Analysis of Efficiency and Competition of Soybeans Farming System in Jember

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SUMMARY

Soybean consumption in Indonesia increased from approximately 2.0 million tons in the beginning of the 1990s to 2.4 million tons in 2002. At the same time, production declined from 1.86 million tons in 1992 to 0.87 million tons in 2001, following a more than 50 percent decline in harvested area.

At least part of the decline in production is due to a decrease in the soybean import tariff that was reduced from 20 percent in 1998 to 5 percent in 2001. Farm groups have argued that this tariff should be reinstituted despite the negative effects that it would have on consumers.

The present study, using the Policy Analysis Matrix methodology, demonstrates that, even at the current levels of productivity, soybeans yield a profitable return to land and management at both private and social prices. Farmers who have switched to the new seeds developed by Indonesian researchers have been able to increase productivity (and profits) substantially. This finding suggests that government efforts to reintroduce import tariffs on soybeans would be undesirable and would lead to inefficiencies in the use of domestic resources.

Government investments in soybean production that are likely to have a high benefit-cost ratio are extension activities that educate farmers on the proper seed bed preparation and planting procedures for the new varieties as well as cold storage facilities that hold seeds at the proper temperature before planting. General improvements in credit facilities that make it easier for farmers to innovate would also be desirable.

1. INTRODUCTION

1.1. Background

Soybean consumption in Indonesia increased from approximately 2.0 million tons in the beginning of the 1990s to 2.4 million tons in 2001. The increase in consumption, however, was not accompanied by production gains. Production declined from 1.86 million tons in 1992 to 0.87 million tons in 2001, following a more than 50% decline in harvested area. Consequently, Indonesian soybean imports doubled in the last ten years from 0.54 million tons in 1990 to 1.28 million tons 2000.

The decrease in production and the resultant increase in soybean imports are often attributed to the government's policy to remove soybean import tariffs. The Minister of Industry and Trade Decision No. 406/MPP/Kep/11/1997 also removed BULOG's role in soybean marketing. While these policies are aimed at helping the soybean agro-industries – mostly small enterprises – to get raw material cheaply and easily, they are not in line with Treasury Minister Decision No. 543/KMK-01/1997. In January 1998, soybean imports were charged an import tariff of 20% that gradually decreased to 5% in 2003.

Because cultivated area and production have declined significantly, it is important to analyze both the efficiency and competitiveness of soybean farming systems. Current productivity commonly falls between 0.9 to 1.2 tons per ha, and soybean competitiveness may be low. However, new varieties introduced by the University of Jember, *e.g. Baluran,* yield more than 3.6 tons per ha in experimental trials. Data from farmers' fields show that soybean farmers using these varieties in the last two planting seasons increased their productivity to between 1.7 and 3.2 tons per ha, with an average of 2.25 tons per ha.

Local governments would like to promote these improved varieties and are considering possible measures toward this end. These include controlling the distribution of the improved soybean seed, providing cool storage for improved seed germination, subsidizing the seed price, and conducting or establishing a specific extension program. This study will seek to identify whether it is worthwhile for the Jember district government to spend considerable resources to support the spread of the new soybean technology.

The Indonesian farmer associations (e.g., HKTI) and some other institutions claim that more direct protection of farmers is needed, and they propose increasing the import tariff on soybean to 50 percent. The purpose of (temporary) protection would be to give farmers more profits, so they could save and invest in the adoption of the new technologies. (This strategy is particularly important, it is argued, because of the lack of credit facilities available to farmers.)

Because increasing the import tariff would transfer consumer income to soybean farmers, this study will provide evidence on whether the farmers' argument makes sense. The research results will also consider other agricultural systems and international policies.

1.2. Research Area and Respondents

The study was conducted in Rambipuji and Bangsalsari sub-districts, Jember District, East Java Province. Jember District is located in the eastern part of East Java, approximately 200 km east of Surabaya. Average annual rainfall is approximately 2400 mm. The highest rainfall area may receive 3000 mm, but the lowest rainfall area gets only 1600 mm per annum. In Rambipuji and Bangsalsari, the rainfall averages between 2000 and 2100 mm per annum.

A total of 2.1 million people live in Jember – 250,000 (11 %) in urban areas and 1,850,000 (89 %) in rural areas. The agricultural sector is the sector with the highest contribution to the region's Gross Domestic Product (GDP). It contributes more than 50 per cent of the regional GDP. While most of the agriculture contributions to GDP are derived from estate and plantation crops, the roles of food and legumes crops are important. Approximately 800,000 tons of paddy and 300,000 tons of corn are produced annually in this region.

Total soybean production in Jember District in 2001 reached 34,534 tons. Soybean cultivation occurs in 22 of 31 sub-districts, with total harvested area of 25,235 ha in 2001. The average productivity in 2001 was 1.37 tons.

A total of 60 farmers were interviewed in this study. The distribution of respondents in each sub-district is presented in Table 1.

Table 1. Distribution of the Respondents based on Districts and Soybean Variety Planted

Sub District	Number of Respondents		Total	Percent
	Planting new variety	Planting common variety		
Rambipuji	10	15	25	41.7
Bangsalsari	20	15	35	58.3
Total	30	30	60	100

Most farmers in the villages have a seasonal cropping pattern of paddy – paddy – soybean, some practice paddy – paddy – corn, and only a small number apply other cropping patterns. Nine (30%) of the respondents planted the new variety (*Baluran*) last year; the other 21 respondents plan to start planting *Baluran* this year.

The majority of soybean farmers are small farmers, with an average farm size of less than 1.0 hectare. The respondents' farm sizes ranged from a minimum of 0.13 ha to a maximum of 3.0 ha. Thirty (50%) of the respondents cultivated less than 0.5 ha. Only 12 (20%) of the respondents cultivated more than 1.0 ha.

Although most farmers in the village have been members of farmer groups for a long time, many stated that they have not benefited enough from their groups. Farmers usually buy their farm inputs from private suppliers, individually. They may buy soybean seed either from input kiosks, informal input suppliers (usually also output buyer/traders), or directly from the seed company supplier. Some farmers stated that last year they got the new variety free from a local government program in cooperation with the University of Jember. But this year most farmers bought the new variety. A distribution company, Agri

Soya Industrindo, controlled most of the distribution of the new variety. Price per kilogram of the new variety (*Baluran*) seed is higher than of the varieties commonly planted, including *Galunggung*. However, the seed rate required per hectare for the new variety is less than that of older varieties.

The main reason that farmers plant the new variety is that it is more productive than traditional varieties. The pods-per-plant ratio of the new variety is significantly greater. Pest and disease resistance is similar to traditional varieties. However, because the new variety's seed membrane is thicker than that of the older varieties, it requires extra care during the germination period. If the soil is too wet or too dry, the seed will not germinate. To gain better seed germination, farmers must be able to control moisture during the germination period. The new variety, therefore, is unlikely to be suitable for use in dry-land areas. Despite greater perceived risks, farmers planting the new variety expect a greater yield and thus higher profit from planting soybeans.

1.3. Research Objectives

The main objectives of this study are to measure the efficiency and competitiveness of soybean farming systems in Jember and to explain the impact of government policies on these systems.

This study seeks to:

- identify whether it is worthwhile for the Jember district government to spend resources to support the establishment of new varieties for increasing the efficiency and competitiveness of local soybean farming; and

- provide evidence whether increasing the soybean import tariff is needed to give profits to soybean farmers.

2. RESEARCH METHODOLOGY

2.1. Data and Sources of Data

Both primary and secondary data were used in the study. The primary data were collected in a field survey in two sub-districts, *i.e.,* Rambipuji and Bangsalsari. The sampling method was proportionate stratified sampling based on the soybean variety planted by the farmers, *i.e.*, common variety and new soybean variety. For each variety, 30 farmers were interviewed. Prior to the field survey, a preliminary survey was conducted to collect information required to test the questionnaire. Secondary data were collected from several related institutions, e.g., farmer groups, agro-industry associations, marketer associations, and government agencies, to support the primary data.

2.2. Method of Analysis

The method of analysis utilized to measure the efficiency and competitiveness of soybean farming systems was the Policy Analysis Matrix (PAM)[1]. The PAM measures the profitability at both private (actual market) and social (efficiency) prices. This method shows the actual revenues, costs, and profits that the soybean farmers are experiencing and compares them with what they would face if commodities and resources were priced at international prices or domestic opportunity costs.

A study on the impacts of the on-going policy is important for restructuring soybean systems. PAM will give measures of the competitiveness and the economic efficiency of existing systems and of the impacts of policy on those systems. The main limitation of PAM is that its results are for a base year and thus it may need to be altered as principal parameters (*e.g.* world prices, exchange rate, interest rate and taxation) eventually change. The method, nevertheless, can readily accommodate such parameter changes. In this regard, a sensitivity analysis (a simulation) will be utilized to study the impact of such changes.

The PAM table consists of private and social profitability in its first and second rows and divergences in its third row. The data entered in the first row provide a measure of private profitability. The term private refers to revenues and costs reflecting actual market prices received or paid by farmers, merchants, or processors in the system. These market prices incorporate the underlying economic costs and valuations plus effects of all policies and market failures.

The values entered in the second row of the matrix provide a measure of social profitability. Social prices are efficiency prices that would be received by farmers in the absence or government policies or market failures. These valuations measure comparative advantage or efficiency of agricultural systems. Details of the Policy Analysis Matrix (PAM) and indicators derived from the matrix are shown in Table 2.

[1] Monke and Pearson, 1989

Table 2. The Policy Analysis Matrix (PAM)

	Revenues	Inputs		Profits
		Tradable Inputs	Domestic Factors	
Private prices	A	B	C	D[1]
Social prices	E	F	G	H[2]
Effect of divergences	I[3]	J[4]	K[5]	L[6]

[1]) Private Profits: D = A – B – C
[2]) Social Profits: H = E – F – G
[3]) Output Transfers: I = A – E
[4]) Input Transfers: J = B – F
[5]) Factor Transfers: K = C – G
[6]) Net Transfers: L = D – H or L = I – J – K

2.3. Ratio Indicators

a) Private Cost Ratio: $PCR = \frac{C}{(A-B)}$

PCR is the ratio of factor costs (C) to value added in private prices (A-B). This ratio measures the competitiveness of a commodity system. The system is competitive if PCR is less than 1.

b) Domestic Resource Cost Ratio: $DRC = \frac{G}{(E-F)}$

DRC serves as a proxy measure of social profits. Minimizing the DRC is thus equivalent to maximizing social profits. The comparative advantage of a commodity system can be assessed by using this ratio. If DRC is less than 1, the system uses domestic resources efficiently and has a comparative advantage.

Nominal Protection Coefficient;

c) Output: $NPCO = \frac{A}{E}$

This ratio shows the extent to which domestic prices for output differ from social prices. If NPCO is greater than 1, the domestic output price is greater than the import (or export) price and thus the system receives protection. On the contrary, if NPCO is less than 1, the system is disprotected by policy.

d) Input: $NPCI = \frac{B}{F}$

This ratio shows how much domestic prices for tradable inputs differ from their social prices. If NPCI exceeds 1, the domestic input cost is greater than the comparable world prices and thus the system is taxed by policy. If NPCI is less than 1, the system is subsidized by policy

e) Effective Protection Coefficient: $EPC = \frac{(A-B)}{(E-F)}$

This ratio compares the value added in domestic prices (A – B) with value added in world prices (E – F). The purpose is to show the joint effect of policy transfer affecting both tradable outputs and tradable inputs.

f) Profitability Coefficient: $PC = \frac{D}{H}$

This ratio measures the impact of all transfers on the private profits. It equals the ratio of private profits to social profits.

g) Subsidy Ratio to Producers: $SRP = \frac{L}{E}$ or $SRP = \frac{D - H}{E}$

SRP is a single measure of all transfer effects. The SRP indicates the extent to which the system revenues are increased or decreased because of transfers. If the market failures are insignificant, the SRP shows the net impact of distorting policies on the system revenues.

2.4. Empirical Information and Assumptions

The basic data collected were commodity and input prices and quantities for representative farms and for post-farm marketing. World prices were used to compute the import and export parity prices for tradables. Social prices for domestic resources (wages, interest rates) were estimated by correcting private prices for potential divergences.

To ensure that the budget data were complete and reliable, figures were compiled from agricultural census data (provided by the Indonesian Statistics Bureau (BPS)), information from farmer groups and agro-industry associations, and estimates from the field surveys. There were two principal assumptions used in this study – that the social value of capital was 6.7 percent (for one planting season) plus the rate of inflation and that the social value of farm labor was the same as the private value of farm labor (the minimum wage rate did not apply in the farming sector). Historical budget data were used to support the basic policy data.

3. RESEARCH RESULTS AND DISCUSSION

3.1. Interpretation of Findings

Empirical results of the study first describe the level of efficiency and competitiveness of both soybean farming-systems, i.e., common planted variety and improved variety, in the base year 2002. The following table provides the PAM for soybean farming systems using the two different varieties – *Galunggung* (common planted variety) and *Baluran* (new variety). Both soybeans were moderately irrigated. They were planted in June 2002 and harvested in September 2002.

Table 3. Policy Analysis Matrices for Soybean Farming Systems in Jember, 2002

	Revenue	Tradable Inputs	Labor	Capital	Total	Profit[2]
Common Variety						
Private	3,107,580	534,654	724,760	131,707	856,467	1,716,459
Social	3,087,686	480,621	724,760	77,711	802,471	1,804,594
Divergences	19,894	54,033	0	53,996	53,996	-88,135
DRC = 0.31; PCR = 0.33; PBCR = 2.23						
New Variety						
Private	3,931,221	659,159	742,185	151,860	894,045	2,378,018
Social	3,841,604	614,815	742,185	90,090	832,275	2,394,514
Divergences	89,618	44,344	0	61,770	61,770	-16,497
DRC = 0.26; PCR = 0.27; PBCR = 2.53						

Table 3 shows the PAM table for both soybean-farming systems. Because this study was unable to collect PAM data for corn[3] as the next best alternative crop after soybeans, the social opportunity costs (SOC)[4] of land could not be estimated. Profits for both systems in the table thus reflect returns to management and land. The table shows that farmers planting the new variety received 38.5 percent higher private profit (D) than those who cultivated the common variety. The profit of the new variety, Rp. 2,378,018, is higher than the profit of the common variety, Rp. 1,716,459. The PBCR for the new variety (2.53) is 13.3 percent higher than that of the traditional variety (2.23). Since the private profits defined in the table are the return to management and land, with a given private land rate of Rp. 1,050,000, the net private profitability (the residual return to management) for the new variety and the common variety were Rp. 1,328,018 and Rp. 666,459, respectively.

The higher private profit of the new variety was caused mainly by increased seed productivity. The average productivity of the new variety, 1.7 tons per hectare, was approximately 20 percent higher than the average productivity of the common variety, 1.4 tons per hectare. Although this yield improvement was modest, costs were only very slightly higher. The result was that profits were significantly higher.

[2] Profit is defined as return to management and land

[3] Alternative cropping pattern, p. 7

[4] SOC of land is defined as the social profit of the next best alternative crop excluding land

Comparative and Competitive Advantage of the Soybean Farming Systems

The ability of an agricultural system to compete without distorting government policies can be strengthened or eroded by changes in economic conditions. Dynamic comparative advantage refers to shifts in competitiveness that occur over time because of changes in three categories of economic parameters – long-run world prices of tradable outputs and inputs, social opportunity costs of domestic factors of production (labor, capital and land), and production technologies used in farming or marketing. Collectively, these three parameters determine comparative advantage.

Comparative advantage of an agricultural system, in the PAM table, is indicated by the value of the Domestic Resources Cost Ratio (DRCR or DRC). The DRC, defined as G/(E-F), serves as a proxy measure for social profits. Minimizing the DRC is equivalent to maximizing social profits. Comparative advantage is an indicator of potential advantage and will be fully received if there is no policy distortion in the system. If a commodity has comparative advantage, its production is economically efficient.

Based on information provided in Table 3, the DRCs of both soybean-farming systems were much less than 1. The DRCs for the common variety and new variety soybean systems were 0.31 and 0.26, respectively. This result indicates that both soybean systems had a strong comparative advantage. The common variety system was less efficient than the new one. In other words, the new variety system had a better comparative advantage compared to the common variety system.

The determination of profit actually received by farmers is a straightforward and important initial result of the PAM approach. The results indicate which farmers are currently competitive. In the PAM table, the competitiveness of a system is measured by the private profitability (D) or Private Cost Ratio (PCR). Based on information given in Table 3, the PCR of both soybean systems was much less than 1. This result indicates that both systems were profitable and thus competitive. The lower value of PCR for the new variety system (0.27) compared to the value of PCR for the common variety systems (0.33) suggests that the new variety system was more competitive than the common variety system.

Transfers and Impacts of Government Policies

In the Policy Analysis Matrix (PAM), impacts of government policies can be identified by the divergences identity in the third row of the PAM table. Divergences cause private prices to differ from their social counterparts. A divergence arises either because a distorting policy intervenes to cause a private market price to diverge from an efficient price or because underlying market forces have failed to provide an efficient price. Divergences in PAM can also be indicated by the ratio between the values in the first row (private prices) and the values in the second row (social prices). The ratio indicators are more frequently used because of their ability to compare different systems producing unlike outputs.

The ratio formed to measure output transfers is called the Nominal Protection Coefficient on Output (NPCO). Output transfers in the two soybean systems were only slightly different. The NPCO for the common variety and the new variety were 1.01 and 1.02, respectively. Both values of the NPCO were greater than 1. This result indicates that soybean farmers for both systems received slightly higher prices than they would have received facing world prices or that the systems were receiving very slight protection. The positive output transfers were caused mainly by indirect quantitative restriction (quotas) on soybean imports. A slight difference in divergences between the new variety and the common variety was due to the new variety gaining a better price in the market. A comparison of output transfers for both soybean systems is presented in Table 4.

Table 4. Output Transfers of Soybean Farming Systems in Jember

	Total Revenue	NPCO
Common Variety		
Private	3,107,580	1.01
Social	3,087,686	
Divergences	19,894	
New Variety		
Private	3,931,221	1.02
Social	3,841,604	
Divergences	89,618	

On the input side, the values of NPCI(s) for both farming systems exceeded 1. The NPCI for the common variety and the new variety systems were 1.11 and 1.07, respectively. This result indicates that both systems were taxed by policy. Details of the input transfers of soybean farming systems in Jember are shown in Table 5.

Table 5. Tradable Input Transfers of Soybean Farming Systems in Jember

	Tradable Input Costs						
	Seed	Urea	TSP	Other fertilizer	Pesticide	Total	NPCI
Common Variety							
Private	209,220	70,595	82,593	79,810	92,436	534,654	1.11
Social	188,928	69,426	72,846	75,473	73,949	480,621	
Divergences	20,292	1,169	9,747	4,338	18,487	54,033	
New Variety							
Private	240,120	57,408	95,220	110,400	156,011	659,159	1.07
Social	240,120	57,304	88,182	104,400	124,809	614,815	
Divergences	0	104	7,038	6,000	31,202	44,344	

Distribution and import regulations on seed[5] and fertilizer[6], import tariffs (up to 20%) on pesticides, and local distribution taxes (retribution) have contributed to higher private prices for inputs. A new variety of seed, produced locally, is a nontradable input. In the absence of government taxes on domestic seed production and distribution, soybean farmers thus paid the social price for the new seed variety. This has resulted in a slightly smaller NPCI for the new variety system compared to the common variety system.

The Effective Protection Coefficient (EPC) shows the joint effect of policy transfers affecting both tradable inputs and tradable outputs. These are almost equal to 1

[5] E.g., to gain reduction and or exclusion of import tariff, a seed importer must be the agricultural commodity producer (subject to KEPMENKEU No. 135/1997).

[6] Fertilizer import and distribution are mostly given and controlled by National Fertilizer Producers (PUSRI, PUPUK KUJANG, PETROKIMIA, etc.)

for both systems. The EPC for the common variety and the new variety systems were 0.99 and 1.01, respectively. These results imply that there was no significant protection from the government to either system. The EPCs of both soybean-farming systems in Jember are depicted in Table 6.

Table 6. Effective Protection Coefficients for Soybean Farming Systems in Jember

	Revenue	Tradable inputs costs	EPC
Common Variety			
Private	3.107.580	534,654	0.99
Social	3.087.686	480,621	
Divergences	19.894	54,033	
New Variety			
Private	3.931.221	659,159	1.01
Social	3.841.604	614,815	
Divergences	89.618	44,344	

There were few signs of market failures in the domestic factor markets. The main cause of the divergences in factor transfers was the high private interest rate. The private interest rate was 24% annually, higher than the social interest rate (20% annually) because of the underdeveloped state of the rural credit market, i.e. too few rural institutions for financial intermediation that are accessible for farmers. Factor market transfers for both soybean-farming systems in Jember are described in Table 7. Farmers usually take some inputs (credit) from their input suppliers at planting time and pay at harvesting time (*yar-nen*)[7]. To increase the competitiveness of the system, long-term development of reliable rural financial institutions is required to give farmers better access to credit with lower interest rates.

Table 7. Domestic Factor Transfers of Soybean Farming Systems in Jember

	Domestic Factors		
	Labor	Capital	Total
Common Variety			
Private	724,760	131,707	856,467
Social	724,760	77,711	802,471
Divergences	0	53,996	53,996
New Variety			
Private	742,185	151,860	894,045
Social	742,185	90,090	832,275
Divergences	0	61,770	61,770

The measure of net transfers is a principal result of the PAM approach. A ratio indicator relating to the net transfers is the Profitability Coefficient (PC). The Profitability Coefficient (PC) measures the impact of all transfers on private profits. The PC is also an expansion of EPC to include domestic factor costs. The PC for the common variety system and the new variety system were 0.95 and 0.99, respectively. This result means that the net transfer caused a reduction in private profits for both soybean systems.

[7] *yar-nen* (*Bayar Panen*) is a common acronym for payment system at harvesting time

Government policy has caused the common soybean system's private profits to be 5 percent less than they would have been without policy transfers. Similarly, the new variety systems received 99 percent of their private profits or 1 percent less than they would receive in the absence of policy transfers. Hence, government policy did not give any positive impact on the soybean farming systems. Protection Coefficients (PC) for both soybean-farming systems are illustrated in Table 8.

Table 8. Net Transfers, Profitability Coefficients, and Subsidy Ratio to Producers for Soybean Farming Systems in Jember

	Revenue	Costs		Profit	PC	SRP
		Tradable Inputs	Domestic Factor			
Common Variety						
Private	3,107,580	534,654	856,467	1,716,459	0.95	- 0.029
Social	3,087,686	480,621	802,471	1,804,594		
Divergences	19,894	54,033	53,996	-88,135		
New Variety						
Private	3,931,221	659,159	894,045	2,378,018	0.99	- 0.004
Social	3,841,604	614,815	832,275	2,394,514		
Divergences	89,618	44,344	61,770	-16,497		

The subsidy ratio to producers (SRP) is a single measure of all transfer effects. This ratio is a comparison of the net transfer to the value of output in world prices. The SRP thus indicates the extent to which the system's revenues are increased or decreased due to transfers. The SRP for the common variety and the new variety farming systems, respectively, were -0.029 and -0.004. These negative values mean that divergences – generally influenced by distorting policies – have slightly decreased the gross profit of both soybean-farming systems in Jember.

3.2. Implications of Results

The policy issue is whether the local government should spend resources for providing facilities (*e.g.*, distribution control and cold storage) and supporting the expansion of the new varieties by subsidizing the seed costs. The results of the study show that the new variety has significantly increased soybean profitability and competitiveness. In this regard, the government may provide assistance to the development, distribution, and adoption of the new variety. Given the new variety characteristics and higher farmer perceived risks of planting the new variety, the government may support the establishment of the new variety by providing assistance in ensuring that the new seed can be efficiently produced and distributed along with more intensive extension programs so that farmers understand the advantages of planting the new variety.

Although the removal of import tariffs favors consumers and the agro-industry sector, at current world prices, both soybean systems are still highly competitive. It is, therefore, not worthwhile for the government to increase import tariffs, because increasing tariffs will create policy distortions and result in economic inefficiency. Policies that provide effective extension and training programs for farmers will better increase productivity and thus profitability.

3.3. International Impacts of Results

Because this study suggests that increasing the import tariff is not the solution to increase the competitiveness of the soybean farming systems, this result has been in line with the international agreements, such as WTO, AFTA, and APEC.

4. CONCLUDING REMARKS

4.1. Conclusions

- Both soybean-farming systems, *i.e.*, common variety and new variety, were efficient and competitive. The competitiveness and efficiency of the new variety were greater than those of the common variety.

- The private benefit cost ratio (PBCR) of the new variety system was 13% higher than the PBCR of the common variety system. This result indicates that the new variety is more profitable than the common planted variety. The higher value of PCR for the common variety system (0.33) compared to the value of PCR for the new variety system (0.27) also indicates that the new variety system was more competitive than the common variety system.

- The DRC for the common variety system (0.31) was greater than that for the new variety system (0.26). The new variety system thus had a better comparative advantage compared to the common variety system.

- Government policies did not generate a positive impact on either soybean farming system. The value of PC for both soybean-farming systems was less than 1. The SRP for the common variety and the new variety farming systems were -0.029 and -0.004, respectively. Divergences – generally influenced by distorting policies – have slightly decreased the profit of both soybean systems.

4.2. Recommendations

- The results of the study show that the new variety has significantly increased soybean profitability and competitiveness. The government may provide assistance in ensuring that the new seed can be produced efficiently and distributed along with more intensive extension programs so that farmers understand the advantages of planting the new variety.

- Both soybean-farming systems are efficient and competitive. It is, therefore, not worthwhile for the government to increase the import tariff, since increasing the import tariff will generate greater policy distortion. However, the long-term development of reliable rural financial institutions would give farmers better access to credit with lower interest rates and thus would increase the competitiveness of both systems.

- While the new variety is found to be very productive and competitive, it is unlikely that the variety is suitable for dry land. The new seeds require good to moderate irrigation (water control), particularly during the germination period.

- Because of the new variety's seed characteristics, an effective extension program is required for the success of the adoption and diffusion process.

BIBLIOGRAPHY

Anonymous, 2002. HKTI proposes Soybean Import Duty Rate at 30 Percents. Media Indonesia (English Version). 24 January 2002. www.mediaindonesia.com

Acocella, N, 1998. The Foundation of Economic Policy. Translated by: Brendan Jones. Cambridge Univertsity Press. Cambridge. UK.

Aji, J. 1997. Dampak Kebijakan Pemerintah terhadap Agroindustri Kedelai di Jember. Laporan Penelitian. Universitas Jember. Jember.

FAOSTAT. 2002. Actual Market Commoditty Price. www.fao.org

Gittinger, J. P. 1972. Economic Analysis of Agricultural Project. John Hopkin University Press. Baltimore – Maryland. USA

Monke, E.A. and S.R. Pearson. 1989. The Policy Analysis Matrix for Agricultural Development. Cornell University Press. London.

Noorsapto, A. 1994. Keunggulan Komparatif dan Dampak Kebijakan Pemerintah pada Komoditas Kakao: Suatu Studi Kasus pada Perkebunan Kakao di Sumatera Utara. thesis. Program Pascasarjana IPB. Bogor

Ilham, N. and D.K. Swastika. 2001 Analisis Daya Saing Susu Segar Dalam Negeri Pasca Krisis Ekonomi dan Dampak Kebijakan Pemerintah terhadap Usaha Peternakan Sapi Perah di Indonesia, Jurnal Agro Ekonomi Vol. 19 No. 1, PSE, Bogor.

Pasaribu, S.M. and S. Bahri. 1998. Recent Adjustments to Indonesia's
AFTA CEPT Scheme. Working Paper. March 1998. CSIS. Adelaide and Jakarta.

Saptana, Supena and Purwantini, T. B., 2002. *Effisiensi dan Daya Saing Usahatani Tebu dan Tembakau di Jawa Timur*. Kertas Kerja. Bogor.

USDA, 1998, Indonesia: The End Of State Trading Soybean Imports In Transition, Special Report. www.usda.org

World Bank, 2002. Pinksheet: Commodity Price Data. www.worldbank.org