government. Another understanding that there is transfer (incentive) from government to farmers.

The NPCI values obtained in this study is 0.05 in Bantaeng district, and 0.05 in Takalar district. These values are less than 1 indicating the presence of subsidy for inputs.

4.3.2 Government Policy on output

The level of government intervention on output can be seen from the value of Output Transfer (OT) and Nominal Protection Coefficient of Output (NPCO). The government's policy on output can be measured by the size of the Output Transfer (OT) indicator, which is used to see how far the government's policy is to provide incentives to producers. If the OT is positive, the producer receives a higher price or the producer receives an incentive from government policy. Conversely, if the OT is negative, the producer receives a lower price or the producer does not receive incentives from government policy. The government policies on the output

of maize farming is shown in Table 5.

Table 5: Government policy on the output of maize farming in Bantaeng and Takalar districts, 2017

Policy Impact Indicators	Bantaeng district	Takalar district
Output Transfer (OT)	-4.174.899	-6.215.859
Nominal Protection Coefficient Output (NPCO)	0,82	0,75

Source: Primary data after being processed, 2018

The result of analysis shows that the value of OT is negative in Bantaeng district (-4.174.899) and Takalar district (-6.215.859). These values mean that the output price in the domestic market is lower than the price international market. NPCO value of Bantaeng district is 0.82, and Takalar district is 0.75. Those value are <1, indicating a government policy that causes private prices to be less than the world market price or a government policy that inhibits output exports, where producers do not get output protection from the government.

The total value of output in Bantaeng district is 18 percent lower than its efficiency value (international price) while in Takalar district it is 25 percent lower than its efficiency value (international price). It means that there are some farmers' income that must be relinquished to the consumers of maize. This is in accordance with research of Mayrita (2007) that the value of NPCO <1 means that consumers and producers receive cheaper prices than they should because there is no government policy on maize trade, either import tariff or maize basic price.

4.3.3 Policy on the overall input output

The overall impact of the policy on input-output, among others, can be seen from the Effective Protection Coefficient (EPC) indicator.

The value of $EPC > 1$ indicates that private profits are greater than those without policy, meaning that the applied policy provides an incentive to produce. Meanwhile, $EPC < 1$ means government policy even hamper efforts to increase production.

Table 7: Government policy on input and output of maize farming in Bantaeng and Takalar districts, 2017

Policy Impact Indicators	Bantaeng district	Takalar district
Effective Protection Coefficient (EPC)	1,27	1,05

Source: Primary data after being processed, 2018

The Effective Protection Coefficient (EPC) of Bantaeng district is 1.27, and Takalar district is 1.05. Values show that overall, existing policies have provided positive incentives for producers.

4.4. Sensitivity Analysis

To know the sensitivity level of maize commodity competitiveness as the effect of change of input price variable, output price. Simultaneously as an analytical tool to measure farming systems in the effort to have more competitiveness (competitive and comparative advantage) is higher or lower.

By conducting a sensitivity analysis, the possible consequences of these changes can be known and anticipated beforehand.

4.4.1. Impact of Output Price Change on Competitiveness

The output price change in a farming system has an effect on the producer's achievement which will further influence the increase of farmer's profit. The higher the level of output will lead to increasingly higher financial value added resulting in decreasing the value of DCR or PCR. This indicates the higher competitive advantage and comparative advantage. Maize Farming in Bantaeng and Takalar districts has competitive advantages and comparative advantages that are directly proportional, the higher the increase in the price of output the higher the advantage is gained.

By raising the output price, the farmer gains a higher private benefit than his social benefit, so the government needs to fix the purchase price of dry maize to keep the maize price from being frauded by the traders.

4.4.2. Impact of Changes in Tradable Input Costs and Domestic Input Costs on Competitiveness

The inputs used in maize production are tradable inputs and domestic inputs. Tradable inputs include seeds, fertilizers, and pesticides. Domestic input costs include depreciation costs, and labor costs. The input cost is very sensitive to the amount of costs that must be sacrificed by the manufacturer. The analysis indicates that the value of PCR and DRCR will be greater with the increase of the tradable input, which will financially or economically lower the added value of inputs. Changes in PCR and DRCR values due to the increase of tradable input price from 0% to 50% resulted in higher PCR and DRCR values. This indicates that the increase in tradable inputs cost will have an impact in decreasing the competitiveness of maize farming.

4.4.3. Impact of Changes in Input and Output Price on Competitiveness

Changes in input and output prices simultaneously rose from 10% to 50% did not show the effect of increases and decreases in PCR or DRCR. The addition of input and output simultaneously did not affect the competitiveness improvement of maize farming. In other words, the value of competitiveness is stagnant, fixed in the original position form of a straight line (not moving up and down). The increase of input prices which simultaneously increasing the output price of 0% -50%, does not affect the increase in PCR and DRCR.

5. Conclusions

Based on the results, can be concluded that:

- 1) Maize agribusiness in Bantaeng and Takalar districts is very profitable and feasible to run, both financially and economically. In Bantaeng district, private profitability is 14.363.384 (per planting season), and social profitability is 9.755.934 (per planting season). In Takalar district, private profitability is 14.661.059 (per planting season), and social profitability is 11.457.106 (per planting season).
- 2) Maize Agribusiness in Bantaeng and Takalar districts has

competitiveness, both competitive advantage and comparative advantage to other countries. Bantaeng district has a value of DRR 0.322 and PCR 0.211. Takalar district has a value of 0.351 DRR and PCR 0.197.

- 3) Competitive advantage is very sensitive to changes in input prices but is unaffected by changes if inputs and outputs are raised simultaneously.
- 4) Government policies on the tradable input price (seed and fertilizer subsidy) have a positive impact on competitiveness of maize commodity produced by farmers in Bantaeng and Takalar districts. However, the impact on output prices does not exist. Output price is formed due to market mechanism, not due to government intervention.

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Author Profile



Sarintang was born in Bontoa, Takalar district, South Sulawesi province, Indonesia, on September 4th, 1982. She received a bachelor's degree (S.P/ Bachelor of Agriculture) in 2010 at the Faculty of Agriculture, Muslim University of Indonesia. Starting from 2016 until now, she continues her studies to get a master degree in Agribusiness Program at the Faculty of Agriculture, Hasanuddin University, Makassar, Indonesia. This paper is a part of her thesis which is supervised by Prof. Dr. Rahman Laba, SE., MBA and Dr. A. Nixia Tenriawaru, SP., M.Si.