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The Impact Of Government Policies On The Competitiveness Of Rice Farming In Purbalingga Regency

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ABSTRACT
Rice is a potential food crop to be developed in Purbalingga Regency, so it is necessary to know its competitiveness so that rice production can be improved. This study aims to (1) determine the competitiveness of rice farming in Purbalingga Regency, and (2) determine the impact of government policies on rice farming in Purbalingga Regency. It used the Policy Analysis Matrix (PAM) as the research method. The research sample was purposively selected from Bukateja Subdistrict because it is the region with the highest rice production in Purbalingga Regency. It used the data of rice farming collected in two seasons, such as MT I (rainy season) and MT II (dry season) with a total sample of 80 rice farmers. The analysis shows that rice farming in Purbalingga Regency in MT I (rainy season) and MT II (dry season) had good level of competitiveness because they had competitive advantages and comparative advantages. The impact of government policies on rice farming output and input for both tradeable and non-tradeable inputs were significant. The government also had applied protective rice farming input-output policy. Based on this research, it is suggested that there is subsidy to improve irrigation networks and subsidy to purchase of modern inputs (agricultural machinery) to increase rice productivity and raise the competitiveness of rice farming in Purbalingga Regency as well as the government needs to maintaining the rice import tariff policy, determining the basic price of rice, and providing input subsidies such as chemical fertilizer.

Keywords: Competitiveness, Rice, PAM, Policy

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INTRODUCTION

Rice is a staple food for people in Indonesia. Increasing domestic rice production is a priority to meet the consumption needs of the people in line with the increasing population in Indonesia. The average rice consumption of Indonesian people is 124.89 kg per capita, while the total population of Indonesia reaches 255,46 million people and it is estimated that the population will continue to increase (Pusdatin, 2016). Unfortunately, the increase in rice consumption is not matched by an increase in production. This encourages the occurrence of imports to meet the needs of rice consumption. On the other hand, rice production by farmers is not only in the context of meeting people's food needs, but also increasing income, both for farm households and nationally (Masyhuri & Novia, 2014). Thus, it is vital that the government designs policy as an effort to increase rice production in the country.

The largest rice production center areas in Indonesia are still in Java, this causes the consumption of Indonesian rice is still borne by the central rice production center which is concentrated in Java. Central Java is one of the centers of rice production in Java with the number of rice farmers around 31.95% of the total farmers in Java. Purbalingga Regency as one of the rice-producing regions in Central Java Province. The area of land use in Purbalingga Regency is mostly for paddy land which is 24.19% where the area of land use is the second highest after land use for roads, settlements, and offices. It shows an opportunity to increase rice production where paddy fields are used for the farming. Land that is used for rice farming is paddy fields with technical irrigation. The harvested area in Purbalingga Regency has decreased in the last two years where in 2017 it was 43,479 ha to 42,285 ha in 2018. Although the harvested area has decreased, there has been an increase in rice production in 2017 by 234,605 tons to 281,079.63 tons in 2018 (BPS, 2019). The increased production is followed by high use of agricultural inputs both tradeable and non-tradeable inputs. Some tradeable inputs are affected by the world prices. The role of government is needed to help rice farming remain efficient and increase the competitiveness (Septarisco & Prihtanti, 2019).

Several previous studies have focused on comparing the competitiveness of rice farming by land type, both in the lowlands, highlands, irrigated land and also rainfed land (Ugochukwu & Ezedinma, 2011; Ogbe et al., 2011; Kikuchi et al., 2016). In this study, only examined the competitiveness of rice farming on irrigated land in the lowlands because rice farming in Purbalingga Regency was only carried out on its land. The highest production for food crops in Purbalingga Regency is rice with a productivity of 6,67 tons/ha with different production each season (BPS, 2019). Previous research, Rachman (2011) analyzed the competitiveness of rice farming in several regions in Indonesia based on the rainy and dry seasons, so that it can be seen the effect of season comparisons on the competitiveness of rice farming.

Research on the competitiveness of rice farming has been widely carried out, but has not been further analyzed on the impact of government policies on agricultural competitiveness (Kikuchi et al., 2016; Suhardedi et al., 2017; Ugochukwu & Ezedinma, 2011). Research on the impact of government policies on the competitiveness of rice farming is very intriguing to study because so far the government has established various policies to help increase rice production in the country. Government policies that have been published to protect domestic producers are floor price and import tariff policies for rice. Policies are also made for tradable inputs for rice farming such as import tariffs, import taxes, and subsidies for farmers (Bowo et al., 2016). Every policy instrument formed by the government will lead to transfers between producers, consumers and the government (Pearson et al., 2004).

The novelty of this study, as compared to the previous research, lies on the fact that the research was conducted in Purbalingga Regency as one of the rice-producing areas in Central Java Province. In addition, this research only observed the technically irrigated paddy fields in two growing seasons namely the planting season I (rainy season) in October-March and the planting season II (dry season) in April-September. On this basis, this study aims to determine the competitiveness of rice farming and the impact of government policies on rice farming in Purbalingga Regency.

METHODS

This research was conducted in Purbalingga Regency, Central Java Province. The research location was purposively selected by considering that the area is one of the rice-producing regions in Central Java Province. Bukateja Subdistrict was chosen purposively as the research sample given the fact that it is the highest rice-producing area in Purbalingga Regency. The sample selection of farmers was carried out deliberately on rice farmers working in an area of 15 ha paddy field in each selected village in Bukateja Subdistrict based on recommendations from the Agricultural Extension Agency (BPP) of Bukateja Subdistrict and including the village with the highest rice production in Bukateja Subdistrict, namely Bukateja Village and Kembangan Village. The selected farmers were 80 farmers, 40 farmers in Bukateja Village and 40 farmers in Kembangan Village. This research data were based on rice farming data for one year, namely from October 2017 to September 2018. The study used primary data and secondary data. Primary data were obtained from interviews with rice farmers, rice input and output

Table 1. Tabulation of Policy Analysis Matrix (PAM)

Description	Revenue	Input Cost		Profit
		Tradeable	Non tradeable	
Private Price	A	B	C	D = A-B-C
Social Price	E	F	G	H = E-F-G
Divergence Effect	I = A-E	J = B-F	K = C-G	L = D-H

Source: Pearson *et al.* (2004)

Information:
Private Profit (D) = A – (B+C)
Social Profit (H) = E – (F+G)
Private Cost Ratio (PCR) = C / (A-B)
Domestic Resource Cost Ratio (DRCR) = G / (E-F)
Transfer Output (I) = A – E
Nominal Protection Coefficient on Output (NPCO) = A/E
Transfer Input (J) = B – F
Nominal Protection Coefficient on Input (NPCI) = B / F
Transfer Factor (K) = C – G
Net Transfer (L) = D – H
Effective Protection Coefficient (EPC) = (A - B)/(E - F)
Subsidy Ratio to Producer (SRP) = L / E

traders and extension workers from the Agricultural Extension Agency of Bukateja Subdistrict. Meanwhile, secondary data were derived from available literature, including books, journals and the internet.

The data were analyzed using the Policy Analysis Matrix (PAM) to determine the competitiveness of rice farming and the impact of government policies on the farming. The stages of analysis in the Policy Analysis Matrix (PAM) according to Pearson *et al.* (2004) are (1) identifying all inputs in rice farming; (2) allocating tradeable and non tradeable inputs; (3) determining the shadow price of rice farming inputs and outputs; and (4) analyzing the comparative and competitive advantages and impact of policies with the Policy Analysis Matrix (PAM) as shown in the following Table 1.

Rice farming output is included in tradeable component, while rice farming inputs can be divided into tradeable component (internationally market/ import) and non-tradeable component (domestic markets). Shadow price are used to find out social profit. Social price for inputs and output tradeable based on international prices, for imports goods use CIF (Cost, Insurance, and Freight) prices, while export goods use FOB (Free and Board) prices, and for non-tradeable inputs are used opportunity cost (Rachman, 2011). The shadow price for the tradeable components converted by applying Shadow Exchange Rate (SER) or the shadow price of the exchange rate is calculated based on the average exchange rate in each planting season.

The Policy Analysis Matrix (PAM) table is used to determine indicators of profit, competitiveness and the impact of government policies. Indicators of profit in this study are private profits (with private/actual prices) and social profits (with social prices or in a perfectly competitive market situation or when there is no government policy). Indicators of farm competitiveness are seen based on the value of the comparative and competitive advantage. Next, the impact indicators of government policies are analyzed through input, output, and combination input-output policy indicators (Bowo et al., 2016) as in the formula of Table 1.

RESULTS AND DISCUSSION

An Overview of Rice Farming in Purbalingga Regency

The results show that the majority of rice farmers in Purbalingga Regency were 54 years old, of which 78.75% were aged between 15-64 years old and 21.25% were over 65 years old. The average experience of farmers in rice farming was quite long, about 22 years. The level of education of rice farmers in the Purbalingga was relatively low where 60% of farmers had a primary school education. The average area of rice farming was 0.43 ha. The type of irrigation at the study site was technical irrigation both in the rainy and dry seasons. The location of rice farming was mostly located in the southern region of Purbalingga Regency because it is a relatively low land.

The average farmer in Purbalingga Regency used 42 kg/ha of rice seeds, which was more than the recommendations given (± 20-25 kg/ha). Farmers tended to plant 3-4 rice seeds per plant hole. According to Kumalasari *et al.* (2017), the use of a large number of seeds per plant tended to increase the competition between plants within one family and other families with light, space, and nutrients so that it affects growth and production. In addition, according to Muyassir (2012), the use of 1-2 seeds per clump will produce higher yields compared to the use of more than 2 seeds. Farmers used more seeds because of farmers' concerns from pests and diseases that will reduce production. The most use of fertilizer inputs by rice farmers in the Purbalingga Regency is urea and NPK fertilizers. The average use of urea fertilizer is 300 kg/ha and NPK fertilizer is 255 kg/ha. According to Misran (2014), the intensive use of chemical fertilizers in paddy fields can cause soil organic matter content to decrease. Farmers generally sold their rice in the form of paddy grains to traders. Trader collectors would come to take the rice to the farmer's home or paddy field. Farmers could save about 10-20% of their farm produce in the form of dry paddy for consumption while the rest will be sold. The average production during the rainy season tends to be lower by 4,670.14 kg of paddy grains compared to the dry season of 4,911.18 kg of paddy grains.

Rice Farming Competitiveness in Purbalingga Regency

The competitiveness of rice farming in Purbalingga Regency was calculated based on the value of competitive advantage (PCR) and comparative advantage (DRCR). First, calculate the private revenue obtained from the multiplication of the amount of output with the private price. The output is sold by farmers in the form of paddy grains. Furthermore, to find out the costs, the inputs have to be separated based on tradeable and non-tradeable components and are calculated with private or actual prices. Tradeable inputs for rice farming in Purbalingga Regency were chemical fertilizers and pesticides. Pesticides used were liquid pesticides (such as combitox and starban) and solid pesticides (such as dangke, furadan, plenum). Non-tradeable inputs used included rice seeds (such as mekongga, situbagendit, and IR 64), manure, labor, land and farm machinery rental such as tractor and power thresher.

Social profits were obtained by multiplying the amount of output with the social price. Social prices for tradeable goods such as chemical fertilizers and pesticides use market prices that have been converted to Shadow Exchange Rate (SER). The social price for labor by multiplying the percentage of the labor force in Purbalingga Regency by the labor wage at the actual price. Social prices for other non-tradeable goods and agricultural machinery rentals used actual prices at the research area. The rice farming competitiveness was calculated using the Policy Analysis Matrix (PAM) method. The calculations resulted in the value of private profit and social profit. This value was obtained from the difference between revenue and input costs of both tradeable and non-tradeable inputs calculated using private and social prices, as shown in Table 2 below.

Table 2 shows that the profits of rice farming in the two growing seasons in Purbalingga can be seen from private revenue and social revenue. The results of this study are slightly different from previous studies because the private revenue of rice farming in Purbalingga

Table 2. Private Profit and Social Profit of Rice Farming per Hectar per Season in Purbalingga Regency

Description	Revenue	Input Cost		Profit
		Tradeable	Non Tradeable	
MT I				
1. Private Price	20,601,139.96	2,377,471.91	12,015,078.76	6,208,589.29
2. Social Price	15,038,731.83	2,828,026.75	11,791,151.52	419,553.57
3. Divergence	5,562,408.13	-450,554.84	223.927.25	5,789,035.72
MT II				
1. Private Price	21,995,965.00	2,734,086.80	12,575,047.14	6,686,831.06
2. Social Price	17,177,771.63	3,371,276.57	12,114,723.78	1,691,771,27
3. Divergence	4,818,193.37	-637,189.77	460,323.35	4,995,059.79

Source: Primary Data Analysis, 2019

Regency during the rainy season was actually lower than in the dry season, whereas in research by Rachman (2011), especially for the Karawang and Sidrap areas, the private revenue during the rainy season is higher than during the dry season. According to Suharyanto *et al*. (2015), some of the problems hampering rice production are drought, floods, and pests or diseases that are increasingly complex as climate change is difficult to predict. Based on research by Koide *et al.* (2013), rice production depends on the rainfall of the previous rainy season. Production in MT I (rainy season) tends to be lower because of a higher rate of pests and diseases attacking rice plants than that during MT II (dry season). Research by Amien *et al.* (2011) said that climate change such as changes in rain patterns will disrupt planting time where rising air temperatures will accelerate the generative period of plants and increase pest attacks so that production yields will fall. So, rice farming in Purbalingga Regency was more suitable during MT II (dry season), which was indicated by more output and revenue.

Input costs used in MT I (rainy season) were less than in MT II (dry season). This result is different than research by (Rachman, 2011). Rice farming in MT I (rainy season) incurred more tradeable input costs to purchase chemical fertilizers and pesticides due to pests and diseases that attack. In addition, the lack of awareness of farmers on the implementation of integrated pest management made farmers use more pesticides to eradicate pests and diseases.

The largest costs of farmers on rice farming in Purbalingga Regency was land rental and labor costs, as much as 40% and 19% of the total farming cost respectively. The cost of land rental for farmers in Purbalingga Regency was IDR

5,876,308.46 per ha per season. This was due to the fact that many farmers did not own land so that they rented the land from the village treasury. Most farmers only had skills in rice farming, so they chose rice farming to supplement their income. The labor cost in MT I (rainy season) was IDR 2,838,848.94, while the labor cost in MT II (dry season) was IDR 2,867,896.09. Labor costs were mostly for land cultivation, transplanting and weeding of rice farming both in MT I (rainy season) and MT II (dry season). This was in line with result of Haryanto *et al.* (2018), that the largest cost in maize farming was on labor especially for land cultivation and weeding. This was because most farmers in Purbalingga Regency were old so they choose to look for labor for their farming. Labor costs for rice farming in Thailand in 2013 was USD 161 or IDR 1,684,221, while labor cost in Vietnam was USD 205 or IDR 2,144,505. Labor use in Thailand and Vietnam were low due to mechanization and the practice of direct seeding, requiring a minimal amount of labor than transplanting (Bordey, et al., 2016).

The rice farming in both MT I (rainy season) and MT II (dry season) were profitable both privately and socially. This is consistent with previous research (Rachman, 2011; Bowo et al., 2016; Suhardedi et al., 2017) where the value of private profits is higher than social profits. According to Rachman (2011), the difference in profit rate was caused by changes in seasons. Other research from Ugochukwu & Ezedinma (2011) stated that high financial incentives for rice production indicate that farmers easily adopt new technologies which are shown in increasing farm output and income. According to Suhardedi *et al.* (2017), the value of private profit that was higher than social profit shows the influence of government policies on rice farming, especially subsidy policies that hinder the efficient allocation of resources thereby creating divergences.

The competitiveness of rice farming was revealed based on competitive advantages and comparative advantages. Competitive advantage is known based on the value of Private Cost Ratio (PCR) while comparative advantage is known from the value of the Domestic Resource Cost Ratio (DRCR), as shows in Table 3.

Based on Table 3, the value of Private Cost Ratio (PCR) in MT I (rainy season) and MT II (dry season) was less than one, which indicates that rice farming in Purbalingga Regency has a competitive advantage. The value of Private Cost Ratio (PCR) where in MT I (rainy season) of 0.66 while in MT II (dry season) of 0.65 indicates that to gain one unit of value added output at the private price it is necessary to sacrifice the cost of domestic input at a private

Table 3. Indicators of Rice Farming Competitiveness in Purbalingga Regency per Season

Description	MT 1	MT 2
Private Cost Ratio (PCR)	0.66	0.65
Domestic Resource Cost Ratio (DRCR)	0.97	0.88

Source: Primary Data Analysis, 2019

price of 0.66 units in MT I (rainy season) and of 0.65 units in MT II (dry season). According to Emelda *et al.* (2014), the lower the value of PCR, the higher the competitive advantage of the commodity.

On the other hand, the value of the Domestic Resource Cost Ratio (DRCR) in MT I (rainy season) and MT II (dry season) was less than one so that the farm has a comparative advantage. Table 3 shows the value of the Domestic Resource Cost Ratio (DRCR) in MT I (rainy season) of 0.97 and in MT II (dry season) of 0.88, which means to produce one unit of output at the social price, it is necessary to sacrifice the cost of domestic input at a social price of 0.97 units in MT I (rainy season) and 0f 0.88 units in MT II (dry season). Based on these indicators, rice farming has competitiveness in both season. According to Rachman (2011), technical factors of farming, price, exchange rate, control of farm land to the labor wage system affect the competitiveness of rice farming. In addition, previous research by (Ugochukwu & Ezedinma, 2011; Ogbe et al., 2011; Kikuchi et al., 2016), said that rice farming has more competitiveness if it is planted on irrigated land.

The Impact of Government Policies on Rice Farming in Purbalingga Regency

The government set various policies to improve rice production. The stipulated policy includes policies for input and output of rice farming. The impact of policies regarding inputs can be identified through indicators of output transfer values and nominal protection on output (NPCO). The impact of input policies is seen from the indicators of input transfer values, nominal protection on inputs (NPCI) and transfer factors, and the impact of input-output policies is seen based on indicators of net transfer value, effective protection coefficient (EPC), and subsidy ratio to producer (SRP).

The value of output transfer based on Table 4 shows a positive value (I> 0), in MT I (rainy season) was IDR 5,562,408.13 and in MT II (dry season) it was IDR 4,818,193.27. The Nominal Protection Coefficient on Output (NPCO) value in both seasons also shows a positive value (NPCO> 1). In MT I (rainy season) and MT II (dry season) were 1.37 and 1.28 respectively. Based on the value of output transfer and NPCO, indicating that the output of private

Table 4. Indicators of Impact of Farming Input, Output, and Input-Output Policies of Rice Farming in Purbalingga Regency

Description	MT 1	MT 2
Output Policies		
Output Transfer (I)	5,562,408.13	4,818,193.37
Nominal Protection Coefficient on Output (NPCO)	1.37	1.28
Input Policies		
Input Transfer (J)	- 450,554.84	- 637,189.77
Nominal Protection Coefficient on Input (NPCI)	0.84	0.81
Factors Transfer (K)	223,927.25	460,323.35
Input-Output Policies		
Net Transfer (L)	5,789,035.72	4,995,059.79
Effective Protection Coefficient (EPC)	1.49	1.40
Subsidy Ratio to Producer (SRP)	0.38	0.29

Source: Primary Data Analysis, 2019

prices of the two seasons is higher than the social price, so the government protected output prices, especially paddy grains because farmers prefered to sell rice farming output in the form of paddy grains because of limited resources owned by farmers to process grains into rice.

The protection was provided by the government to the output of rice farming through Presidential Instruction No 5 of 2015 concerning Grain/Rice Procurement and Rice Distribution Policy by the Government (Hermanto, 2017). Other policy is relating to rice import tariffs are based on Minister of Trade Regulation No 01 of 2018 concerning Provisions on Rice Exports and Imports and Minister of Finance Regulation No. 6/PMK.010/2017. This regulation concerns with Establishment of Goods Classification System and Imposition of Import Duty Tariffs on Imported Goods, which explains the tariff that needs to be paid for imported goods such as rice with an import duty of IDR 450.00/kg. This shows that the policies implemented by the government have a positive impact on the producers by increasing their revenue.

The impact of input policies on rice farming (Table 4) is apparent from negative input transfer values (IT≤0), such as in MT I (rainy season) it is IDR -450,554.84 and in MT II (dry season) it is IDR -637,189.77. Other indicators of input policy are seen based on the Nominal Protection Coefficient on Input (NPCI) value. In MT I (rainy season) and MT II (dry season), the value of NPCI was <1. This result is in line with the research by (Ugochukwu & Ezedinma, 2011; Ogbe et al., 2011; Bowo et al., 2016). The NPCI value on MT I (rainy season) was 0.84, while on MT II (dry season) was 0.81. Based on the value of input transfer and NPCI indicators, it is known that the government has implemented protection policy against tradeable inputs such as chemical fertilizer subsidies, that listed in the Regulation of the Minister of Agriculture No. 47/Permentan/SR.310/12/2017 concerning the allocation and highest retail price of subsidized fertilizer. Due to the subsidy, farmers only paid input at a lower price than they should. Another input policy indicator is transfer factor. The factor transfer value in both seasons shows a positive value (K>0), indicating that the price of non-tradeable inputs at private prices was higher than non-tradeable inputs on social prices. The factor transfer value for MT I (rainy season) was IDR 223,927.25 and for MT II (dry season) was IDR 460,323.35. It shows that there is an implicit tax where farmers must pay higher for non-tradeable inputs than social prices, especially tax for land.

Input-output policy is a combined analysis of input policies and output policies from the government on farm inputs and outputs, which can be seen in Table 4. The first indicator is indicated by the net transfer value in both seasons, which shows the value of > 0. In this case, the net transfer value in MT I (rainy season) was IDR5,789,035.72, while in MT II (dry season) was IDR4,995,059.79. The net transfer value in both seasons shows additional producer surplus caused by government policies applied to the input and output of rice farming, so the government implemented protection policies.

Another input-output policy is the Effective Protection Coefficient (EPC) which is an indicator that shows the extent of government policy in protecting or hampering domestic production. The EPC values in MT I (rainy season) was 1.49 while in MT II (dry season) was 1.40. The coefficient value of EPC > 1 indicates that government policies both on output and farm inputs have protected domestic producers. The next indicator is the subsidy ratio to producers (SRP), which is a ratio that measures the entire transfer impact. In MT I (rainy season), the SRP value was 0.38 and in MT II (dry season), it was 0.29, indicating that the applicable government policy causes farming costs paid by producers lower than the opportunity cost to produce the output so that farmers benefit from this simultaneous input-output policy. Based on these indicators, the impact of government policies, in general, both on inputs and outputs has benefited farmers. These are in line with result to Bowo *et al.* (2016), that rice farming already protected trough policy intervention in both season.

CONCLUSION AND SUGGESTION

Rice farming in Purbalingga Regency had competitiveness because it had competitive and comparative advantages both in MT I (rainy season) and MT II (dry season). This can be seen from the value of PCR and DRCR that were less than one. Government policies related to input, output and input-output policy of rice farming were high, as seen from several indicators of the impact of government policies on rice farming. This shows that government has applied protective policy on rice farming inputs and outputs.

Based on this research, it is suggested that to protect rice farming competitiveness such as determining import tariffs on rice, determining basic price of rice output, also subsidizing rice farming inputs such as chemical fertilizers because it makes a lower cost of production for rice farming. Efforts to increase technical competitiveness are include the efficiency of agricultural cultivation technologies such as subsidy to the addition and improvement of irrigation networks and subsidy on the purchase of modern inputs (agricultural machinery) to increase the productivity of rice farming in Purbalingga. It is the same as the protection based on (Bordey, *et al.* (2016), in Philippine that still protect their food crops especially rice.

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