

## THE IMPACT OF GOVERNMENT POLICIES ON THE COMPETITIVENESS OF CLOVE COMMODITY IN TOLITOLI REGENCY: MULTI PERIOD PAM APPROACH

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### ABSTRACT

This study aims to determine the competitiveness of clove commodities in Tolitoli Regency in terms of competitive and comparative advantages and to determine the impact of government policies on the sustainability of clove farming in Tolitoli Regency. The method of determining respondents used a simple random sampling method and obtained as many as 87 samples of clove farmers. The data analysis method used was the Multi-Period PAM (Policy Analysis Matrix). The results of this study indicate that the clove commodity in Tolitoli Regency had competitiveness in terms of competitive and comparative advantages with a PCR value of 0.415 and DRCR 0.412. The impact of government policies on the output of clove farming in Tolitoli was protective against farming systems with an NPCO value of 1.088, but tent to be weak. While on the other hand, the impact of government policies on clove farming inputs was unprotective with an NPCI value of 1.061, meaning that farmers have not received positive incentives from the current input subsidy policy. The impact of government policies on input-output as a whole was protective and provided positive incentives to farmers, but the value of the coefficient shows the level of protection that was still relatively weak and very vulnerable if there is a change in policy. The regional government is expected to provide protection to clove farmers in the form of setting the cost of clove purchases and also to exercise strict supervision of cartel practices in the clove trade system.

**Keywords:** Competitiveness; Government policy; Multi-period PAM

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### INTRODUCTION

In recent decades clove trade has been able to impact economic development in the Asian region (Cortés-Rojas et al., 2014). However, clove plants in Indonesia currently face several challenges in its sustainability including competition in the conversion of land to other commodities such as oil palm and

nutmeg (Santoso, 2019). In international trade, although Indonesia is known as the world's largest clove producer country, the competitiveness of Indonesia's clove commodities is still lagging behind other countries such as Madagascar and Comoros, one of the main causes is the low productivity (Pratama et al., 2020). Appropriate

policies are urgently needed to support the sustainability of clove commodities which often face constraints on price instability, low productivity and challenges in meeting domestic and international needs (Indriyani et al., 2020).

Tolitoli Regency is one of the districts known as the Clove-producing Center in Central Sulawesi and even in Indonesia with an area of 37,720 ha with the highest production achievement in 2017 which reached 10,276.28 tons. The realization of inter-island clove trade in Tolitoli in 2016 was 8,785.55 tons, an increase of 35.87% compared to the conditions in 2015, where the realization of inter-island clove trade was only 5,634.1 tons (BPS Kabupaten Tolitoli, 2018).

Clove plants are plantations that have an important role in the economy of the community, especially farmers in Tolitoli Regency, but clove farmers are always faced with the classic problem that always makes farmers lose before the harvest, namely price fluctuation. According to Masengi et al. (2015) the characteristics of clove plants can only be harvested a maximum of 1 or 2 years and the harvest is 4 years, high production in a certain year will be followed by a decrease in the production of the next 1 or 2 years so that sometimes scarcity occurs but often there is also an oversupply so that prices often plummet.

In addition to the problem of low productivity, the problem of falling prices before the main harvest is often faced by clove farmers in Tolitoli Regency, this is due to monopsony market conditions. Wahyudi (2016a) stated that around 95% of clove

production was used for the cigarette industry and the rest for food and spices. The large percentage of clove uptake by the kretek cigarette industry left farmers short of choices in marketing their products so that the cigarette industry had considerable authority in price monopolies. Currently Indonesia is also known as the main supplier of global clove essential oil to several countries in such as Saudi Arabia, India, Vietnam and United States (Bustaman, 2016). According to Kingu (2014) the motivation of farmers in maintaining clove plants is very much influenced by fluctuations in clove prices, especially in the export market.

Research related to the impact of government policies on the competitiveness of agricultural commodities using the Policy Analysis Matrix has been done quite a lot in Indonesia both for food crops, horticulture, and plantations, but prior research related to clove competitiveness and the impact of government policies is still lacking. This can be caused by clove being a plantation that has a long life span, so to conduct research and find out its competitiveness comprehensive data covering the age of the plant is needed. One of the studies that may be relevant to this research is a research conducted by (Indriyani et al., 2020) found out that clove farming had a comparative and competitive advantage but the government policies were disincentives to output, no protection policies for inputs, ineffective government incentive policies and no additional producer surpluses.

Based on the description of the above problems, the purpose of this

study is to evaluate the impact of existing government policies on the clove plantation sector in Tolitoli Regency. The Policy Analysis Matrix (PAM) is a method of analysis approach that examines the effect of price policies and investment policies on agricultural productivity. The results of the PAM analysis can show both individual and collective effects of price policies and domestic factor policies. PAM also provides basic information that is important for Benefit-Cost Analysis for investment activities in agriculture (Pearson et al., 2005). The novelty of this study compared to the previous studies is that it employs a PAM multi-period approach which is a more in-depth analysis and is slightly different from a single PAM period because in a multi-period PAM the analysis is carried out based on the age of plants within longer period.

## **METHODS**

The research location was chosen purposively, in which the research was conducted in Tolitoli Regency, Central Sulawesi Province with the consideration that Tolitoli Regency is the center of the largest clove commodity producers in Central Sulawesi, both in terms of production and land area. The multistage cluster sampling method was used to select Baolan District and Ogoide District as a sample of research areas from 10 existing sub-districts with the consideration that the two Districts were the highest clove production centers in Tolitoli Regency. Samples were collected using the Slovin method (Prasada & Masyhuri, 2019), based on the calculation of the Slovin method, from a population of 675, a total sample

of 87 people was obtained with a proportion of 65 respondents in Baolan District and 22 respondents in Ogoide District.

The type of data used in this study was primary data and secondary data. Primary data was obtained directly from the source using a questionnaire from clove farmers, traders, experts related to clove agriculture, stakeholders, and clove agriculture institutions. Secondary data was obtained by collecting information in the form of documents and reports that can be obtained from the Central Statistics Agency, the Director-General of Plantations, the Plantation and Livestock Services Office of Tolitoli Regency, UNComtrade, Bank Indonesia and other supporting sources.

The data collected was then analyzed using the Policy Analysis Matrix (PAM) Method used to measure the impact of policies on producer income and identifying transfers between producers and consumers as the main actors involved in the agricultural system as well as policymakers in controlling government budget allocations. Stages carried out in PAM analysis included (1) determination of input-output in farming, (2) allocation of inputs into tradable and non-tradable components (3) method of determining shadow prices, (4) determining the competitiveness of a commodity in terms of excellence comparative (economic efficiency) and competitive advantage (financial efficiency) and the impact of government policy interventions on a commodity system (Table 1).

PAM table consisted of a revenue column, two input cost columns (tradable and non-tradable) and profit

The first line of the PAM matrix shows the calculation concerning the private price, that is, the actual price received or paid by the producer. The second line shows the calculation by referring to the social price or the shadow price which is

the price that describes the real economic value of the input and output. The third line shows the transfer effect that illustrates the impact of government policy on input-output and market failure (Suhardedi et al., 2017).

**Table 1.** Policy Analysis Matrix (PAM)

Description	Revenue	Cost		Profit
		Tradable Input	Non Tradable Input	
Private Price	A	B	C	$D = A - B - C$
Social Price	E	F	G	$H = E - F - G$
Policy Impact	$I = A - E$	$J = B - F$	$K = C - G$	$L = D - H = I - J - K$

Source : Pearson et al., (2005)

Note:

Private Profitability (D) =  $A - (B+C)$

Social Profitability (H) =  $E - (F+G)$

Private Cost Ratio (PCR) =  $C / (A - B)$

Domestic Resource Cost Ratio (DRCR) =  $G / (E - F)$

Ouput Transfer (I) =  $A - E$

Nominal Protection Coefficient on Output (NPCO) =  $A / E$

Input Transfer (J) =  $B - F$

Nominal Protection Coefficient on Input (NPCI) =  $B / F$

Transfer Factor (K) =  $C - G$

Effective Protection Coefficient (EPC) =  $A - B / B - F$

Net Transfer (L) =  $D - H$

Inputs in this study included land, seeds, labor, fertilizer, pesticides, tools and agricultural machinery. The output produced in this study was in the form of dried clove flowers. Determination of the allocation of inputs into foreign and domestic components can be seen in table 2.

**Table 2.** Determination of Clove Farming Input Allocation into Domestic and Foreign Components

Component	Domestic (%)	Foreign (%)
Seeds	100.00	0.00
NPK- Phonska Fertilizer	45.54*	54.46*
Urea Fertilizer	100.00*	0.00*
ZA Fertilizer	58.65*	41.35*
SP-36 Fertilizer	52.28*	47.72*
Organic Fertilizer	100.00	0.00
Pesticide	64.00**	36.00**
Labor	100.00	0.00
Land	100.00	0.00
Equipment Depreciation	100.00	0.00
Transportation	44.86***	55.14***

Source: \*(APPI, 2019); \*\*Input-Output Indonesia (2008) in (Arfah et al., 2017),\*\*\*(Saputro et al., 2017)

Shadow prices or social prices are the prices formed in an economy under

conditions of perfect competition and equilibrium. Border price adjustment

was calculated to determine shadow price. The shadow price for tradable commodities, both input, and output, was calculated using the FOB (Free on Board) limit approach, namely the price of goods arriving at the export port, while for imported commodities using the CIF (Cost Insurance Freight) price limit, namely the price of goods arriving at the import port. The method determining the Shadow Exchange Rate uses the Squire and Van der Tak methods (Gittinger, 1984) is shown in the below formula:

$$SER = \frac{OER}{SCF_t}$$

Where:

SER : Shadow exchange rate (IDR/US\$)

OER : Official exchange rate (IDR/US\$)

SCF<sub>t</sub> : Standard conversion factor

The SCF (Standard Conversion Factor) value is the ratio of the value of imports and exports plus tax which is formulated as follows:

$$SCF_t = \frac{X_t + M_t}{(X_t - T_{xt}) + (M_t + T_{mt})}$$

Where:

SCF<sub>t</sub> : Standard conversion factor for year - t

X<sub>t</sub> : Indonesia's export value for year-t (IDR)

M<sub>t</sub> : Indonesia's import value for year-t (IDR)

T<sub>xt</sub> : Government revenue from export tax for year-t (IDR)

T<sub>mt</sub> : Government revenue from import tax for year-t (IDR)

Clove plantations are annual plantations for plants that require a long period from the time of preparing the

land, planting to harvest time which must reflect representative results that can describe the full competitiveness of cloves. Thus, it is necessary to apply a multi-period method PAM (Setiawan & Sengadji, 2016). The PAM multi-period method requires calculating the total net present value (NPV) according to the economic age of the plant. Furthermore, the NPV formula used was as follows:

$$NPV = \sum_{t=0}^n \frac{B_t - C_t}{(1+i)^t}$$

Description:

B<sub>t</sub> = Benefit for year-t

C<sub>t</sub> = Cost for year-t

$1/(1+i)^t$  = Discount factor

t = year ( 1,2,3,... n )

n = farming period

Each NPV calculation model was applied to the private and social prices, then the results of the NPV calculation are entered into a single PAM matrix period for analysis based on PAM indicators in general. The results of the interpretation of the PAM single period and the multi-period PAM are the same, which show the total profit and divergence during that period (Pearson et al., 2005).

## RESULTS AND DISCUSSION

Government policy can be one of the determinants of efficiency in economic activity. Among the policies that have been carried out by the government in the clove farming sector so far on the input side are input subsidies in the subsidized fertilizer program, while in terms of output there is no real policy in protecting the farmers in the face of clove price fluctuations in

**Table 3.** Policy Analysis Matrix (PAM) of Clove Farming in Tolitoli Regency (IDR/Ha)

Description	Revenue	Cost		Profit
		Tradable Input	Non Tradable Input	
Private Price	174,956,203	20,271,805	64,172,610	90,511,787
Social Price	160,783,171	19,108,962	58,372,308	83,301,902
Policy Impact	14,173,031	1,162,843	5,800,303	7,209,885

Source: Primary Data Analysis, 2020

addition to the clove import ban policy that it was implemented in 2002 which was revoked in 2015. This paper examines the efficiency of policies that take place in the clove farming sector with the Multi Period Policy Analysis Matrix approach

The PAM table used in this study was derived from the multi-period calculation of PAM by calculating the revenue, costs, and benefits according to the economic age of the plant for 20 years. The data then became an indicator of the competitiveness and policy impact of the clove farming system. The following table of PAM from the clove farming system for 20 years in Tolitoli Regency can be seen in Table 3.

**Competitive and Comparative Advantages of Clove Commodities in Tolitoli Regency**

The indicators used to determine the competitive and comparative advantage of a commodity were Private Cost Ratio (PCR) and Domestic Resources Cost Ratio (DRCR) (Mallu et al., 2018). PCR and DRCR values are also

able to illustrate the efficiency of a farming system in terms of both financial and economic aspects. Financial efficiency describes the efficiency that occurs in private prices, while economic efficiency is based on the prices received or paid by farmers in conditions without market distortion (Nurwahidah et al., 2015). Values of PCR and DRCR of clove commodities in Tolitoli Regency for 20 years can be seen in Table 4.

Table 4 shows that the value of the Private Cost Ratio (PCR) of clove commodities in Tolitoli Regency was 0.415 or less than one (PCR <1) which means clove commodities in Tolitoli Regency have competitive advantages and can compete at national and global levels even with the presence of government distortion or interference, the lower the value of PCR shows the stronger competitive competitiveness of a commodity. A PCR value of 0.415 can also be interpreted that to increase one unit of value-added output at the private price, it should incur additional domestic input costs at the private price of 0.415 (Haryanto et al., 2019).

**Table 4.** Indicators of Competitive and Comparative Excellence in Clove Farming in Tolitoli Regency

Indicators	Value
Private Cost Ratio (PCR)	0.415
Domestic Resources Cost Ratio (DRCR)	0.412

Source: Primary Data Analysis, 2020

The value of the Domestic Resources Cost Ratio (DRCR) of clove commodities in Tolitoli Regency was 0.412 or less than one ( $DRCR < 1$ ) which means that clove commodities in Tolitoli Regency have a comparative or economically efficient advantage with the assumption that in conditions there was no distortion or no government hand interference. It also shows that clove commodities are more profitable if they are produced domestically rather than imported from abroad because the production costs must be lower than if they must be imported (Putri et al., 2019). PCR value of 0.412 can also be interpreted that to produce one unit of cloves in the country only requires the cost of domestic input at a social price of 0.412 so that it will save on import costs of 0.588.

#### Impact of Output Policy

The impact of government policies in Table 5 shows that the value of Output Transfer (OT) was positive ( $OT > 0$ ) in the amount of IDR. 14,173,031. This condition can be interpreted that the 20-year government policy in the clove farming sector in Tolitoli Regency as a whole can provide positive incentives to farmers as producers and there has been a transfer from the consumer community to farmers or producers, even if it is examined further in some certain years there are policies that make farmers lose money many times and even they have to

cut down their clove plants, such as the existence of BPPC in the 1990s and export-import regulations which were not so strict in controlling the entry of clove products from abroad into the country which often lowered prices at the farmer's level.

Nominal Protection Coefficient Output (NPCO) based on Table 5 shows that the value of NPCO was greater than one ( $NPCO > 1$ ) that was equal to 1.088. It shows that the government policy on clove farming in Tolitoli Regency for 20 years was protective or this reflects that the overall price of domestic output was higher than the output price at the international level. Although the overall policy was protective, the NPCO value was almost close to the number one that reflects that the level of protection still tends to be weak. The role of the local government is also needed in this regard to encourage the community motivation to properly maintain the clove plants. It is because Tolitoli Regency ranks first in producing cloves in Indonesia in terms of production since 2016 (Direktorat Jenderal Perkebunan, 2017).

The fact occurred at the study site shows that the level of protection from the Tolitoli Regional Government against clove farmers on their own clove products tends to be weak. Trading conditions at the regional level where there are only one or two large traders who have the authority to export cloves out of the region make the market

**Table 5.** Indicators of Policy Impacts on Clove Farming Output in Tolitoli Regency

Indicators	Value
Output Transfer (OT)	14,173,031
Nominal Protection Coefficient Output(NPCO)	1.088

Source: Primary Data Analysis, 2020

structure become monopsonistic and suppress prices at the farm level, triggering price disparity.

It requires several elements of the community such as farmers, farmer organizations, and Non-Governmental Organizations (NGOs) to voice these conditions to the government so that the local government issues a regulation through Decree of the Regent No. 337 2019 on July 16, which sets the standard cost of clove purchases at IDR 100,000 / kg. Since the issuance of the decree, there have not been any concrete steps taken by the regional government to realize this, so what has happened to date has remained following market mechanisms.

According to Siregar (2011) clove is a commodity that is very vulnerable to price fluctuations, clove prices can surge up to 200% and vice versa can drop dramatically in a percentage that does not differ much from the increase. The Indonesian Government once limited the import of cloves through Regulation of the Minister of Industry and Trade No. 7 of 2002 even though this contradicted the World Trade Organization agreement (Suprihanti et al., 2018).

The impact of the policy makes the price of cloves reach IDR 120,000/kg – IDR 130,000/kg, however in 2015 the government re-issued a policy in the Minister of Trade Regulation of (Permendag) Number 75 of 2015 which regulates the liberalization of clove imports so that the price of cloves in the country dropped to IDR 70,000/kg. According to the Indonesian Clove Farmers Association (APCI), it is considered to be very pressing and detrimental to the clove farmers because

it causes domestic clove prices to be low and farmers lose the opportunity to enjoy the proper price they should have obtained.

### **Impact of Input Policies**

The impact of government policies in Table 6 shows that the value of Input Transfer (IT) was positive ( $IT > 0$ ) in the amount of IDR 1,162,843, in which the cost of private tradable inputs was greater than the costs of social tradable inputs. It shows that there was a transfer from producer farmers to tradable input producers meaning that farmers have to pay more to obtain tradable inputs.

This condition is certainly in conflict with or not in line with the input subsidy policy that has been set by the government in the form of a subsidized fertilizer program since 2003 through the Minister of Industry and Trade Decree Number 70 / MPP / Kep / 2 / 2003 to support efforts to achieve agricultural production targets. The types of fertilizers included in the subsidized fertilizer category include Urea, NPK-Phonska, SP36, ZA, and organic fertilizer, but the policies implemented by the government to provide incentives to farmers often occur that subsidies were not on target and in distribution there was often smuggling (Darwis & Supriyati, 2014). Existing input subsidy policies have not been able to provide positive incentives for the clove farming system in Tolitoli Regency for 20 years. Frequent fraud and misuse of subsidized fertilizer in the field make it often difficult for farmers to obtain fertilizer and if available the price is higher than it should be (Hasibuan et al., 2012).



**Table 6.** Indicators of Policy Impacts on Clove Farming Input in Tolitoli Regency

Indicators	Value
Input Transfer (IT)	1,162,843
Nominal Protection Coefficient Input (NPCI)	1.061
Transfer Factor (TF)	5,800,303

Source: Primary Data Analysis, 2020

Nominal Protection Coefficient Input (NPCI) based on Table 6 shows that the value of NPCI was greater than one ( $NPCI > 1$ ), which was 1.061. It shows that farmers must incur more expensive input costs because the price of domestic tradable input is higher than the price of tradable input at the international level (Haryono et al., 2011). Domestic tradable input prices were 6.1% more expensive than tradable input prices at the international level. Overall, the government's policy towards tradable input of clove farming in Tolitoli Regency for 20 years was unprotective or had not been able to provide positive incentives for tradable inputs in the clove farming system.

Based on Table 6 shows that the TF value was positive ( $TF > 0$ ) in the amount of IDR 5,800,303, it indicates that there is a transfer from producer farmer to non-tradable input producers or farmers must pay higher costs because there were negative subsidies in the form of taxes clove farmers must bear the non tradable inputs. Components of non-tradable input costs that required higher costs by clove farmers at the study site are labor costs and harvesting equipment in the form of bamboo ladders. This is because the availability of labor or harvest workers available at the study site was increasingly scarce, so farmers often brought in labor from the

subdistrict or neighboring district causing wages to rise, as well as harvesting tools for farmers who still used traditional tools such as bamboo ladders which recently are increasingly hard to find.

#### Impact of Input - Output Policies

The Effective Protection Coefficient (EPC) coefficient is useful to know the extent of the impact of government policy in supporting or hampering farmers in their farm management. Based on Table 7 it is known that the value of the EPC was more than one ( $EPC > 1$ ) of 1.092, which means if it is accumulated for the whole 20 years, the government policy was protective for the clove farming system in Tolitoli Regency. As one of the largest clove producing regions in Indonesia, the government should support the sustainability of the farming system so that it continues to produce. This certainly needs to be synchronized between the central government and regional governments in a tangible form.

Table 7 shows that the Net Transfer value of clove farming in Tolitoli Regency was positive ( $NT > 0$ ) in the amount of IDR 7,209,885, which means that government policies were protective for the clove farming system and farmers get a producer surplus of IDR.7,209,885 from the policy which exists.

**Table 7.** Indicators of Policy Impacts on Clove Farming Input and Output in Tolitoli Regency

Indicators	Value
Effective Protection Coefficient (EPC)	1.092
Net Transfer (NT)	7,209,885

Source: Primary Data Analysis, 2020

The weak level of protection will be very vulnerable to the threat of policy distortion, the entry of imported products of the same type at lower prices needs to be watched by the government as a regulator of policy makers with due regard to tax regulations and subsidies (Dos Santos Alves et al., 2017). The characteristics of clove production which fluctuated every year also need to be reviewed by applying supply chain management so that production fluctuations do not have a significant effect on falling clove prices at the farmer level Wahyudi (2016b).

#### CONCLUSION AND SUGGESTION

The clove farming system in Tolitoli Regency for 20 years has shown that clove commodities had competitiveness in terms of competitive or comparative advantage. The impact of government policies on the output of clove farming in Tolitoli was protective, but tent to be weak and needed to be strengthened. While on the other hand the impact of government policies on clove farming inputs was unprotective, meaning that farmers had not received positive incentives from the current input subsidy policy. The impact of government policies on input-output as a whole was protective and provided positive incentives to farmers, but the the coefficient that tent to approach the efficient limit indicates the level of protection that was still relatively weak

and very vulnerable if there was a change in policy.

The regional government is expected to be able to provide protection to farmers as the main producers of cloves in the form of interventions to determine the clove floor prices and supervising the implementation. The regional government must carry out strict supervision on cartel practices in the clove trade system which causes the clove market to be monopsony and evaluate the fertilizer subsidy policy by replacing the application of the farmer card mechanism so that the benefits of the subsidies are immediately felt by farmers and intensifying and supervising the distribution of subsidized fertilizer to the farmer level.

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