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COMPETITIVENESS OF MEDICINAL PLANTS TURMERIC FARMING AT MLOKOMANIS KULON VILLAGE, NGADIROJO SUBDISTRICT, WONOGIRI REGENCY

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ABSTRACT

Turmeric is one of the medical plants which highly competitive and incessantly tradedin international market. Indonesia also plants a lot of turmeric, one of them located at Mlokomanis Kulon Village, Ngadirojo Sub-District, Wonogiri District. This study aims to (1)calculate the comparative and competitive advantages of turmeric farming at Mlokomanis Kulon Village, (2) analyze the effect of government policy towards turmeric farming at Mlokomanis Kulon Village, (3) and identify the affecting factors of turmeric farming's comparative and competitive advantages. The study was conducted in Mlokomanis VIllave, Ngadirojo Sub-District, Wonogiri District with a sampleof 30 turmeric farmers who sold their harvest. Analysis method used in this study is R/C ratio, Policy Analysis Matrix (PAM), and analysis of multiple linear regression. Results of this study shows that (1) turmeric farming at Mlokomanis Kulon Village has comparativeadvantage and competitive advantage, (2) Fresh turmeric incurred losses by practice of government policy but powdered turmeric gain advantage by practice of government policy, (3) comparative advantage of turmeric farming is affected by farmer's age, education, and production of powdered turmeric while (4) affecting factors of turmeric farming's competitive advantage are output transfer and product diversification.

Keywords: *medical plant, turmeric, competitiveness, Policy Analysis Matrix, comparative advantage, competitive advantage*

INTRODUCTION

Turmeric which has the highest competitiveness comes from India, followed by Myanmar, then Indonesia, the Netherlands and the UK. Based on data from the United Nation (UN) Comtrade (2018), the total export revenue from Indonesian turmeric in 2017 was in third place after India and Myanmar, which was US $ 11 million, compared to India with total revenues reaching more than US $ 180 million and unable to compete with Myanmar by a difference of US $ 2 million from Indonesia.

Indonesia is one of the countries competing in the spice trade, one of which is turmeric. Turmeric production in Indonesia ranks 3rd after ginger and galangal based on data from 2013-2017 (BPS, 2018). Turmeric production in Indonesia trend to increase from year to year. Turmeric production in 2013 was 120,726,111 kg, while in 2017, turmeric production increased to 128,338,949 kg.

Central Java, one of the three largest turmeric producing provinces in Indonesia besides East Java and Bengkulu. The center for turmeric production in Central Java is Wonogiri. Turmeric is able to thrive in Wonogiri because it is supported by adequate geographical conditions for the growth of turmeric. Based on data on the production and harvest area of turmeric by the Agriculture Office of Wonogiri Regency in 2016, the production of turmeric reached 15,769,328 kg with a harvest area of 5,044,985 m^2.

As one of the centers for turmeric production in Central Java, certainly turmeric from Wonogiri has competitors outside the region, including Bondowoso Regency which has been aggressively producing turmeric for local herbal medicine producers and exporting to international markets, one of which is going to India. Turmeric is a medicinal plant commodity that has high potential in Wonogiri, however in fact farmers are still more dominant in planting corn and cassava than turmeric. Turmeric cultivation is only used as a side business, while people like to grow cassava because it is easy to cultivate it is also considered more profitable because of the ease of marketing. This causes the potential competitiveness of turmeric to be hidden.

The ability of a country trade can be measured through its competitiveness. Competitiveness is a condition country able to

produce goods and services according to international standards and is able to expand market reach in conditions of free and fair trade (OECD, 2012 cit. Collignon and Esposito, 2014). Competitiveness is the main benchmark for each company in formulating strategies based on profitability to improve performance in trading.

The concept of competitiveness according to Huggins et al. (2013) is divided into two references, namely in terms of input and output. Competitiveness which refers to input will consider cost factors (labor, capital, resources) and productivity more, while in terms of output consider many things that vary, including Gross Domestic Product (GDP), social impact, income, and even ecology.

Competitiveness can be obtained from comparative advantage and competitive advantage. Based on research by Shumacher (2012) regarding the theory of absolute advantage by Adam Smith, comparative advantage is obtained from labor. The division of labor leads to increased output, development technology, and increased productivity. Meanwhile, Porter (2008) explains that competitive advantage is the core of company performance because it is directly related to price variations, product differentiation and benefits compared to other products. Competitive advantage is determined by three aspects, namely price, product differentiation, and business focus. The price aspect relates to minimizing production costs, the product differentiation aspect is the sale of other forms of product and the business focus aspect involves specialization of the business.

Policies are provisions that apply repeatedly consistent and are implemented by policy makers or implementers (Jones, 1984 cit. Parjiono, et al., 2018). Government policy aims to achieve a target set collectively at a certain stage. The impact of government policies on each farm is different, because it has different interests. Therefore, it is necessary to evaluate the impact of government policies on a farm. Evaluation of government policies can use the Policy Analysis Matrix (PAM).

According to Monke and Pearson (1989) PAM aims to identify two things, first is profitability based on the difference between profit and cost at private and social prices, while the second is the effect of deviations due to policy distortion and market failure, as the difference between the two parameters and the parameters that should be exists when the deviation is eliminated. According to Morrison and Balcombe (2002), the PAM indicator has weaknesses so that it needs accuracy to be interpreted. These weaknesses are: (1) the PAM method is still partial and static; and (2) ignore the feedback (feedback) and multiplier effects.

METHOD

The method used in this research is descriptive statistical analysis. Descriptive statistical analysis method is used to describe a set of raw data into mature data that is easily understood in a more concise form in tabular form.

The selection of research locations is based on the research objectives to be achieved. Wonogiri Regency has the largest turmeric production area in Central Java. Ngadirojo Subdistrict was chosen as the research location because it has suitable geographic conditions for planting turmeric and the largest area of turmeric production in Wonogiri Regency.

The study population was turmeric farms in Ngadirojo District, Wonogiri Regency. Sampling was done by purposive sampling method with the selection of members of the population based on certain criteria.

Farming Feasibility

Farming feasibility analysis is carried out to determine whether the commodity planted by farmers is feasible or not. According to Soekartawi (1995) cit Maulidah (2012) the feasibility of farming can be seen from the R / C ratio, namely the ratio of revenue to costs. The R / C ratio can be formulated as follows:

$$\frac{\mathrm{R}}{\mathrm{C}} = P_{Q\,.}\, Q \;/\; (TFC + TVC)$$

Where:
R = reception
C = cost
PQ = output price
Q = output
TFC = total fixed costs
TVC = total variable costs

With three criteria, namely:
R / C> 1 : The farming is feasible or profitable.
R / C = 1 : The farm is at the Break Event Point (BEP).
R / C <1 : Farmingnot worth the effort or harm

Analysis of Competitiveness and Impact of Government Policies

The effectiveness of the implementation of government policies on a commodity can be measured by the Policy Analysis Matrix (PAM). PAM is an instrument for evaluating government policies based on the benefits and costs of farmers and demonstrating the effects based on prices and policies (Pearson et al., 2004). PAM is used not only to analyze the impact of government policies but to determine comparative and competitive advantages. The stages of preparing the PAM table are as follows:

1. Identify all the inputs used in the turmeric farming production process.
2. Allocating tradable and non-tradable inputs.
3. Computes the shadow prices of inputs, outputs, and the exchange rate.
4. Analyze comparative and competitive advantages and the impact of policies with the PAM model.

The results of the PAM preparation are then recorded in a table form as follows:

Table 1. Policy Analysis Matrix (PAM)

Information	Reception (Rp)	Input Cost (Rp)		Advantage (Rp)
		Tradable	*Non-Tradable*	
Private Price	A	B	C	D
Social Pricing	E	F	G.	H
Policy Impact	I	J	K	L

Source: Monke and Pearson, 1989.

Where:
Comparative Advantage

a. *Private Profitability* (PP) = A - B - C
b. *Social Profitability* (SP) = E - F- G

Competitive advantage

a. *Private Cost Ratio* (PCR): C / (A - B)
b. *Domestic Cost Resource Ratio* (DRCR): G / (E - F)

Output Policy:

1. *Output Transfer* (OT): (I) = A - E
2. *Nominal Protection Coefficient on Output* (NPCO) = A / E

Input Policy:

1. *Input Transfer* (IT): (J) = B - F.
2. *Nominal Protection Coefficient on Input* (NPCI) = B / F
3. *Transfer Factor* (TF): (K) = C - G.

Input-Output Policy:

1. *Net Transfer* (NT): (L) = D - H
2. *Protection Coefficient* (PC) = D / H
3. *Effective Protection Coefficient* (EPC) = (AB) / (EF)
4. *Subsidy Ratio to Producer* (SRP) = L / E

Analysis of the Factors of Comparative and Competitive Advantage

Every comparative and competitive advantage there are always factors that can influence it. These factors can be analyzed using multiple linear regression analysis. The regression model of the analysis the factors comparative advantages are:

$$Y1 = \beta 0 + \beta 1X11 + \beta 2X12 + \beta 1X13 + D14 + \mu i$$

Where:
Y1 = Comparative Advantage (DRCR)
X11 = Age of the Farmer
X12 = Farmer's Experience
X13 = Farmer Education
D14 = Powdered Turmeric Dummy

Then the following is a model of multiple linear regression analysis of competitive advantage as follows:

$$LnY2 = \beta 0 + \beta 1X21 + \beta 2D22 + \beta 3D23 + \beta 4X24 + \beta 5X25 + \mu i$$

Where:
LnY2 = Competitive Advantage (PCR)
X14 = Land area
X21 = Output price
D22 = *Dummy*-Product differentiation
D23 = *Dummy*-Focus of effort
X24 = Land Tax
X25 = Output Transfer

RESULTS AND DISCUSSION

Farming Feasibility

Table 2. Farming Feasibility in Mlokomanis Kulon Village in 2018

Commodities	Reception (Rp / Ha)	Total cost (Rp / Ha)	R / C	Standard	Criteria
Fresh Turmeric	2,276,025.40	10,286,857.48	0.22		Not feasible
Turmeric Powder	25,260,000.00	21,551,395.71	1.17		Feasible
Rice	63,439,450.99	24,383,695.84	2.60		Feasible
Cassava	28,610,710.34	8,265,770.19	3.46	1.00	Feasible
Corn	30,686,640.78	9,738,624.60	3.15		Feasible
Peanuts	11,951,577.40	7,764,919.82	1.54		Feasible
Ginger	27,900,000.00	10,842,500.00	2.57		Feasible

Source: Primary Data Analysis, 2018

Table 2 shows that some of the farms are feasible and not feasible to operate. Farming with a proper predicate in Mlokomanis Kulon Village based on the feasibility analysis of farming is sebuk turmeric powder, rice, corn cassava, peanuts, and ginger. Each of them has farming feasibility value in order of 1.17; 2.60; 3.46; 3.15; 1.54; and 2.57. Cassava farming is the most feasible business compared to others, while fresh turmeric farming is not feasible to operate. The amount of costs incurred for production and the low selling price causes turmeric to be unfit for farming. The R / C value of cassava is 3.46, the farmers get 3.46 times the income they have spent.

Turmeric Farming Input-Output Structure

Table 3. Input-Output Structure for Turmeric Farming and per Hectare in Mlokomanis Kulon Village

Input / Output	Type	Fresh Turmeric		Turmeric Powder	
		Per Farm	Per Hectare	Per Farm	Per Hectare
Tradable	Urea Fertilizer (kg)	25.12	69.59		
	TSP fertilizer (kg)	5.38	14.90		
	KCl fertilizer (kg)	0.42	1.15		
	ZA fertilizer (kg)	0.01	0.03		
	Phonska Fertilizer (kg)	22.09	61.20		
	Pesticide Gramoxone (L)	0.002	0.01		
	Furadan Pesticides (kg)	0.09	0.25		
Non-Tradable	Fertilizer (kg)				
	Manure (kg)	1,274.72	3,531.09		
	Organic Fertilizer (kg)	0.58	1.62		
	Roundup Pesticide (L)	0.001	0.002		
	Biological Pesticides (L)	0.07	0.18		
	Labor (HKO)	3.25	9.01		
	Shrinkage of Tools				
	Hoe (Rp)	29,710.00	82,299.17		
	Sickle (Rp)	32,387.78	89,716.84		
	Gosrok (Rp)	11,655.56	32,286.86		
	Spray tool (Rp)	1,111.11	3,077.87		
	Crowbar (Rp)	133.33	369.34		
	Gatul (Rp)	162.22	449.37		
	Land Tax (Rp)	19,023.00	52,696.21		
	Machine Cost (Rp / kg)			5,000.00	272,727.27
Output	Fresh Turmeric (kg)	7,118	19,717.45		
	Turmeric powder (kg)			421	1,166.20

Source: Primary Data Analysis, 2018

The results showed the largest use of input was obtained from non-tradable input in the form of manure, amounting to 1,274.72 kg. Manure is popularly used because of the stigma of society using more natural ingredients. The use of urea and phonska fertilizers is only to balance plant nutrition. The output of turmeric farming is divided into two, namely fresh and powdered turmeric. Powder turmeric is turmeric that is sold immediately after harvest in fresh condition and powdered turmeric is turmeric that has been further processed. Fresh turmeric production in Mlokomanis Kulon Village was 19,717.45 kg / ha and powdered turmeric production was 1,166.20 kg / ha.

Analysis of Competitiveness and Impact of Government Policies

Table 4. Policy Analysis Matrix (PAM) of Turmeric Farming in Mlokomanis Kulon Village in 2018

Information	Revenue (Rp)	Cost Input (Rp)		Profit (Rp)
		Tradable	*Non-Tradable*	
Fresh Turmeric				
Private Price	2,198,798.70	726,516.22	2,128,465.76	(656,183.28)
Social Pricing	8,858,714.46	1,705,884.62	2,091,037.79	5,061,792.05

Impact of Government Policy	(6,659,915.77)	(979,368.40)	37,427.97	(5,717,975.34)
Turmeric Powder				
Private Price	25,260,000.00	5,342,878,788	1,7274,632.03	2,642,489.18
Social Pricing	14,123,472.48	9,086,700,326	1,6901,447.62	(11,864,675.46)
Impact of Government Policy	11,136,527.52	(3,743,821,538)	373,184.42	14,507,164.64

Source: Primary Data Analysis, 2018

The private profit of fresh turmeric farming is -Rp656,183.28 while the profit social amounting to Rp5,061,792.05. This shows that turmeric farming is not profitable in terms of private prices but profitable based on social prices. It is known that based on the impact of the fresh turmeric farming policy the negative value is -Rp5,717,975.34. The negative value indicates that fresh turmeric farming is less profitable if the policy is implemented. Powdered turmeric actually has different results in terms of private profits, namely Rp2,642,489.18; social benefits of -Rp11,864,675.46; and the difference is IDR 14,507,164.64. Powdered turmeric is profitable in terms of private prices but not in terms of social prices, therefore it can be concluded that powdered turmeric benefits if government policies are applied.

Table 5. Competitiveness Value of PAM Indicators

Indicator	Fresh Turmeric	Turmeric Powder
SP	5,061,792.05	(11,864,675.46)
PP	(656,183.28)	2,642,489.18
DRCR	0.292	3,356
PCR	1,446	0.867
OT	(6,659,915.77)	11,136,527.52
NPCO	0.248	1,789
IT	(979,368.40)	(3,743,821,538)
NPCI	0.426	0.588
TF	37,427.97	373,184.42
EPC	0.206	3,954
NT	(5,717,975.34)	14,507,164.64
PC	(0.130)	(0.223)
SRP	(0.645)	1,027

Source: Primary Data Analysis, 2018

Based on Table 5, it is known that the SP value of fresh turmeric is IDR 5,061,792.05; powdered turmeric is Rp. 11,864,675.46 and the DRCR value of fresh turmeric is 0.292; Powdered turmeric was 3.356. Based on the SP indicator, fresh turmeric farming was considered to be comparatively superior, but powdered turmeric was not comparatively superior. The DRCR value of fresh turmeric farming is smaller than one (DRCR <1) but reversed with the DRCR value of powdered turmeric (DRCR> 1). This indicates that market distortion due to government policies is beneficial for fresh turmeric farming but has a negative impact on powdered turmeric farming.

The PP value shows more than one (PP> 1), therfore turmeric powder farming is feasible to operate when there is an influence of market distortion due to government policies. The PCR value of powder turmeric farming is also less than one (PCR <1), so it can be concluded that the turmeric powder farming activities have a competitive advantage. The PCR value of 0.016 means that to produce one unit of added value at the private price, 0.867 units of domestic resources are needed, or it can be said that to produce one output of farmers can save additional domestic input costs with a private price of 0.133 units.

The impact of government policies in terms of output is seen from the OT and NPCO indicators. that the OT for fresh turmeric farming was negative, namely -Rp6,659,915.77; turmeric powder, amounting to Rp. 11,136,527.52; while the NPCO for fresh turmeric farming is worth 0.248; while turmeric powder was 1.789. Judging from the OT indicator, it can be concluded that the government does not implement a protection policy for fresh turmeric farmers therefore the price received by farmers is lower than the international price and vice versa in powdered turmeric there is a distortion in the form of government protection against the output price. The NPCO value of less than one indicates that 75.20% of the profits from fresh turmeric farming that should be obtained by the farmers are in the

side of consumers.

The impact of government policies is viewed from the input side based on IT and NPCI indicators for tradable inputs and TF for non-tradable inputs. It is known that the input transfer value of fresh turmeric is smaller than one, namely - Rp. 979,368.40 and turmeric powder of - Rp. 3,743,821,538, as well as the NPCI value of fresh turmeric which is 0.426 and the NPCI of turmeric powder is 0.588. The IT value is smaller than one, meaning that there is a market distortion due to government influence on turmeric farming inputs. The implementation of government policies can be in the form of input subsidies or restrictions on the import of farm inputs.

Table 5 shows that there is more than one TF of fresh and powdered turmeric farming (TF> 1). From these results it can be concluded that the input costs incurred by farmers are greater than in general due to the effect of the subsidy policy on inputs. One form of government influence on non-tradable inputs is the application of the Minimum Wage for Work (UMK). Furthermore, the impact of government policies is seen simultaneously between input and output. The EPC value of fresh turmeric farming in Mlokomanis Kulon Village is less than one, which means that government policy causes it drop the benefits for fresh turmeric farmers and increase the benefits of turmeric powder when distorted market from government influence.

The NT value of fresh turmeric shows is no surplus for producers, because the government does not implement an input and output policy system for fresh turmeric farming. The absence of a surplus in producers means that there is no increase in income for fresh turmeric farmers. The decrease in the income of turmeric farmers was caused by the income of farmers at private prices which were smaller than the social prices so that the farmers lost money because they lost income amounting to IDR 5,717,975.34 but for powdered turmeric farmers it was able to increase their income to IDR 14,507,164.64.

The PC value on turmeric farming in Mlokomanis Kulon village has a value of less than one, which is 0.130 for fresh turmeric and 0.223 for powdered turmeric. From the PC results, it can be concluded that fresh turmeric farmers get 87% profit than the profit that should be obtained at social prices, as well as 78.7% of the turmeric powder farming income that can be obtained compared to income at social prices. Therefore government policies have a bad impact on the income of turmeric farmers.

SRP value of farmingFresh turmeric in Mlokomanis Kulon Village has a value of less than one as well, namely 0.645 but the SRP value of powdered turmeric is 1.027, greater than one. Based on the results of EPC analysis, it is known that the profit from fresh turmeric farming is smaller based on social prices because the production costs of fresh turmeric incurred by farmers are greater than normal costs. The government policy resulted in a lower price of fresh turmeric in the market along with the increase in supply.

Analysis of the Factors of Comparative Advantage

Table 6. Factors Affecting the Comparative Advantage (DRCR) of Turmeric in Mlokomanis Kulon Village in 2018

Variable	Hope Sign	Coefficient	t-Statistics	Probability
Constant	+	2,8629	1.3326	0.1952
Age of Farmers	-	-0.0598 *	-1,9843	0.0588
Experience	-	0.0196	0.8757	0.3899
Education	-	-0.1976 **	-2,0992	0.0465
Land area	-	0.0438.10-3	0.5217	0.6067
Dummy (Turmeric Powder)	-	1.6325 *	1,8581	0.0755
Adjusted-R2				0.1999
F-stat				2.4495
Prob (F-stat)				0.0626

Source: Primary Data Analysis, 2018

Farmer age has a significant effect on comparative advantage. This is indicated by the t-test probability value of 0.0588, which is greater than alpha 1% and 5%, but smaller than alpha 10%, so that the age of the farmer has a significant effect on the 90% confidence level. The relationship between the age of the farmer and the comparative advantage will reduce the DRCR value so that there will be an increase in the comparative advantage, meaning that every 1 year addition of the farmer's age will increase the comparative advantage by 0.0598. Most of the farmers in Mlokomanis Kulon Village are in their productive age, namely 15 to 64 years.

Farmer education has a significant influence on the comparative advantage of Mlokomanis Kulon village turmeric farming. This is evidenced by the t test probability value of 0.0465 is smaller than alpha 5%; and 10% so that it has a significant effect. Generally, turmeric farmers in Mlokomanis Kulon village only reach the elementary and junior high school strata, but there are also farmers who have high school education to university level. This shows that improving education is important to increase the comparative competitiveness of turmeric farming.

Powder turmeric is a dummy variable to determine the comparative advantage of turmeric farming if the fresh turmeric is processed into powdered turmeric. The probability value of this variable is 0.0755 which is significant at alpha 10%. This shows that the processing of fresh turmeric into turmeric powder can reduce its comparative advantage. The addition of powdered turmeric product can reduce the comparative advantage by 1.6325. The DRCR value of powdered turmeric is greater than one, so it is known that there is an inefficient use of non-tradable social inputs in the development of comparative competitiveness.

Output transfer in the competitive advantage analysis has a significant effect on alpha 1%; 5%; and 10%. This shows that the output transfer will reduce the competitive advantage by 4.72% for each additional transfer output of one million Rupiah. The higher the output value, the lower the competitive advantage. The low competitive advantage is due to the fact that pricing on the domestic market is still influenced by collectors. Derivative products have a significant effect on turmeric farming in Mlokomanis Kulon village but have a negative effect. The t test results show the probability number of 0.0096 is smaller than alpha 1%; 5%; and 10%. Each addition of one derivative product will increase the competitive advantage by 2.5243%. This is because the selling price of turmeric derivative products in the form of powder is much higher than fresh turmeric. The price of powdered turmeric at the research location is IDR 33,000 / kg while the price of fresh turmeric is only around IDR 1,500 / kg. On the other hand, the price of fresh turmeric in the market generally has a price of IDR 2,000 / kg to IDR 2,700 / kg. Farmers are not interested in further processing their turmeric products and the turmeric harvest is sold directly in fresh conditions.

Table 7. Factors Affecting the Competitive Advantage (PCR) of Turmeric in Mlokomanis Kulon Village in 2018

Variable	Sign Hope	Coefficient	t-Statistics	Probability
Constant	+	3,8216	1.0209	0.3208
Output Prices	-	0.0008	0.8014	0.4334
Land Tax	-	-0.0004.10-3	-0.4194	0.6799
Output Transfer (OT)	-	0.0472.10-3 ***	2.8808	0.0099
Dummy (Derivative Product)	-	-2.5243 ***	-2.8961	0.0096
Dummy (Business Focus)	-	-0.3571	-0.5423	0.5943
Adjusted-R2				0.2774
F-stat				2,7666
Prob (F-stat)				0.0503

Source: Primary Data Analysis, 2018

CONCLUSION

1. Turmeric Farming in the Mlokomanis Kulon Village has a comparative advantage.
2. Turmeric Farming in the Mlokomanis Kulon Village has a competitive advantage.
3. The government is protective of input prices but is protective of output, especially fresh turmeric so that input prices are cheaper but output prices are less competitive.
4. The existence of a derivative product negatively affects the competitive advantage of turmeric, on the other hand an increase in transfer output reduces the competitive advantage of turmeric.
5. Farmers' education and age can increase comparative advantage.

SUGGESTION

1. Prepare farmers of productive age and the efficient use of domestic inputs as an increase in the comparative advantage of turmeric.
2. Increased competitive advantage through derivative products in the form of turmeric powder, herbal medicine, and dried sweets.

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