THE COMPETITIVENESS OF SOYBEAN PRODUCTION IN BLITAR-EAST JAVA

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June 2003

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Summary

In Indonesia, soybean is an important component of the national food supply. It is not only a source of protein, but also a source of minerals, vitamins and fat. In recent years, the demand for processed products such as tofu, tempe, and soy sauce have increased significantly, especially in urban areas.

Production has not kept up with the demand for soybeans. In 1997, approximately 900,000 tons were imported. Imports increased to 1,177 tons in 2001. As a result, groups interested in increasing soybean output have suggested that the government impose a tariff that would make soybeans more profitable domestically and thereby reduce the country's dependence on imported beans.

The research undertaken in Blitar District developed farm level budgets for soybean production using both traditional and improved technology. The latter consisted of better seeds and more precise water control. Both monoculture and multi-culture cropping systems were investigated. Primary field data were supplemented with secondary day from the Department of Agriculture, the Central Bureau of Statistics and the Regional Bureau of Planning.

The analysis of the Blitar budgetary data, undertaken using the Policy Analysis Matrix methodology, shows that all methods of soybean production are both privately and socially profitable. This leads to the conclusion that protectionist policies that would raise domestic soybean prices above the import parity prices determined in world markets are unnecessary. However, investments in improved technology and better irrigation systems show profits that are greater than traditional technology. These are likely to be areas in which government investments would yield a significant rate of return and reduce dependence on world markets.

1. Introduction

1.1. Background

In Indonesia, soybean is an important component of the national food supply. It is not only a protein source, but also a source of minerals, vitamins and fat. In 100 gram of soybean, there are 33.3 g protein, 15 g fat, 213 mg calcium, 0.65 vitamin B1, 0.23 mg vitamin B2 and vitamin C (Hermana, 1985). The availability of soybean in country will improve the nutriention of society through the consumption of soybean and its processed products such as tofu, tempe, and soy sauce. The demand for soybean is increasing since the industrial sector based on soybean product has been growing significantly.

Table 1: Soybean Consumption by kinds in Indonesia 1984-2000 (kg, capita, year)

Year	Kind of Product	Rural	Urban	Urban+Rural
1984	Bean	0,16	0,05	0,10
	Tofu	2,60	6,19	3,43
	Tempe	3,48	5,36	3,90
	Others	0,05	0,10	0,05
1990	Bean	0,18	0,07	0,15
	Tofu	3,23	5,97	3,92
	Tempe	3,73	5,60	4,22
	Others	0,04	0,09	0,05
1996	Bean	0,10	0,10	0,10
	Tofu	4,63	6,66	5,36
	Tempe	5,41	6,81	5,88
	Others	0,10	0,16	0,13
2000	Bean	0,11	0,12	0,53
	Tofu	5,03	7,02	6.03
	Tempe	6,20	7,51	6,86
	Others	0,12	0,19	0,15

Sources: Central Bureau of Statistic (1984, 1990,1996, 2000)

Table 1.1 above shows the rural and urban consumption rate for soybean and soybean products in kg per capita. On the average, urban people consumed more soybean than rural people, especially for processed products, e.g. tempe, tofu. In 1984, tofu consumption was 3.43 kg/capita. In 1990, the figure became 3.92 kg/capita. It increased continually to 5.36 kg/capita in 1996. Rice consumption decreased from 112.9 kg/capita in 1993 to 105.7 kg/capita in 1996. However, fresh fish consumed in urban areas increased from 15.1 kg/capita to 18.2 kg/capita. In rural areas, the situation was not so different; fish consumption increased from 10 kg/capita to 13.5 kg/capita.

The pattern of protein consumption is largely determined by income. In 1996, soybean consumption of three different income groups differed significantly, i.e., 13.3 kg, 21.1 kg, 29.3 kg per capita. High-income households consume more soybeans than low-income groups.

Therefore, soybean consumption is likely to expand as the economy and income per capita improves.

Soybean imports are used as food for both animals and humans. The volume of soybean imports in 1994 was 800,000 ton and in 1995, it increased to 807,000 ton. In the period 1997-1998, imports of soybean increased continually. National production was, on average, 12.11 Kw/ha in 2001. This was well below experimental yields that averaged 20-30 Kw/ha in 2001. Government efforts to increase soybean production have had only minor success. The low productivity is caused both by a lack of significant improvements in technology and poor management techniques. The overall result has been a declining domestic production and an upward trend in soybean imports.

Table 2 shows the area, production, demand, and trade gap for soybeans from 1997 to 2001.

Table 2: Area, Production, Productivity, Supply, and Demand for Soybean from 1997-2001

Year	Area (ha)	Productivity (kg/ha)	Production (000 ton)	Supply (000 ton)	Demand (000 ton)	Gap (000 ton)
1997	1,272	1,184	1,506	1,355	2,255	-900
1998	1,265	1,180	1,493	1,344	2,312	-968
1999	1,258	1,177	1,481	1,333	2,369	-1,036
2000	1,252	1,173	1,469	1,322	2,428	-1,106
2001	1,245	1,170	1,457	1,311	2,488	-1,177

Source: PSE dan Bappenas (2002)

Soybean production decreased about 0.81 percent annually. Area decreased about 0.52% annually. Productivity decreased about 0.29% annually. In Java, increasing population caused the decline in area. Area in the outer islands was relatively stabile. Total demand for soybean, either for food and animal use, increased about 2.21% per year. The result was a widening import gap.

A number of constraints have held back domestic production:

1. Suitable land extension is limited because of the high degree of acidity in most other parts of the country.

2. Most additional land that could potentially grow soybean is hilly and rolling, so it leads to easy erosion,

3. Farmers have not adopted improved technology

4. Fluctuating prices have made soybeans risky

1.2. Policy Issues

As a province with a high performance agricultural sector, the government of East Java intends to make soybean a major product of the province. They expect that soybean production will stimulate significant economic growth, especially in the small-scale industrial sector where products such as tofu, tempe, and soy sauce are made. East Java's provincial needs for soybean cannot be fulfilled by local soybean production and, if current trends continue, substantial amounts of beans and meal will be needed in the future.

The Government still provides a subsidy to soybean production in form of soft credit for production inputs. However, since Government budgets continue to decline, subsidies on all commodities have decreased. Profits at the farm level are becoming increasingly dependent on greater productivity. Among the most important sources of greater efficiency is the new seed technology called "WILIS 2000" as well as better irrigation systems (*Lodagung* Irrigation).

The proposed research will develop farm budgets for soybeans under different types of technology. With these results in hand, conclusions can be drawn about the likelihood that the proposed policies will meet the Government's objective of reducing dependency on imported soybeans.

1.3. Research Objectives

The research will try to achieve the following objectives:

1. Compute soybean farmer incomes in District Blitar under different cropping system;
2. Analyze comparative advantage and competitiveness of soybean by different cropping system;
3. Analyzing influences of social price changes to farmer income due to public investment;
4. Analyzing government policy impact on farmer income due to market/actual price fluctuations;

1.4. Research Implications

1. The result of the research will provide information to the provincial and district government. The expanded data with new technology of different kinds of investments could be used as alternative policy to increase the soybean production.
2. Technical change resulting from support of soybeans would improve the efficiency of the system and increase the soybean farmer's income.

2. Research Methodology

2.1. Introduction

. As the first step of the research process, a survey of literature on farm management data was conducted. This step is needed in order to get an idea of what was already known about farm level data in Blitar District.

2.2. Methods of the Study

The research was based on two kinds of empirical studies:

1. Investigations of production at the micro level to better understand the techniques used in growing soybeans.

2. Evaluation of influences of the macro economic performance and policy on soybean production at the local government level;

The farm management study was carried out using a stratified sample survey method. Secondary data were collected from government agencies and the Central Bureau of Statistics at various levels.

The micro survey was carried out in Blitar District because the region is the center of food production (especially soybean) in East Java province. In the district, 5 sub-districts were selected for detailed investigation: Binangun, Panggung Rejo, Kademengan, Wonotirto, and Bakung.

Using both a closed questionnaire and a structured open survey, a number of respondents were interviewed, e.g., soybean farmers, traders, and government officials. The place of interview was basically in the "field." However, efforts were made to obtain a comfortable or neutral type of interview site. Only after establishing a relation of confidence with the interviewee were delicate questions brought up requiring individual experiences and personal opinions.

Apart from the sample respondents, some key informants who are particularly knowledgeable about the matters and socioeconomic situation of such regions, were also interviewed. The person interviewed was free to voice his/her own concerns in an unstructured interview. The interviewer relied on open questions to introduce topics of interest, without the interviewer imposing his or her ideas. Data and information gained from field observation and by interviewing some key informants turned out to be valuable for this study.

Secondary data provided useful supporting material for the study. Particularly helpful were data such as the Gross Domestic Regional Product, population density, infrastructure, land areas, production rate of soybean and productivity. These estimates are issued by the Department of Agriculture, the Central Bureau of Statistics or the Regional Planning Development Board.

Care should be taken in using secondary data from different sources. Using a single data source as much as possible will help in insuring internal consistency.

The secondary data survey was designed to generate data in relation to the following aspects:

1. Production, intermediate inputs, and production input aspect;

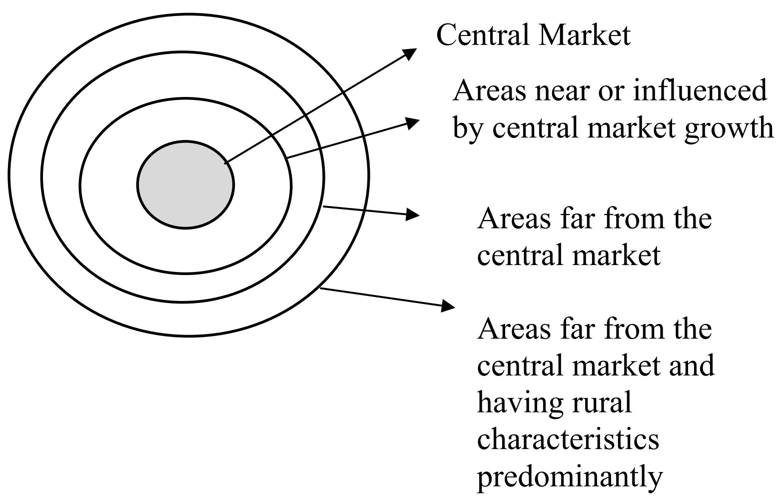
2. Post-harvest activities including marketing, transportation cost and other costs that influenced the end price such as police tariff (illegally); and

3. External factors such as government policy (subsidies), CIF prices, and other charges in port (non-formal)

2.3. The Study Areas

In this part, the characteristics of study areas within the District of Blitar will be described. Irrigated and non-irrigated-land were used to determinate sample design. Moreover, The dividing line of these areas is the market distance from the central market and infrastructure. The study areas are structured from the specific region to the region situated at the longest distance from the central market. Graphically, these study areas are showed by Figure 1 below:

Figure 1: The Four Study Areas and Their Distance from the Central Market



2.4. Method of Analysis

2.4.1. Policy Analysis Matrix (PAM)

In the following table, the policy analysis matrix (PAM) is summarized.

Table 3: Policy Analysis Matrix (PAM)

		Costs		
	Revenue	**Input tradable**	**Domestic Input**	**Profit**
Private Price	A	B	C	D
Social Price	E	F	G	H
Policy Impact	I	J	K	L

Note: I= A – E; J= B – F; K= C – G; L= D-H
DRCR: G/(E-F); NPCO= A/E; NPCI= B/F; EPC= (A-B)/(E-F)

<u>Private Profit</u>

Private profit is used to show how much profit that can be obtained by soybean farmer per area (e.g. ha) based on private price

<u>Social Profit</u>

Social profit can be seen through difference between output produced and input tradable and non-tradable based on social price.

<u>Output transfer</u>

Output transfer is transfer receipt by producers through output price. The output price is influenced by government policy. The more output transfer value, the higher support of government policy.

<u>Input transfer</u>

Input transfer shows the number of transfer receipt by soybean producers through input price. The higher input transfer, the cheaper input price paid by producers.

<u>Factor transfer</u>

Factor transfer is transfer receipt by producers through domestic input factor. The higher factor transfer, the lower factor price paid by producer

<u>Net Transfer</u>

Net transfer is used to show whether the government policies have positive or negative transfer on production system of soybean. A positive net transfer mean supporting of government on the soybean production system, a negative is opposite one.

3. Research Area

3.1. The Description of Research Site

3.1.1 Geographical Condition

District Blitar consists broadly 1,628.58 km2 of 267.58 km2 settlement area (kampong), 336.12 km2 rice field, 490.29 km2 dry land, 143.93 km2plantation, 325.18 km2 forest area, 13.20 km2 desert and 52,50 km2 which consist of other types of land. District Blitar lay in co-ordinate 111° 40 - 112° 10' Longitude East and 7° 09' Transversal South. Topography of district Blitar have highest position 800 meter and the lowest 40 meter of sea surface.

Regional boundary of district Blitar is as follows:

1. North boundary is district Kediri and Malang district;
2. Southern is Indonesian ocean;
3. Eastern is Malang district; and
4. Western is Tulungagung and Kediri

Administratively Blitar district consists of 5 districts assistants and 21 sub-districts. It contains 28 villages, 220 "countrysides," 639 orchards, 730 foundation citizens and 7,272 neighborhoods.

Blitar district contains the headwaters of the river Brantas that originate in the eastern part of the District and flow west. This river divides Blitar into two parts: Upstate and South. Upstate contains 847,79 km2; South is somewhat smaller and is made up of 780,79 km2.

Social problems of orderliness, hygiene, and unemployment have been largely overcome during the last three years.

3.1.2. Economic Structure of Research Area

District Blitar is one of the 38 Sub-Province existing in East Java Province that have been deemed particularly suitable for intensive agriculture. They have special potential for such sctors as livestock production, fishery, plantation, and food crops.

Approximately 67 percent of the District is farm land growing rice and dryland crops. The remaining 33 percent consists of plantations, forests, and mining operations (Table 4).

Table 4: Land Areas by Utilization 1998 (Ha)

No.	Sub-District	Rice Field	Dry Land	Others	Total
1.	Selorejo	1.085	2.984	1.143	5.212
2.	Kesamben	1.758	2.874	1.075	5.707
3.	Soko	1.815	3.356	1.924	7.095
4.	Wlingi	3.231	2.836	4.068	10.135

Table 4: Land Areas by Utilization 1998 (Ha)

No.	Sub-District	Rice Field	Dry Land	Others	Total
5.	Talun	2.419	2.660	329	5.408
6.	Kanigoro	2.797	3.043	715	5.555
7.	Garum	2.214	2.123	1.118	5.456
8.	Sanan Kulon	1.668	1.743	378	3.789
9.	Srengat	1.212	3.266	465	4.943
10.	Udanawu	2.229	1.563	145	3.937
11.	Wonodadi	2.209	1.786	200	4.195
12.	Ponggok	2.103	6.488	1.792	10.383
13.	Gandusari	2.582	2.661	3.580	8.823
14.	Nglegok	1.600	3.178	4.478	9.256
15.	Wates	843	3.436	2.597	6.876
16.	Kademangan	808	6.324	3.396	10.528
17.	Sutajayan	1.361	1.824	1.235	4.420
18.	Bakung	65	5.335	5.015	10.415
19.	Wonotirto	228	5.586	11.289	17.163
20.	Wates	843	3.436	2.597	6.876
21.	Punggungrejo	615	7.882	3.407	11.904
	JUMLAH	32.026	77.223	49.630	158.879

Source: Kabupaten Blitar Dalam Angka 1998

3.1.3. Soybean Prices in District Blitar

Empirically the national price of soybean since 1990 to 1996 has been increasing moderately, on the average 3.7% annually. Therefore, it can be concluded that over this period, the price of soybean was relative stable.

Four months after the financial crisis (mid of 1997), the prices of all goods exhibited uncontrolled increases. This multidimensional crisis changed consumption behavior throughout the country. Soybean products also increased in price. In August 1998, the domestic soybean price was 2,300 Rp per kg. The imported soybean price was 3,500 Rp per kg. At these prices, domestic soybeans had a competitive advantage.

Table 6: Domestic and Import Prices of Soybean from 1990 to 1996

Year	Domestic Soybean (Rp/kg)	Import Soybean (Rp/kg)
1990	847	489.63
1991	905	518.39
1992	833	536.46
1993	1.010	482.72
1994	1.087	646.60
1995	995	663.93
1996	1.092	803.17

Source: Data Statistik Pertanian, DEPTAN

Table 7: Domestic Price of Soybean from 1990 to 1996

~~1.~~No	Sub-District	Price at Producer level	Price at Consumer level	Notes
1	Udanawu	2.500	2.600	
2	Nglegok	-	2.450	
3	Sanan Kulon	-	3.000	
4	Wates	1.950	2.000	
5	Kanigoro	3.300	3.500	
6	Wonotirto	2.050	2.225	
7	Gandusari	-	2.200	
8	Selopuro	-	2.250	
9	Srengat	2.300	-	
10	Kesamben	2.300	2.400	
11	Kademangan	1.800	2.000	
12	Wonodadi	-	3.200	
13	Binangun	1.800	1.900	
14	Sutojayan	1.800	1925	
15	Panggungrejo	1.900	2.050	
16	Bakung	1.900	2.200	
17	Ponggok	2.500	2.900	
18	Selorejo	1.900	2.100	
19	Wlingi	-	2.500	
20	Talun	-	2.300	Imported
21	Doko	-	2.300	

Sumber Data : Kantor Pertanian Kabupaten Blitar

3.1.4. Soybean Cropping System at District Blitar

Several cropping systems exists in Blitar District:

<u>Irrigated Paddy Field</u>

September - December	**January ------- May**	**June - August**
Paddy	**Paddy**	**Soybean**

Source: survey

The first Paddy season is started early in the rainy season. It lasts from September to December, the so called as “Musim Padi Raja”. The second Paddy Season can be started in January to May when the dry season starts. This season is called as “Musim Padi Gadu”. Empirically, Gadu season often results a better harvest than Musim Padi Raja.

Wet Paddy Field

September - November	December ------- April	May – August
Soybean + Corn	Paddy	Soybean + Corn + Chili or Peanuts + Corn + Chili

Source: survey
Note: Chili is planted at the start of the rainy season

Another alternative crop is sugarcane, especially as a substitute for peanuts, corn and chili.

Dry Land

December - March	April ------- August	September - November
(Soybean + Corn+ Chili) or (Soybean + Corn + paddy)	(Soybean + Corn+ Chili) Or (Soybean + Corn + Maize)	Maize or off

Source: survey

The survey showed that, at the peak of the dry season in September and November, many dry lands were not used productively. The only work on them was in preparation for the next plantation.

The research sample contained all of the cropping patterns described above. For the purpose of the study, cropping systems were divided into four groups. These groups made it possible to compare the following categories:

- Traditional technology vs. improved technology
- Irrigated land vs. non-irrigated (dry land)
- Multi-cropping vs. monoculture

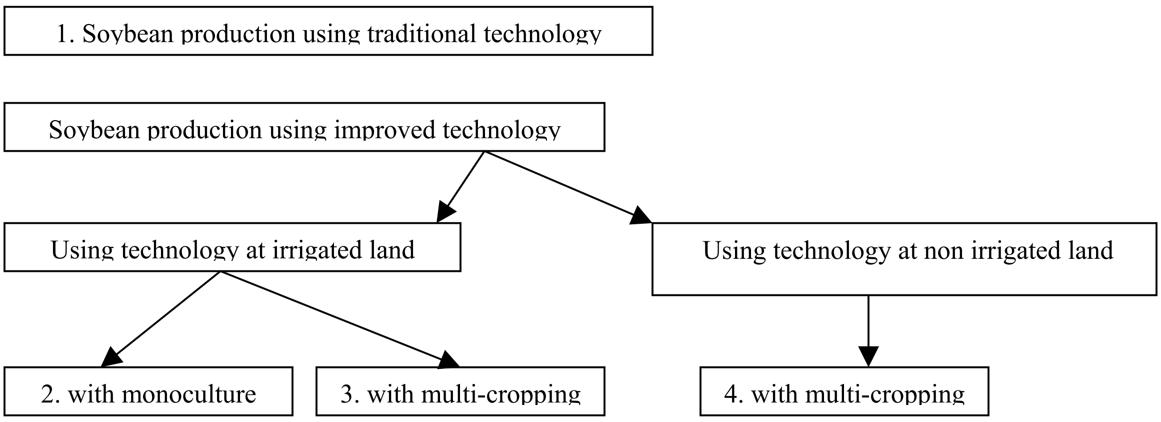
4. Analysis

Because of the various cropping systems and different ecological zones in Blitar district, a number of PAM models have been developed.

The traditional system is one in which soybean farmers use traditional seed that is of low quality. These seeds are bought at the local market. Most of them are unbranded and are only for household consumption. Traditional soybean farmers rarely use composite fertilizer, and they harvest only once per year.

Improved technology systems use high quality seed (WILIS 2000). This seed has already proved that it can increase productivity significantly. Improved technology can be found on both irrigated and non-irrigated land. It can also be used in both monoculture and multi-culture cropping systems.

The research investigates four cropping systems: one traditional system and three cropping systems using improved technology. The various cropping systems can be depicted in the following diagram:



PAMs shown in the text have been computed for the following systems:

1. Soybean production using traditional technology
2. Soybean production using improved technology, on irrigated land, with monoculture
3. Soybean production using improved technology, on irrigated land, with multi-cropping
4. Soybean production using improved technology, on non- irrigated land, with multi-cropping

Policy Analysis Matrix (PAM) is applied to measure the level of competitiveness, efficiency, and effect of government policy on soybean production. Complete data and the results of PAM analysis are presented in tables 8, 9, 10, and 11. Other PAM tables are include in attachments.

4.1. Soybean production using traditional technology

Table 8: PAM calculation using traditional system

	Revenues	Costs		Profits
		Tradables	Factors	
Private prices	3.162.431	844.480	1.829.366	488.585
Social prices	3.286.766	786.501	1.921.335	578.910
Effect of divergences	-124.335	57.979	-91.969	-90.325

Resources: own calculation

Based on table 8, private revenue was Rp 3.162.431, and social revenue was Rp. 3,286,766. The small divergence of 4 percent results from errors in the data rather than policy or market failures.

Private profit in amount of Rp 488.585 shows actual profit that will be received by the farmers with traditional technology. This low figure is caused by a lack of knowledge on the part of farmers about how to plant properly and the timing and amount of fertilizers that should be applied. They plant by digging holes in the ground and waiting for the plants to mature.

The social profit (Rp 578,910) shows that the system is profitable and has a comparative advantage in the Biltar area. (Social profits are 18 percents of social revenue). These results show that soybean production, even using traditional technology, does not require any protection or subsidy to yield substantial profit. This very important result negates the false claims of farmer organizations that soybeans farmers cannot compete with imports if they do not receive protection.

The tradable input transfer of Rp. 57,979 is an implicit tax increasing the distribution cost of tradable inputs from supplier to farmer. These costs are completely paid by farmers. An example of additional cost is illegal levy by policeman on trucks carrying tradable inputs (fertilizer, seed, etc).

Factor transfer in the amount of Rp. -91.969 means that factor costs (working capital, rent of land, and wages) paid by the farmers are lower than they should be. In 2000-2001, the government provided cheap credit through a program called KUT. But only a few farmers received subsidized credit from the government, so the implicit transfer is small.

4.2. Soybean production using improved technology, on irrigated land, with monoculture

Improved technology is defined by the application of high-yielding seed and inorganic fertilizers. The soil with the necessary characteristics is normally located on flat, well-drained ground. Traditional technology is usually in rough areas that can be planted only once per year. The private profit shown in Table 9 (Rp 1,628,028) is the actual profit obtained by farmers in the cropping system using improved monoculture technology on irrigated land. The social profit, Rp. 1,925,282, is computed by multiplying the same improved technology times social prices.

Input transfers in the amount of Rp. 24,489 are due to the fact that private prices are higher than social prices. This is caused in part by the prices charged farmers when they purchased through the kiosk system. Higher prices also result from implicit taxes on the distribution of tradable inputs from suppliers to farmers. An example of additional distribution costs are the illegal levies imposed by policeman on trucks carrying tradable inputs (fertilizer, seed, etc).

Table 9 embodies yields that can be obtained using improved monoculture on irrigated land.

Table 9: PAM calculation for soybean production using improved technology, on irrigated land, with monoculture

	Revenues	Costs		Profits
		Tradables	Factors	
Private prices	5.172.203	1.521.021	2.023.154	1.628.028
Social prices	5.463.245	1.496.532	2.041.431	1.925.282
Effect of divergences	- 291.042	-24.489	- 18.277	- 297.254

Output transfer obtained from the cropping system shows a negative value Rp.- 291.042. Private price revenues obtained by the farmers is lower than social price revenue. The small divergence of 6 percent results from errors in the data rather than policy or market failures.

Input transfer of Rp.-24,489 shows that farmers have to pay tradable input prices less than social input prices. This is caused by a government subsidy on high yielding seed, WILIS 2000 (high variety), and also some extension services for increasing production.

Factor transfer of Rp.-18,277 shows that factor costs (cost of working capital, rent of land, wages) paid by the farmers were higher than social factor prices. There are inadequate financial institutions to provide cheap credit for the farmers. Consequently, the farmers have to pay high interest rates.

Diagram 1. Private and Social Profits from Four Systems

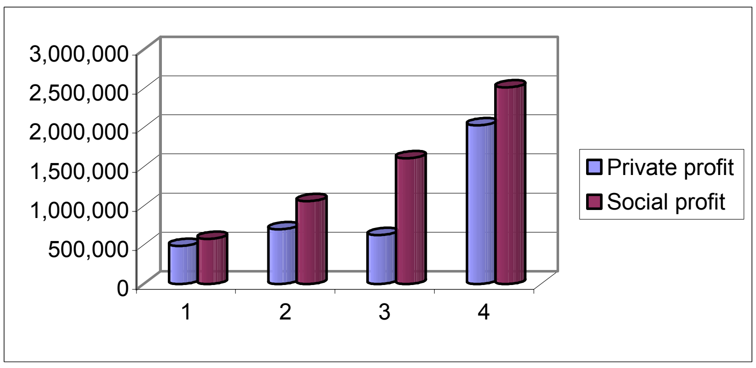


Diagram 1 shows that soybean production using improved technology (PAMs 2, 3, and 4) has higher private and social profits than production with cropping system 1 (using traditional technology).

Both cropping systems 3 and 4 are using improved technology. A comparison of the profitability of systems 2 and 3 shows that multi-cropping is more profitable than a monoculture system. The production costs of multi-cropping are cheaper than mono-culture due to its low average cost of total output (soybean, corn, maize and chili). Among the three systems using improved technology, the two on irrigated land (systems 2 and 3) are less profitable than the one on non-irrigated land.

5. Conclusion and Policy Recommendations

5.1 Conclusion

Three conclusions emerge from the analysis:

1. Based on PAM calculations, the three systems using improved technology (applied seed WILIS 2000) provide higher private and social profits than the system using traditional technology.

2. The highest private and social profits were achieved with PAM 4 (improved technology, multi-cropping, and non-irrigated land). Soybean is appropriate for non-

irrigated land, especially if high market prices can be obtained for high quality soybeans.

3. All four PAM systems provide high social profits. Government subsidy and protection to soybean production are unnecessary. Soybean production in Blitar is competitive with imported soybeans.

5.2 Policy Recommendations

The government should provide a policy that can promote all stakeholders in the soybean production system such as farmers, wholesalers, and government. The government should play an "equity" role in enhancing and distributing welfare among stakeholders. Because soybeans are an input into key food industries (tempe, tofu, soy sauce), a higher soybean price will influence food prices negatively.

Multi-cropping is a good way to improve the efficiency of soybean production, but the farmers should have good combinations of crops (soybean and corn). Reducing illegal levies and making information easily available to stakeholders will promote soybean production. Application of improved technology in the form of better seed quality (WILIS 2000) in soybean production provides a better yield. Moreover, government should improve financial intermediation so that farmers can obtain competitive credit.

Attachments

Table 10: Cropping system by using technology at irrigated land on monoculture system				
		Cost		
	Revenues	**Tradable input**	**Domestic factor**	**Profit**
Private prices	3.545.952	892.126	1.953.654	700.172
Social prices	4.011.530	775.712	2.175.856	1.059.962
Effect of divergences and efficient policy	-465.578	116.414	-222.202	-359.790

Table 11: Cropping system by using technology at irrigated land on multi-cropping system				
		Cost		
	Revenues	**Tradable input**	**Domestic factor**	**Profit**
Private prices	3.278.054	1.034.064	1.617.432	626.558
Social prices	4.089.963	745.725	1.734.426	1.609.812
Effect of divergences and efficient policy	-811.909	288.339	-116.994	-983.254

Table 12: Cropping system by using technology at non-irrigated land on multi-cropping system				
		Cost		
	Revenues	**Tradable input**	**Domestic factor**	**Profit**
Private prices	6.381.802	1.930.778	2.419.778	2.031.246
Social prices	6.875.742	2.232.344	2.127.721	2.515.677
Effect of divergences and efficient policy	-493.940	-301.566	292.057	-484.431

Table 13: Recapitalization of ratio indicators of *Policy Analysis Matrix* (PAM)

Indi Cators Ratio	PAM 1	PAM 2	PAM 3	PAM 4
Private profits	488.585	700.172	626.558	2.031.246
Social profits	578.910	1.059.962	1.609.812	2.515.677
Output transfers	-124.335	-465.578	-811.909	-493.940
Input transfers	57.979	116.414	288.339	-301.566
Factor transfer	-91.969	-222.202	-116.994	292.054
Net transfers	-90.325	-359.790	-983.254	-484.431
PCR	0,7661	0,7362	0,7208	0,6400
DRC	0,7685	0.6724	0,5186	0,4852
NPCO	0,887	0,8839	0.8015	0,8307
NPCI	1,0741	1,1501	1,3867	0,8649
EPC	0,8289	0,8201	0,6710	0,8142
PC	0,8375	0,6606	0,3892	0,5410
SRP	-0,028	-0,0897	-0,2404	-0,1679

Notes:

PAM 1= table 8 PAM 3= table 10
PAM 2= table 9 PAM 4=table 11

Table 16: ***Ranking of Competitiveness of the agricultural system***

Ranking	**No. PAM**	***Private profits***
1	PAM 4	2.031.246
2	PAM 2	700.172
3	PAM 3	626.558
4	PAM 1	488.585

Table 17: ***Ranking of efficiency of the agricultural system***

Ranking	**No. PAM**	***Social profits***
1	PAM 4	2.515.677
2	PAM 3	1.609.812
3	PAM 2	1.059.962
4	PAM 1	578.910