



Competitiveness of strategic food commodities in Lampung Province, Indonesia

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ARTICLE INFO

Article history:

Received 28 July 19

Received in revs. form 12 August 19

Accepted 18 August 19

Keywords:

Lampung

Competitiveness

Strategic food commodities

JEL Classification:

F31

O10

ABSTRACT

Food commodities play an important role in income increase of people, job opportunities, and regional and national development. Competitiveness of food commodities needs for community welfare increase and national food security and sovereignty. The aims of this research were: (1) to analysis of competitiveness of strategic food commodities in Lampung Province, (2) to analyze the impact of changes of input and output prices against of strategic food commodities in Lampung Province, and (3) to know the policy of suitable minimum prices of strategic food commodities in Lampung Province. This research conducted in Lampung Province from September 2013 to September 2014. The regencies as a sample selected by purposive sampling were Middle Lampung, North Lampung, South Lampung, and East Lampung. The determination of the farmers used stratified simple random sampling. The sample in this study was 120 respondents. The results showed that the farming of strategic food commodities (paddy and corn) had PCR and DCR value less than one point. Strategic food commodities had lesser value due to an increase in fertilizer price and a decline in output prices. The competitiveness of strategic food commodities in Lampung Province was sensitive to output prices decrease. The policy of the minimum price of paddy at least two times greater than the price of corn.

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Introduction

Agricultural development intends to achieve competitive and sustainable industrial agriculture based on local resources, to expand food security and nutrition, to improve food diversification, to increase value, competitiveness, and export, as well as to increase welfare and income. To achieve those goals, Ministry of Agriculture has set prime target, i.e.: achieve rice self and sustainable sufficiency in production, improvement food diversification, increase added value and export, and improvement of farmers welfare (KementerianPertanian, 2009).

Although Lampung Province is the center of rice and corn production, some areas in the region still experiencing problems that could affect the availability of food. Farm land for food commodities has decreased in some areas. The decrease is due to land conversion, from food commodities into plantation crops such as rubber, oil palm and cocoa, which is done by farmers. In this paper, data were obtained from the Department of Agriculture and Horticulture (PTPH) Lampung, agricultural land conversion has reached 38.31 percent of total the land area of 447 thousand hectares (ha). The decreased of farm land affect the production of important agricultural commodities in Lampung, namely rice and maize. In addition, the attacks of various diseases caused the decrease of quality and quantity of crops resulting in low prices. Low selling prices and high production costs caused low profits.

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Peer review under responsibility of Bussecon International Academy.

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<https://doi.org/10.20525/ijrbs.v8i5.477>

This study aims to: (i) analyze the competitiveness of strategic food commodities in Lampung Province, (ii) analyze the impact of changes in input and output prices on the competitiveness of strategic food commodities in Lampung Province, and (iii) determine minimum pricing policy that is suitable for strategic food commodities in Lampung Province.

Research and Methodology

The importance of the agricultural sector to the national economic can be seen, one of which, from the amount of Indonesia's gross domestic income derived from agriculture sector, which is known as second-biggest sector after food processing sector. The contribution of agricultural sector on gross domestic income tend to be decreased from 15.28 % at the end of 2010 to 14.44% at the end of 2012. Food commodity becomes a prime sub-sector that is very important. Food commodity is very crucial and potential because food commodity is necessary for human life. There are several main food commodities, i.e. rice and corn. Rice is Indonesia main staple food, while corn is important for feed industry in addition to staple food. Production target of food crops in Indonesia in 2010-2014 is shown in Table 1.

Table 1: Production target of food crops in Indonesia in 2010-2014

No	Commodities	Year				
		2010	2011	2012	2013	2014
(000 ton)						
1	Rice	66.680	68.800	71.000	73.300	75.700
2	Corn	19.800	22.000	24.000	26.000	29.000
3	Soy Bean	1.300	1.560	1.900	2.250	2.700
4	Cassava	22.248	22.400	25.000	26.300	27.600
5	Sweet potato	2.000	2.150	2.300	2.450	2.600

Source : Agriculture Ministry, 2009

Lampung Province is one of the centers of production of rice and corn in Indonesia. Lampung Province is seventh largest rice production center and third largest corn production center in Indonesia. As food production center in Indonesia, Lampung province should be able to increase production and productivity of farming, in order to contribute to the fulfillment of target production of rice and maize that is established by national government, to meet the needs in local and national markets (Zakaria, 2000). Increased competitiveness needs to be placed on the conception of the increase in welfare which is measured from the increased of farm productivity. Increased productivity can be done by allocating factors of production efficiently to produce maximum production or to reduce production costs. In addition, the government has also established a variety of policy to help farmers to increase productivity as well as comparative and competitive advantages of farming, such as input subsidies and regional minimum price (Suryana, 1980; Sambodo, Ahmad, and Purwanto, 2007).

The research was conducted in Lampung Province. Research location was determined purposively based on survey result. Based on the survey, four regency was determined as the center of important food commodities in Lampung Province, namely, Central Lampung, North Lampung, SouthLampung and East Lampung. Sampling method was stratified random sampling assuming homogeneous groups' population. Research method was survey method. The data used in this study were primary data and secondary data. The primary data obtained through direct interviews with farmer households respondents. Secondary data were obtained from the department or agency related to the study and previous reports. Competitiveness analysis performed using Policy Analysis Matrix (PAM). PAM is used to calculate the revenues, expenses, and profits in private and social rates, as shown in Table 2.

Table 2: Policy Analysis Matrix (PAM)

No	Description	Revenue	Cost		Profit
			Input Tradeable	Input Nontradeable	
1	Private Price	A	B	C	D
2	Social Price	E	F	G	H
3	Policy Impact	I	J	K	L

Source: Pearson, et.al.,2005

Description:

Financial Profit	(D)	= A-(B+C)
Economic Profit	(H)	= E-(F+G)
Transfer <i>Output</i> (OT)	(I)	= A-E
Transfer <i>InputTradeable</i> (IT)	(J)	= B-F
Transfer <i>InputNontradeable</i> (FT)	(K)	= C-G
Net Transfer (NT)	(L)	= I-(K+J)
Private Cost Ratio (PCR)		= C/(A-B)
Domestic Resources Cost Ratio (DRC)		= G/(E-F)
Nominal Protection Coefficient of Output (NPCO)		= A/E
Nominal Protection Coefficient of Input(NPCI)		= B/F
Efective Protection Coefficient (EPC)		= (A-B)/(E-F)
Profit Coefficient (PC)		= D/H
Subsidi Ratio to Produsen (SRP)		= L/E

Table 3: Determination of tradable and nontradable input

<i>Tradable</i>	<i>Nontradable</i>
Urea Fertilazer	Manure
SP-36 Fertilazer	Seeds
Phonska Fertilazer	Kompos Fertilizer
KCl Fertilizer	Petroganik Fertilizer
Pesticide	Karbio Fertilizer
	Dolomit
	KNO3 Fertilizer
	Micro Fertilizer
	Labour
	Land Tax
	Equipment
	Land
	Corncob
	Irrigation cost
	Transport cost

Source: Authors

The assumption of Rupiah exchange rate was Rp 9,830.26 / US \$ and the shadow exchange rate was Rp 9,826.24 / US \$. Input was divided into two, namely tradable inputs and non-tradable inputs, details explanation in Table 3. The social price of rice, corn, urea, SP-36, Phonska and KCl was predicted by price Free On Board (FOB) and the price of Cost, Insurance and Freight (CIF). The social price of pesticides was 80% of its private price, because the pesticides prices prevailing in the market considered include 20% import tax of (Oemar and Mulyana, 2006). The social price of labor is calculated at 80% of its private prices because farmers' labor is considered to have lower productivity (Suryana, 1980). The social price of manure, seeds, compost fertilizer, petroganik, dolomite, karbiofertilizer, KNO3 fertilizer, micro fertilizers, equipment depreciation, land lease, corn cob, irrigation costs and transport costs similar with private prices, while the tax on social price considered zero because the tax is a form of government intervention that should not exist in a perfectly competitive market. Sensitivity analysis was used to determine the impact of changes in the components of revenues, expenses and profits in the farming of food commodities. Analyzer tools used to measure the sensitivity of PCR is the elasticity of PCR and the DRC, with the following formula:

$$PCR_{\text{Elasticity}} = \frac{\Delta PCR / PCR}{\Delta Xi / Xi}$$

$$DRC_{\text{elasticity}} = \frac{\Delta DRC / DRC}{\Delta X_i / X_i}$$

Where;

ΔPCR = Change of PCR value

ΔDRC = Change of DRC value

ΔX_i = Change of tested parameter

X_i = Tested parameter

Criteria, If :

PCR or DRC elasticity < 1 means inelastic

PCR or DRC elasticity \geq 1 means elastic

Result and Discussion

Competitiveness of strategic food commodities

Competitiveness of strategic food commodities can be measured by the PCR and the DRC value from the PAM matrix. PCR value indicates a competitive advantage while DRC value shows comparative advantage. PAM matrix of strategic food commodities can be seen in Table 4. Table 4 shows that private profit and social profit of food commodities farming in Lampung province is positive. This means that the strategic food commodities farming in Lampung Province is profitable both financially and economically. Furthermore, components of private revenues, expenses and profits is different from social revenue, cost and profit. The variation in the private and social revenue is due to different rates of output price between private and social. The cause of the variation is the the market structure for rice and corn which are generally oligopsonistic, this is in line with Zakaria (2000) and Zakaria, Lestari, and Indriani (2004).

Table 4: Policy Analysis Matrix of strategic food commodities farming (per hectare) in Lampung Province, 2016/2017

Components		Revenue	Tradable Input	Nontradable Input	Profit
		(Rp)	(Rp)	(Rp)	(Rp)
Rice					
MT I	Private price	19.719.956,40	1.451.683,31	13.515.012,41	4.753.260,68
	Social price	22.002.582,45	2.522.670,90	12.615.144,09	6.864.767,47
	Divergence	-2.282.626,06	-1.070.987,59	899.868,32	-2.111.506,79
MT II	Private price	17.195.853,88	1.413.559,20	12.769.228,56	3.013.066,12
	Social price	16.618.717,03	2.166.816,85	11.933.646,19	2.518.254,00
	Divergence	577.136,84	-753.257,64	835.582,37	494.812,12
Corn					
MT I	Private price	13.310.944,59	1.667.684,36	6.073.785,10	5.569.475,13
	Social price	16.490.429,65	2.816.087,69	5.588.892,04	8.085.449,91
	Divergence	-3.179.485,06	-1.148.403,33	484.893,05	-2.515.974,79
MT II	Private price	11.904.379,70	1.626.920,05	5.989.764,09	4.287.695,55
	Social price	12.729.789,57	2.467.413,77	5.511.405,22	4.750.970,57
	Divergence	-825.409,87	-840.493,72	478.358,87	-463.275,02

Source: Authors

The difference in private inputs cost of tradable and non-tradable caused by the policies set by the government for tradable inputs, such as fertilizer subsidies and pesticides import taxes, as well as the policy on non-tradable inputs such as the minimum wage policy. Market distortion and government policies affect the private and social profit of food commodities. Largest Private and social profit of food commodities per year is gained from corn farming, respectively Rp 9,857,170.68/ha and Rp 12,836,420.49/ha. Competitiveness indicators of strategic food commodities in Lampung is shown in Table 5.

Table 5: Indicators of competitiveness strategic food commodities in Lampung Province, 2016/2017

Ratio	Rice		Corn	
	MT I	MT II	MT I	MT II
<i>PCR</i>	0,74	0,81	0,52	0,58
<i>DRC</i>	0,65	0,83	0,41	0,54

Table 5 shows that the strategic food commodities which include rice and maize in Lampung Province have competitiveness both financially and economically, which is characterized by less than one PCR and DRC value. The smaller the value of PCR and the DRC, the higher competitiveness. This is in line with Zakaria, Lestari, and Indriani (2004), the production of rice in two cultivation systems, with irrigation and rainfed, has competitiveness both in the rainy season and dry season. This study is also in line with research of Abidin (2006).

Indicators of government policy can be determined based on the value of output Transfer (OT), Nominal Protection Coefficient of Output (NPCO), Input Transfer (IT), Nominal Protection Coefficient of Input (NPCI), Transfer Factor (FT), Net Transfer (NT), effective Protection Coefficient (EPC), Profitability Coefficient (PC) and Subsidy Ratio to Producers (SRP). Policy indicators for strategic food commodities can be seen in Table 6.

Table 6: Indicators of government policy on strategic food commodities farming in Lampung

Ratio	Rice		Corn	
	MT I	MT II	MT I	MT II
<i>OT</i>	-2.282.626,06	577.136,84	-3.179.485,06	-825.409,87
<i>NPCO</i>	0,90	1,03	0,81	0,94
<i>IT</i>	-1.070.987,59	-753.257,64	-1.148.403,33	-840.493,72
<i>TF</i>	899.868,32	835.582,37	484.893,05	478.358,87
<i>NPCI</i>	0,58	0,65	0,59	0,66
<i>NT</i>	-2.111.506,79	494.812,12	-2.515.974,79	-463.275,02
<i>PC</i>	0,69	1,20	0,69	0,90
<i>EPC</i>	0,94	1,09	0,85	1,00
<i>SRP</i>	-0,10	0,03	-0,15	-0,0364

Source: Authors

OT value is the difference between private revenue and social revenue, whereas NPCO is the ratio between private revenue and social revenue. OT value on rice farming (MT I) and corn are negative and NPCO value is less than one. It shows that revenue of farming that is received by farmers is lower than it expectation because private output price is lower than the social price. One of the reason is oligopsonistic market structure, where there are few buyers (contractors) with many sellers (farmers) so that farmers act as price takers. Different condition occurs in rice farming (MT II) where OT values are positive and NPCO is more than one. This condition happened because the average of rice FOB price at MT II is decrease and tends to be lower than the average price of rice in the area of research so that private revenue is higher than social revenue.

IT value represents the difference between private tradable inputs cost and social tradable input cost, while NPCI is the ratio between private tradable inputs cost with social cost. IT value on strategic food commodities farm is negative and NPCI is less than one, which means that farmers pay the cost of tradable inputs cheaper than it should be. This is due to subsidies policies which implemented by the government for Urea fertilizer, Phonska and SP-36, as well as import taxes for drugs. Transfer Factor (FT) is the difference between private non-tradable inputs cost with social costs. FT value on strategic food commodities is positive, which means that farmers pay non-tradable inputs cost higher than it should be. This is due to the policy of Average Minimum Wage (UMR). The policy aims to protect workers from low wage. This policy negatively affects strategic food commodities farming, due to the transfer of profits from farmers to non-tradable inputs manufacturers. Net transfer (NT) is the difference between private profits to social profits, while Profitability Coefficient (PC) is the ratio of private profits to social profit. Net transfers show the overall impact of government policy on farming systems of strategic food commodities. NT value on rice farming (MT I) and corn are negative with PC value of less than one. It means that the profit received by farmers is lower than expected, and the government's

policies, output as well as input policy, have not provide incentives to farmers yet. Different conditions occur in rice farming in MT II where the NT value is positive and PC is more than one, which means that the farmer gains higher profit than it should be. This is because on MT II, very few farmers who grow rice so that the price of private output price is higher than the social price. EPC is the ratio between the difference of private revenue and private tradable input costs and the difference of social revenue and private tradable input costs. EPC value in rice farming (MT I) and corn (MT I) are less than one. These conditions indicate that the distortion of the market and government policy towards the input and output still disprotected, existing policy should be able to protect farmers and encourage exports. EPC values in rice farming (MT II) and corn (MT II) are more than one, which means the overall policies of the government provide protection for farmers in production activity

SRP is the ratio between the divergence of the profit components with social revenue. SRP value on rice farming (MT I) and corn are negative, which means that any market distortions and government policy towards the input and output causing a decrease in profit of farmers, while the value of SRP on rice farming (MT II) is positive, which means that market distortions and government policies for the input and output causing an increase in farmer profits.

Sensitivity Analysis

Sensitivity analysis is used to determine the impact of revenues, cost and profit changes in competitiveness analysis. Two scenarios were used in the sensitivity analysis of strategic food commodities, namely the increase in the increase in fertilizer costs and a decrease in output prices.

The Increase of fertilizer cost

Sensitivity analysis of the increase in fertilizer price was done by rising the price of fertilizer to make PCR value equal to one, which means that the competitive advantage is at break-even point. The results of the sensitivity analysis of the increase of fertilizer price increases seen in Table 7.

Table 7: Sensitivity Analysis of the Increase in Fertilizer Price

Commodity	Season	Change (%)	Increased Fertilizer Price				PCR	DRC	El. PCR	El. DRC
			Urea Price (Rp)	Phonska Price	TSP/SP-36 Price	KCl Price				
Rice	MT I	417,3%	9.819,93	12.913,34	11.630,33	28.404,47	1,00	1,26	0,08	0,22
	MT II	273,5%	7.147,76	9.265,98	8.188,27	19.870,20	1,00	1,29	0,08	0,21
Corn	MT I	425%	10.333,45	13.984,09	12.661,25	29.100,00	1,00	1,90	0,21	0,86
	MT II	336%	8.581,68	11.610,52	10.460,21	24.166,86	1,00	1,88	0,21	0,74

Source: Authors

Fertilizer is a very important input component for farmers. Therefore, the government set the fertilizer subsidy policy so the price becomes cheaper and can be reached by all the farmers. Based on the sensitivity analysis, the increase in the price of fertilizer in rice farming are 417.3 percent (MT I) and 273.5 percent (MT II), corn are 425 percent (MT I) and 336 percent (MT II) those values make the PCR and DRC value equal to one. This shows that the competitive and comparative advantage is at breakeven point.

The Decrease in output price

Sensitivity analysis of the decrease in output price was done by lowering the price of output to create equal to one PCR value, which means that the competitive advantage is at break-even point. The results of the sensitivity analysis of the decrease in output prices shown in Table 8.

Table 8: Sensitivity Analysis of the Decrease in Output Price

Commodity	Season	% Decrease Output Price	% Decrease Output Price		PCR	DRC	El. PCR	El. DRC
			Private Cost (Rp/kg)	Social Cost (Rp/kg)				
Rice	MT I	24%	2.686,60	2.997,58	1,00	0,89	1,46	1,55
	MT II	17,15%	3.012,87	2.911,75	1,00	1,03	1,34	1,43
Corn	MT I	42%	1.080,93	1.339,13	1,00	0,82	2,81	2,42
	MT II	36%	1.244,27	1.330,54	1,00	0,97	1,99	2,24

Source: Authors

The analysis showed that the competitive advantage of rice farming (MT I and MT II) and corn (MT I and MT II) will be at break even if the decline in the price of each output are 24 percent, 17.15 percent, 42 percent, and 36 percent. PCR elasticity and DRC

value which are higher than one indicates that the competitiveness of strategic food commodities sensitive to a decrease in output prices.

Policy instrument

The sensitivity analysis showed that the increase in fertilizer cost and the decrease in output price cause a decrease in competitiveness of rice and corn farming. PCR elasticity and the DRC value showed that the competitiveness of rice and corn are not sensitive to the increase in fertilizer costs but sensitive to a decrease in output price. It means that the stability of the price of rice and corn is very important to be maintained. Therefore output minimum price policy for those commodities is needed in order to improve its competitiveness. Output price is a very important variable in determining the competitiveness of strategic food commodities. Competitiveness of strategic food commodities which are most vulnerable to the decrease in output prices is the competitiveness of rice. A decrease in output price with a low percentage makes rice farming lose competitiveness. A decrease in output price will also affect profits that was received by farmers. Therefore the condition might trigger land conversion, from paddy fields to corn farming.

The profit of paddy farming is Rp 7,766,326.79 per hectare per year. That amount of profit is lower than corn farming profits with the amount of USD 9,857,170.68 per hectare per year. That condition might lead to land conversion, from rice to corn farm. Therefore, we need output price policies that can regulate rice grain price to remain stable in order to provide higher profit than corn farming profits. Assuming that the private price of corn has not changed (fixed), ie USD 1852.50 / kg (MT I) and USD 1944.17 / kg (MT II), the analysis shows that the price of rice grain which provide higher profit per year compare to corn farming profits is \$ 3850.00 / kg (Table 9).

Table 9: PAM of Rice and Corn Farming

	Components	Revenue	<i>tradable Input</i>	<i>nontradable Input</i>	Profit
Rice (Rp 3.850/kg)					
- MT I	Private price	21.477.180,23	1.451.683,31	13.515.012,41	6.510.484,51
	Social price	22.002.582,45	2.522.670,90	12.615.144,09	6.864.767,47
	Divergence	-525.402,22	-1.070.987,59	899.868,32	-354.282,95
- MT II	Private price	18.205.235,04	1.413.559,20	12.769.228,56	4.022.447,28
	Social price	16.618.717,03	2.166.816,85	11.933.646,19	2.518.254,00
	Divergence	1.586.518,01	-753.257,64	835.582,37	1.504.193,28
Corn					
- MT I	Private price	13.310.944,59	1.667.684,36	6.073.785,10	5.569.475,13
	Social price	16.490.429,65	2.816.087,69	5.588.892,04	8.085.449,91
	Divergence	-3.179.485,06	-1.148.403,33	484.893,05	-2.515.974,79
- MT II	Private price	11.904.379,70	1.626.920,05	5.989.764,09	4.287.695,55
	Social price	12.729.789,57	2.467.413,77	5.511.405,22	4.750.970,57
	Divergence	-825.409,87	-840.493,72	478.358,87	-463.275,02

Source: Authors

The rice grain price is two times higher than the price of corn at the farmer level. Thus, to prevent land conversion, the government set the price of grain twice the price of corn, which is stated in the grain minimum price policy. Besides rice, the competitiveness of strategic food commodities which are also sensitive to a decrease in output prices is competitiveness of corn. Government intervention to stabilize the price of corn through the implementation of regional Minimum Price policy (HMR) is needed to anticipate these conditions.

Conclusions

Food commodities play an important role in income increase of people, job opportunities, and regional and national development. Competitiveness of food commodities needs for community welfare increase and national food security and sovereignty. In this study, it was aimed (1) to analysis of competitiveness of strategic food commodities in Lampung Province, (2) to analyze the impact of changes of input and output prices against of strategic food commodities in Lampung Province, and (3) to know the policy of suitable minimum prices of strategic food commodities in Lampung Province. . This research conducted in Lampung Province from September 2013 to September 2014. The regencies as a sample selected by purposive sampling were Middle Lampung, North Lampung, South Lampung, and East Lampung. Based on the research that has been conducted, it is concluded that the strategic food commodities farm in Lampung Province are financially and economically competitive with PCR and DRC value less than one. Competitiveness of strategic food commodities in Lampung decrease with the increase in fertilizer cost also the decrease in output prices. Competitiveness of strategic food commodities in Lampung is sensitive to a decrease in output prices. Regional minimum price policy for strategic food commodities (rice and corn) is necessary to prevent land conversion between the commodities. The minimum price of rice (grain) is twice the price of corn. The results showed that the farming of strategic food commodities (paddy and corn) had PCR and DCR value less than one point. Strategic food commodities had lesser value due to an increase in fertilizer price and a decline in output prices. The competitiveness of strategic food commodities in Lampung Province was sensitive to output prices decrease. The policy of the minimum price of paddy at least two times greater than the price of corn.

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