

**GOVERNMENT POLICIES AND ECONOMIC ANALYSIS
OF THE LIVESTOCK COMMODITY SYSTEM
IN INDONESIA**

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ABSTRAK

Penelitian ini merupakan suatu usaha untuk meneliti keunggulan komparatif dan tingkat perlindungan/beban ekonomi untuk beberapa komoditas bahan baku pakan dan peternakan. Analisis keunggulan komparatif dilakukan dengan mempergunakan konsep rasio sumberdaya domestik, sedang tingkat perlindungan/beban ekonomi diukur dengan tingkat perlindungan nominal, tingkat perlindungan efektif dan subsidi implisit. Hasil penelitian menunjukkan bahwa produksi jagung di Indonesia lebih menguntungkan apabila dipakai untuk memenuhi kebutuhan domestik. Produksi kacang kedele di Jawa Barat ternyata tidak efisien. Kacang kedele mempunyai keunggulan komparatif apabila dihasilkan di Jawa Tengah dan di luar Jawa. Ubikayu dan beras mempunyai keunggulan komparatif yang tinggi di seluruh Indonesia. Produksi susu sangat tidak ekonomis. Sedangkan produksi daging sapi, babi dan ayam ras mempunyai keunggulan komparatif yang tinggi. Produksi telur lebih menguntungkan untuk konsumsi dalam negeri. Produksi telur mempunyai daya saing ekspor jika dihasilkan di Lampung dan Bogor. Struktur perlindungan komoditas secara umum tidak konsisten dengan efisiensi produksi komoditas. Insentif ekonomi cenderung bias untuk petani di Pulau Jawa.

ABSTRACT

This study is an investigation on comparative advantage and economic incentives of some major feed-stuffs and livestock products. The comparative advantage is analyzed using the domestic resource cost ratio criterion, whereas, economic incentive is measured using the nominal and effective protection rates, and implicit subsidy. The study shows that the corn production in Indonesia would be more beneficial economically if used domestically. The soybean production in West Java is not economical. The soybean only has comparative advantage if produced in Central Java and the islands outside Java. Cassava and rice have comparative advantage wherever they are produced. The dairy farming is highly uneconomical. Whereas beef, pork, and broiler productions are highly competitive, even for exportation. The egg production is more beneficial for domestic consumption. The egg production is competitive for exportation if produced in Lampung and Bogor. The commodities protection structures are generally in consistent with their economic efficiency configuration. The economic incentives are generally biased toward Java.

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INTRODUCTION

In an increasingly interdependent world, domestic policies in a country can be easily transmitted to other countries. It should be clear that not only trade policies but also commodity production and consumption policies as well as macroeconomic fiscal and monetary policies of one country can be harmful to other countries. Under such a situation, cooperation among trading partners are needed to harmonize their policies for mutual benefits.

The objectives and interest of each country may be different one to another. Regional cooperation among smaller number of countries would be more plausible both economically and politically. Accordingly, economic cooperation among the Pacific countries should be a feasible proposal.

Indonesia is a net import of livestock and dairy products and a net import of feedgrains especially corn and soybean. With increasing income and population the demand for meat, eggs and milk and other livestock products will increase at a rapid rate. At current level of income demand elasticity for livestock products are elastic.

In the last 20 years (1968-1988) the rate of growth of production of meat, egg and milk were 7.3 percent, 14.8 percent and 12.6 percent respectively. In addition, the livestock subsector plays an important role in the national economy. This subsector contributed about 10% of the agricultural GDP and provided almost 4.0 percent of employment in agriculture.

At current level of consumption, domestic production of chicken meat and eggs has satisfied domestic demand, whereas beef slightly deficit and dairy products has only been able to provide 40 percent of domestic consumption.

To meet the increasing demand for the livestock products the Government of Indonesia has implemented a set of policies on livestock production, feedgrain production and trade. These policies aimed to give incentive to producer and to protect consumers from international price fluctuations. To be able to implement these policies effectively and efficiently it is important to have adequate and reliable informations economic analysis of the livestock commodity system.

This present study is part the PECC Task-Force Livestock and Feed Grains Study Programme. This Indonesia Country study will be focused on feed grains, beef, dairy and poultry industries. The general objective of this study is to examine the feasibility and to formulate activities of regional cooperation among the Pacific Countries to achieve domestic and regional objectives.

The specific objectives of this Indonesia country study are:

- (1) To describe the structure and performance of the livestock and feed stuff subsectors.
- (2) To review government policies related to livestock and feed stuff sub sectors.

- (3) To examine the impacts of the government policies on the promotion of efficiency and equity.
- (4) To measure comparative advantages (competitiveness) of domestic livestock and feed stuff production relative to various regions, technologies and farm structure.
- (5) Examining whether existing incentives encourage development in a way that is consistent with comparative advantage, or hinder such development.
- (6) To develop alternative incentive structures to improve resource allocation within the livestock and feed stuff sub sector.

METHODOLOGY

Indonesia is a large country. Its resource potentials vary from region to region. Presumably, each region has comparative advantage on some feed and livestock production over the others. A study of comparative advantage, therefore, should be more appropriately conducted on regional basis rather than aggregate national basis. This regional disaggregation is also useful to capture any regional biases on the government incentives. Regional bias government incentives have been major issues in Indonesia economic development.

In addition to appropriate disaggregation, another important aspect of comparative advantage study is trade regime. Trade regime indicates marketing orientation of the domestic products. There are three trade regime scenarios investigated in this study. The trade regimes are interregional trade (IR), import substitution (IS), and export promotion (EP).

The incentive criteria used in this study are Nominal Protection Rate (NPR), Effective Protection Rate (EPR), Effective Subsidy Rate (ESR), and Implicit Tariff (IT). The comparative advantage criteria are Domestic Resource Cost (DRC), Domestic Resource Cost Ratio (DRCR), and Net Economic Benefit (NEB).

The Nominal Protection Rate (NPR) is the ratio of the difference between the domestic producer price and world (border) price of a commodity expressed in percentage. A positive NPR indicates domestic price protection of the output which is an incentive to expand production. A positive IT, on the other hand, means an implicit taxation on inputs a production disincentive.

The net effect of both NPR and IT can be calculated using the formula for Effective Protection Rate (EPR). The EPR measures the degree to which protection causes actual value added to diverge from the value added that would have prevailed in the absence of protection. A positive EPR implies that production of a particular commodity is receiving net positive incentive, while a negative EPR indicates net disincentive.

The Domestic Resource Cost (DRC) can be formally stated as the ratio of the domestic costs of production and the difference between the border price of output and foreign (or tradable) costs. Comparative advantage is measured by the resource cost ratio (RCR), which is the DRC value divided by the shadow exchange rate of currency.

The relevant values of DRC and RCR are derived only when the border price of output is greater than the foreign costs of producing it. Otherwise, it is clear that the production system has no comparative advantage, since it cannot cover the foreign cost of producing it.

For a useful analysis the DRC and RCR comparative advantage indicators will be combined with profitability indicators. The profitability indicators include private profitability (Net Financial Profit = NFP) and social profitability (Net Economic Benefit = NEB). The NFP is computed in the usual way, that is revenue minus cost per unit output.

As an indicator of comparative advantage, the concept of NEB has direct relationship with DRC. A production system has a comparative advantage whenever the NEB is positive. The DRC approach will be employed using assumption of two basic trade regimes: *Import Substitution (IS)*, each activity is assumed producing import substitution commodity, and *Export Promotion (EP)* assesses the viability of the country to export the commodities under study.

The Data

The data used for this study include secondary and primary data. The secondary data are obtained from various institutions such as Ministry of Agriculture, Central Bureau of Statistics, National Logistic Agency, and research institutions. Primary data is collected through field survey. The secondary data is collected to obtain input-output coefficient of livestock farmings and their marketing costs. Input-output coefficients for feed grain farmings are obtained from the Central Bureau of Statistics.

GOVERNMENT POLICIES

Indonesia is now in transition toward a more open economy. A massive deregulation programs have been conducted in the last five years. The deregulations include banking, trade and industry, taxes and tariff. The policy is designed to promote domestic production and exports.

Livestock production in Indonesia is geared through three types of development pattern namely: (a) smallholder household farming, (b) large scale private farming, and (c) nucleus smallholders farming system.

Livestock Production Organization

Indonesian livestock production is dominated by household farming. As we can see from Table 1, in any type of livestock farming the household farmings own at least 94 percent of the animal populations. The private enterprises are not surprising, therefore, that the livestock development programs are concentrated on household farmings. The livestock development policies are designed to increase production (value added), farmer's income, labor absorption, export promotion and import substitution. The livestock sector development is also expected to help increasing food nutritional quality of the people.

Table 1. Composition of animal holding by type of enterprise (percentage), 1983

Farming	Household	Enterprise	Total
1. Beef and dairy cow	99.4	0.6	100.0
2. Buffalo	99.7	0.3	100.0
3. Horse	99.9	0.1	100.0
4. Goat and sheep	100.0	0.0	100.0
5. Pig	96.0	4.0	100.0
6. Poultry*	93.7	6.3	100.0

*Chicken and ducks.

Sources: Central Bureau of Statistics.

Household farming development is encouraged through cooperative system. Extension of strong cooperative system is both for political and economic reasons. The cooperative system is recommended economic organization according to the national constitution. Various government incentives are channeled through cooperative and may be provided to cooperative members.

The success of milk cooperative system is the result of government heavy intervention. The most important one is on milk marketing. Fresh milk domestic market is controlled by the government by arranging the amount of fresh milk supplied to the processors and at a determined price. With this, the cooperative members have warranted market for their milk product. In addition to marketing certainty, the cooperative members also obtain various incentives such as credits (usually in cow bred and feed), artificial insemination service, and animal health service.

Livestock Credits

Based on its sources and implementation, livestock farming credit are of four types: (1) commercial credit; (2) livestock development program; (3) government aid; (4) foreign aid projects. The commercial credit is the ordinary commercial bank

credit. It can be obtained individually with the usual banking credit procedures. This type of credit is usually provided for larger farmers. The government program related credit is organized by the government as a part of a particular development package. It is usually provided to small farmers extensively. The foreign aid project is a livestock development program funded with foreign aid, usually with counter part fund from the government. The government aid program is a special aid for the poorest farmers. This include the presidential aid and crash program aid.

Without any doubt the commercial credit in livestock sector is quite large. This is especially true since the rapid development of livestock related private enterprise since late 1970's. The increase in number and size of the private enterprises is especially high in feed manufacturing industry, milk processing industries and poultry farming. Unfortunately, this can not be substantiate with empirical data.

Cooperative credit is given to farmers, members of rural cooperative (KUD Model). The requirements to obtain the credit are very limit. Those who have experience in livestock farming, even does not own any livestock, may qualify to get the credit. In other words, livestock farmers, fence laborers and grass collectors are all elligible.

The cummulative value of credit distributed to the farmers and the unrepaid portion for various government programs are presented in Table 2. From the table we can see that the largest amount of the credit is channelled through the BANKOP (Cooperative aid). This is an indicator of the Government objective to promote

Table 2. The cummulative amount of total credit and unrepaid credit by programs (by April 1985).

No.	Program	Total Credit (Million Rp.)	Unrepaid ²	
			(Million Rp.)	(%)
1.	PUSP	4 373.6	855.4	(19.56)
2.	PUTP	10 707.8		
	a. Fattening	8 598.0	618.7	(7.20)
	b. Breeding	2 109.8	593.6	(28.14)
3.	BIMAS Ayam	3 249.1		
	a. Layer	2 199.4	242.5	(11.03)
	b. Broiler	1 050.7	442.1	(42.07)
4.	Keppres 50/81	19 475.9		
	a. Layer	15 396.1	1 527.4	(16.42)
	b. Broiler	4 079.8	1 195.1	(29.29)
5.	RCP	21 430.8	n.d.a	n.d.a
6.	BANKOP	36 727.6	n.d.a	n.d.a
7.	INTEK	87.0	n.d.a	n.d.a
Total		96 052.8	unknown	

Source: Directorate General of Livestock data files.

livestock farming through cooperative system. The unrepaid credit is quite high, ranging from 7.20 to 42.07 percent. The lowest credit repayment rate is for broiler. This is reasonable since poultry farmers have faced a hard time due to price instability. Many farmers have losing money. The highest loss has been for broiler farmers.

Livestock Product Trade

Livestock product market is one of the most heavily controlled by the government. This may be partly due to the role of the livestock product as basic food. The government regulates both international and domestic (especially inter-regional) trades. The trade regulations, however, are quite selective. They vary according to the kind of products. In general, the livestock trade policies are designed to protect domestic industry, farmers and consumers.

Perhaps in an attempt to protect domestic consumers, meat and egg exportation are controlled by the government. Beef and dairy cattle exportation is strictly prohibited. Chicken meat, pig, goat and meat may be exported but with special permit or licence. Indonesian meat export has been very small in recent years, however there is an indication of increasing in meat import.

Import tariff varies from zero to 40 percent. Breeding animal importations do not have tariff. The tariff restrictions are partly designed to protect domestic industry and farmers.

In the spirit of farmers protection, the government also places quantitative restriction on milk import, in addition to tariff. The quantitative restriction is commonly known as milk ratio. Milk importation is linked to the use of milk domestic production by milk processing industry through a quota system. The milk import quota is given to each milk processing company in proportion to the amount of domestic produced milk used by the company.

Livestock interregional trade is regulated by the government through a quota system. The amount and direction of interregional trade is determined every year by the Director General of Livestock.

Occasionally, the government may intervene directly in the market to stabilize the meat price. The market operation may be conducted by the National Logistic Agency (BULOG). This market operation could happen during the hari raya lebaran (moslem holiday).

Feed Stuff Production

Feed stuff can be either green vegetation, agricultural waste and feed concentrate. Feed concentrate basic ingredients are corn, soybean, rice bran, cassava and wheat pollard. Wheat is not produced domestically. The government involvement in green vegetation production is very limited. If there is any, it is basically in

the provision of high yielding seed. The major government involvements are in rice, corn, soybean, and cassava production. The most important policies are certified rice seed, fertilizer and pesticide subsidies. These subsidies, however, have been reduced gradually. This is in line with the government economic deregulation program. Currently pesticide subsidy has been pass out and fertilizer prices still at 40 percent to 60 percent subsidized.

The Government also set floor price at the farm level on corn and soybean. Cassava, however, does not have floor price. Their ratios with paddy floor price decrease overtime. This indicates that the government support price policy is biased toward rice.

The feed grains and tuber are in competition with rice production. Rice is the main food in Indonesia. Rice production does not only enjoy input subsidies, but also price support, extension service, irrigation and official encouragement. The rice biased policy discourages feed grain and tuber production.

Feed Grain Trade

Most feed stuffs trades, such as corn, soybean, soybean cake, and fish meal, are controlled by the government. These commodities are net imported products. Importation of the products is the monopoly right of the National Logistic Agency (BULOG). BULOG then distributes the product to various users. Recently corn trade has been deregulated and liberalized.

The domestic markets are controlled by the BULOG by changing the price level and quantity of the distributed products. The purpose of the government market intervention is to stabilize the price at a level which is considered fair to both producer and consumer.

Domestic procurement of corn has been insignificant. The floor price have been ineffective in the sense that it has always been below the market level. In addition storage of domestic produced corn is difficult because of its high moisture content. Market operation is conducted by stabilizing price and supply facing the local feed industry by releasing corn from the stock and importation.

Domestic procurement of soybean grain and meal are also very small. The floor price has been far below the market price. The main instrument for price stabilization has been controlling imports. The soybean grain and meal are distributed directly to large feed meal, Feed Importer Association, and Tofu and Tempe Producer Cooperative.

Feed Industry

The feed industry expanded very rapidly in the early 1970's. This rapid expansion had been closely related to the rapid growth of the poultry industry due to

introduction of modern poultry farming. The modern poultry farming is characterized by; (1) highly specialized, (2) using high yielding chicks, (3) using manufactured feed; (4) using modern rearing practices.

In 1986 there were 71 feedmills registered with the Directorate General of Livestock. The feed mills were located in nine provinces (Table 3). Most of the feedmills are mainly concentrated in West Java (33), East Java (10), Central Java (8) and North Sumatera (7). Although there were only three feed mills in Jakarta, but in terms of production it placed in the third rank.

Table 3. Feed mills distribution, production capacity and actual production, 1986.

Province	Number	Production (ton/month)		Capacity utilization (%)
		Capacity	Actual	
Jakarta	3	18450	13850	75.0
West Java	33	120300	46578	38.8
Central Java	8	9150	4538	49.0
Yogyakarta	2	750	190	25.3
East Java	10	126450	48580	38.6
North Sumatera	7	16960	8580	50.5
West Sumatera	3	1020	420	42.2
Lampung	4	10900	3140	19.6
Riau	1	300	30	10.0
Total	71	304280	126148	41.5

The five largest feed mills production regions are East Java, West Java, Jakarta, North Sumatera and Lampung. But unfortunately, the capacity utilization is very low in all provinces except Jakarta. The capacity utilization reached 75 percent in 1986. But in other regions, the capacity utilization ranged from 10.0 to 50.5 percent.

The very low capacity utilization rates indicate over expansion of the feed mill industry. The over expansion and under capacity problem of the feed mill industry is partly induced by Government Policies. In early 1970's the industry enjoys various incentives such as low interest rates, over value exchange rate, easy credit, and free importation of raw materials. At the same time the demand of feed had been increased rapidly. But then the Government changed it policies. The importation and distribution of feed raw materials were taken over by the Government. The policy was intended to conserve foreign exchange and to help small size feed mills at the same time the growth of the poultry production was slowed down. The growth rate of the demand for feed also slowed down. But the feedmills were already constructed more than sufficient to supply effective feed demand.

COMPARATIVE ADVANTAGE

Corn

The summary of economic comparative advantage for corn for each region and trade regimes are presented in Table 4. The table shows that the domestic corn production is economically feasible in all regions under the interregional and import substitution regimes. The production is not feasible if intended for export in two regions, West Java and East Java. The corn production in these two regions should be used for domestic consumption, either for import substitution or inter regional trade. The average production for open polinated corn in all regions was around 2.0 ton/ha. The potential to improve the level of production is still very large, because potential yield with improved technological package can reach 4 ton/ha.

Table 4. Summary of economic comparative advantage of corn by region and trade regimes.

Region	Trade regimes	RCR	DRC	NEB (Rp/kg)	NFP (Rp/kg)
West Java	IS	0.85641	1408	20.64	18.43
	EP	1.52588	2509	-49.47	-56.56
Central Java	IR	0.64226	1056	50.18	77.07
	IS	0.53806	885	67.85	98.88
East Java	EP	0.93058	1530	7.08	7.52
	IR	0.79586	1308	21.71	14.64
	IS	0.69801	1148	40.85	55.59
Sumatera	EP	1.23166	2025	-20.87	-20.46
	IR	0.55306	909	59.72	56.94
	IS	0.46642	767	73.96	96.37
Bali & N. Tenggara	EP	0.98264	1615	1.62	17.33
	IR	0.44179	726	78.70	93.70
	IS	0.41974	690	89.11	107.28
South Sulawesi	EP	0.72184	1187	27.39	16.71
	IR	0.47879	787	75.38	48.55
	IS	0.8454	1390	91.25	43.01
Kalimantan	EP	0.75442	1240	24.88	17.21
	IS	0.47165	775	81.82	110.91
	EP	0.82205	1351	17.67	6.56

RCR = Resource Cost Ratio; DRC = Domestic Resource Cost;
NEB = Net Economic Benefit; NFP = Net Financial Profitability

The most efficient producing regions are Bali & Nusa Tenggara, Sumatera, and Kalimantan. Both economic and financial profit are also high in Bali & Nusa Tenggara, Sumatera and Sulawesi. Hence corn production in these three regions should be promoted for both domestic and export purposes.

Based on the above analysis, the suggested trade directions for each producing region are presented in Table 5.

Table 5. Suggested corn trade directions for each producing region.

Producing Region	Import substitution	Interregional trade	Export promotion
West Java	West Java	—	—
Central Java	Central Java	Jakarta	—
East Java	East Java	Jakarta	—
Sumatera	Sumatera	Jakarta	—
Bali & Nusa Tenggara	Bali & Nusa Tenggara	Kalimantan	Denpasar
Sulawesi	Sulawesi	Sulawesi	Ujung Pandang
Kalimantan	Kalimantan	—	Balik Papan

Cassava

Table 6 shows that the domestic resource cost ratios for cassava were less than 0.5 in all regions. Hence, the cassava production is very competitive in all region of Indonesia. The dried cassava production should be promoted as an export commodity.

Table 6. Comparative advantage indicators of dried cassava production by region and trade regime, 1986.

Region	Trade regime	Resource cost ratio	Domestic resource (Rp/US\$)	Net economic benefit (Rp/kg)
West Java	EP	0.45908	754.73	84.28
Central Java	EP	0.40589	667.28	93.06
East Java	EP	0.46067	757.34	83.23
Sumatera	EP	0.29620	486.95	109.32
Bali & Nusa Tenggara	EP	0.26586	437.07	113.96
Sulawesi	EP	0.31036	510.23	105.90
Kalimantan	EP	0.26139	429.73	116.05

EP : Effective protection. Official exchange rate in 1986 was Rp 1644/US\$.

If we look at production centers, the most efficient dried cassava producing regions are Kalimantan, Bali, Nusa Tenggara and Sumatera. The cassava production in Java is less efficient than that off Java. The domestic resource cost ratios in Central Java, West Java and East Java were higher than outside Java regions. Therefore export promotion trade regime cassava production in the above regions outside Java should be increased.

Soybean

In Table 7 we can see that soybean production in West Java does not have comparative advantage either under the import substitution regime nor under the export promotion regime. Clearly from the economic point of view, the soybean production in West Java is not feasible. It is better to use land resource in West Java for non soybean farming, and its soybean requirement supplied from other region.

Table 7. Summary of economic comparative advantage of soybean, 1986.

Producing region	Trade regimes	Resource cost ratio	Domestic resource cost	Net economic benefit (Rp/kg)
West Java	IS	1.40797	2315	-110.29
	EP	1.59217	2618	-151.56
Central Java	IR	0.72661	1195	82.27
	IS	0.66206	1088	104.38
	EP	0.76028	1250	71.44
East Java	IR	1.04375	1716	-11.84
	IS	0.94716	1557	14.82
	EP	1.07263	1763	-19.55
Sumatera	IS	0.55759	917	134.65
	EP	0.65924	1084	99.72
Kalimantan	IS	0.78492	1290	64.19
	EP	0.90005	1480	28.46
Sulawesi	IS	0.46451	764	167.49
	EP	0.55830	918	132.65
Bali & Nusa Tenggara	IR	0.47732	785	166.71
	IS	0.48753	801	151.85
	EP	0.56779	933	132.93

OER = Official exchange Rate = Rp 1644 /US\$.

Soybean production in East Java is only feasible economically under the import substitution regime, under the interregional and export promotion regime, the soybean farming in the region is highly under the break even point. Clearly, this region is still highly promising to become feasible under the three trade regimes. This can be improved by changing technology and resource (inputs) allocations.

The other producing regions, Central Java, Sumatera, Bali and Nusa Tenggara, Sulawesi and Kalimantan are economically feasible to produce soybean. The three most efficient producing regions are Sulawesi, Bali and Nusa Tenggara and Sumatera : This is consistent with the farming analysis in the last section. Kalimantan, however is barely break even under the export promotion regime. Average pro-

duction of soybean was still very low i.e around 1.2 ton/ha. Therefore there is a relatively large potential yield improvement, since potential yield can reach 2.5 ton/ha.

Based on this analysis the suggested efficient production and trade orientation may be summarized as in Table 8. The analysis also shows that the most efficient resource use is always under the import substitution regime, and then followed by the interregional trade. In other words, the domestic soybean production should be directed for domestic consumption first. This is also consistent with the present situation where Indonesia is still deficit in soybean.

Table 8 Suggested producing regions and trade directions.

Producing region	Trade direction
1. Central Java	Intra province, West Java, Jakarta, export
2. East Java	Intra province
3. Sumatera	Intra island, export
4. Bali & Nusa Tenggara	Intra regional, Kalimantan, Sulawesi, export
5. Sulawesi	Intra island, export
6. Kalimantan	Intra island

Rice

Rice production is economically feasible in all regions and all trade regimes. These indicate that rice farming should be promoted in Indonesia. This study shows that the rice production is also beneficial for exportation. Indonesia has comparative advantage in producing rice (Table 9).

If we look at by trade regimes, then we could see that the most efficient rice production orientation is for domestic use, import substitution and then followed by Interregional Trade. Accordingly, the policy for using domestic rice production primarily for domestic consumption is consistent with efficient resource allocation. In other words, although rice exportation is feasible in recent years, but it is economically more efficient if the rice production is used domestically.

The most efficient rice producing regions are Sulawesi and Kalimantan, and then followed by Bali & Nusa Tenggara and Sumatera. As it has been mentioned, the rice production outside Java is more efficient than in Java. Accordingly, rice production in Indonesia should be promoted especially outside Java. Presently, most Government supports and facilities have been concentrated in Java and Java contributed to nearly 60 percent of total rice production.

The need to promote rice production outside Java is very important to maintain rice self-sufficiency which was already achieved in 1984. Presently, the

Table 9. Comparative advantage indicators of rice production by regions and trade regimes, 1986.

Region	Trade regimes	Resource cost ratio	Domestic resource cost	Net economic benefit
West Java	IR	0.49624	815.82	153.47
	IS	0.46147	758.66	166.06
	EP	0.69814	1147.74	73.01
Central Java	IS	0.49624	815.82	153.47
	EP	0.40397	664.13	182.54
East Java	IR	0.49230	809.34	143.66
	IS	0.45158	742.40	158.57
	EP	0.66493	1093.14	76.72
Sumatera	IR	0.35004	575.47	197.16
	IS	0.30841	507.03	216.94
	EP	0.47635	783.12	132.85
Sulawesi	IR	0.28487	468.33	215.26
	IS	0.25626	421.29	230.79
	EP	0.36516	600.32	159.35
Kalimantan	IS	0.27867	458.13	228.64
	EP	0.43728	718.89	145.04
Bali & N. Tenggara	IS	0.29957	492.49	221.42
	EP	0.46345	761.91	137.84

Government still concentrates its efforts in Java by launching the so called Special Intensification program (INSUS). Perhaps, this kind of policy could only solve short run problems. The more plausible policy to increase rice production sustainably might be through promoting intensification and developing irrigation outside Java.

Dairy

From Table 10 we can see that the dairy industry is not yet economically feasible for all types of enterprise technology and trade regimes. The domestic resource cost ratios for the corporate farming range from 1.67 to 5.02, whereas for household farming they range from 1.40 to 3.52.

This findings indicate that the cross breed is more suitable than imported breed in Indonesia. This is especially true for the small farmers. The dairy farming in Indonesia is dominated by smallholders. The government also induces the dairy development through the nucleus private corporate and smallholders system. Accordingly, the present study shows that the dairy farming development should be directed to use the cross breed.

Milk processing industries are concentrated in Jakarta and Surabaya. Accordingly, the raw material (fresh milk) must be transported from the producing regions to the milk processing locations. Table 10 shows that the interregional

trades of semi processed milk production in Salatiga, Central Java, are the most inefficient among the trade orientations. This is due to high transportation cost and inefficient marketing system.

Table 10. Summary of comparative advantage criteria for milk production.

Producing region	Technology	Trade regimes	Wholesale location	Resource cost ratio	Domestic resource cost	Net economic benefit	
Corporate	Imported breed	IR	Jakarta	5.02	8315	-208	
			Surabaya	3.19	5275	-170	
			Bandung	2.82	4659	-149	
		IS	Salatiga	2.88	4767	-150	
			EP	Semarang	2.85	4718	-155
	Cross breed	IR	Jakarta	2.20	3640	-204	
			Surabaya	1.74	2883	-155	
			Bandung	1.67	2767	-139	
		IS	Salatiga	1.70	2819	-142	
			EP	Semarang	1.67	2767	-142
Household	Imported	IR	Jakarta	3.52	5828	-176	
			Surabaya	2.66	4398	-147	
			Bandung	2.70	4463	-138	
		IS	Salatiga	2.40	3979	-127	
			EP	Semarang	2.36	3908	-131
	Cross breed	IR	Jakarta	1.74	2885	-168	
			Surabaya	1.40	2317	-109	
			Bandung	1.45	2400	-115	
		IS	Salatiga	1.45	2407	-115	
			EP	Semarang	1.45	2240	-99

Based on this finding we can conclude that with given technology, farming system and prices of the dairy industry in Indonesia are not efficient in resource use. If the milk production must be produced domestically, then the most efficient production orientation is import substitution. This means that the milk processing must be located in the same location with the dairy farm. The processed milk produced is then used for local consumption. With this consolidation of the dairy farming and milk processing plants locations is useful to reduce transportation cost. Hence the milk production will be more efficient.

Pork

From Table 11 we can see that the domestic resource cost ratio (DRCR) of pork meat products were always less than unity. The data from the table indicate

that the pork meat production is feasible in Indonesia either for domestic use (interregional trade and import substitutions) or for export (export promotions).

If we look at by trade regime, we can see from Table 11 that the most efficient trade orientation is import substitution and then followed by export promotion and interregional trade. The efficiency differentials between the trade regions, however, are quite small. Hence the pork production can be directed for any trade regimes.

This study also indicates that the intensive household pig farming is more efficient than the corporate pig farming. As we can see from the above table the domestic cost ratios of the corporate intensive pig farming are around 0.6 under all trade regimes. This indicates that the pig production in Indonesia should be directed toward household intensive farming. The household intensive farming would generate higher economic benefit and more efficient than the corporate farming. However, for export standarization and quality of the products should be improved.

Table 11. Summary of swine meat comparative advantage criteria (Rp/Kg).

Producing region	Technology	Trade regime	Wholesale/ Port	DRCR	DRC	NEB
Bali	Intensive	IR	Kalimantan	0.30	496	20,671
			Surabaya	0.29	476	217,576
		EP	Bali	0.25	419	239,217
			Bali	0.26	430	235,573
Bali	Unintensive	IR	Kalimantan	0.64	1,067	108,830
			Surabaya	0.66	1,087	102,978
		EP	Bali	0.57	946	141,976
			Bali	0.58	962	138,332
Central Java	Corporate & Intensive	IR	Jakarta	0.60	989	89,293
		IS	Semarang	0.59	971	105,543
		EP	Semarang	0.60	990	102,445

IR = Interregional Trade.

IS = Import Substitution.

EP = Export Promotion.

Official exchange rate is Rp. 1,655/US\$ in 1987.

Beef

Table 12 shows that the beef production is economically feasible in all producing regions, all types of technology and all trade regimes. The data from this table indicate that beef production is economically feasible either for domestic consumption or exportation.

Table 12. Summary of domestic resource cost criteria of beef production, 1987 (for kg carcass).

Producing region	Technology	Trade regimes	Domestic resource cost ratio	Domestic resource cost	Net economic benefit
East Nusa Tenggara	Free grazing (Household)	IR	0.40231	665.82	260537
		IS	0.30745	508.84	319425
		EP	0.28883	478.00	356644
East Nusa Tenggara	Tied system (Household)	IR	0.37531	621.14	277301
		IS	0.28353	469.24	336189
		EP	0.26708	442.02	373408
Central Java	Fattening (Household)	IR	0.52808	873.97	165613
		IS	0.48280	799.03	187052
		EP	0.44199	731.50	224271
West Java	Fattening (Corporate)	IR	0.61960	1025.13	100275
		IS	0.59173	979.32	109230
		EP	0.54751	906.13	137494

Notes: Official exchange rate in 1987 was Rp. 1,655/US\$.

The most efficient producing region is East Nusa Tenggara. The tied system is a little more efficient than the free grazing system. As it has been mentioned the beef farming system in Nusa Tenggara is a whole system, where the farmers rear the animal since the starter stage. The farming system in Central and West Java is fattening. The farmings in Central Java are a household business whereas in West Java the sample is a corporate business. From the data in the table we can see that the household fattening is more efficient than the corporate fattening in terms of resource use.

It we look at by trade regimes, the data show that the export promotion regime is the most efficient one, and then followed by import substitution and interregional trade regimes. Accordingly, the present system, where the beef produced in East Nusa Tenggara, East Java, and West Java, and then transported to West Java and Jakarta is not the most beneficial trade arrangement economically. Perhaps, the more beneficial alternative is exportation of the beef from the producing regions, and importing from abroad the meat requirement of the deficit region. The present interregional trade is not efficient because the animal must be transported alive from the producing regions. As we know, Jakarta is far away from East Nusa Tenggara. Therefore for efficiency reason the beef should be process in the production and the processed products then transported to consuming regions in Java.

Chicken (Broiler and Layer)

From Table 13 we can see that the domestic resource ratios of the chicken meat productions were below unity in all producing regions under all trade regimes. Accordingly, the broiler farming is economically efficient and has comparative advantage and be able to compete in domestic and world markets.

If we look at by producing region, we can see that the most efficient producing regime is in Bogor, than followed by Tasikmalaya and Lampung. Both Bogor and Tasikmalaya are located in West Java. Hence West Java is a very efficient region of producing chicken meat.

Table 13. Summary of chicken meat comparative advantage criteria, 1987 (for 100 kg carcass).

Producing region	Trade regimes	Resource cost ratio	Domestic resource cost (Rp/\$)	Net income benefit (Rp)
Lampung	IR	0.5343	884	62,553
	IS	0.3290	545	109,257
	EP	0.3479	576	104,820
Tasikmalaya	IR	0.5106	845	59,802
	IS	0.1940	321	141,933
	EP	0.5376	890	55,975
Bogor	IR	0.2379	394	135,586
	IS	0.1944	322	151,243
	EP	0.2546	421	131,759

Notes: IR = Interregional trade.

IS = Import Substitution.

EP = Export Promotion.

Exchange rate in 1987 was Rp. 1,655/US\$.

West Java is the largest broiler producer in the country. This large production, therefore, is consistent with the very efficient resource cost. Broiler production in Lampung is still very low, but it is increasing very rapidly in recent years. Both West Java and Lampung are very close to Jakarta, the largest consuming area in the country. Therefore, poultry farmings in West Java and Lampung have a large potential to further developing in the future.

From this study we can conclude that the broiler industry in Indonesia is quite efficient. It is very competitive in international market. But the more beneficial use of the broiler production is for domestic consumption, especially for import substitution. The more efficient producing region is West Java. This is consistent with the fact that this region is the largest broiler producer in the country. Broiler production in Indonesia should be promoted.

Egg production in Lampung is economically feasible under the three trade regimes. For Tasikmalaya, the egg production is not economically feasible for exportation and interregional trade. But it is very efficient for import substitution (Table 14).

Egg production in Bogor is feasible under the import substitution and inter-regional trade regime but not feasible for exportation. Consequently, the highest economic benefit generated from the egg production is under the import substitution regime. Clearly, the net economic benefits obtained under the interregional and export promotion regime are far below the import substitution trade regimes. Hence egg production in Bogor should be directed for import substitution.

Table 14. Summary of the comparative advantage criteria for chicken egg production, 1987 (per 100 kg).

Producing region	Trade regimes	Resource cost ratio	Domestic resource cost	Net economic benefit (Rp 100/kg)
Lampung	IR	0.4988	825.51	23,290
	IS	0.1925	318.59	59,892
	EP	0.2235	369.89	55,862
Tasikmalaya	IR	1.9808	3278.22	-16,123
	IS	0.4239	701.55	25,085
	EP	2.3055	3815.60	-19,960
Bogor	IR	0.8350	1381.93	35,518
	IS	0.3689	610.53	22,271
	EP	1.0111	1673.37	- 224

Notes: IR = Interregional Trade.

IS = Import Substitution.

EP = Export Promotion.

Exchange Rate in 1987 was Rp 1655/US\$.

Based on these findings we can conclude that the most efficient egg producing region is Lampung. The egg production in Lampung can be efficiently used either for domestic consumption or exportation. Presently, the egg production in Lampung is still very low. Nevertheless, it has been increasing very rapidly in recent years. The egg production in Lampung could be directed especially for exportation. This region is close to Singapore. The feed materials in this region are also abundant. Lampung is a surplus region of corn, cassava and rice.

ECONOMIC INCENTIVES

As it has been mentioned that the policy incentive indicators used in this study are Nominal Protection Rate (NPR), Effective Protection Rate (EPR) and Implicit Tariff (IT). The incentive indicators will be computed by regions and trade regimes.

Corn

Table 15 shows that the nominal protection rates are negative in West Java, East Java and Sulawesi. These three regions produce large amount of corn. The highest nominal protection rates are for Jakarta and Kalimantan. These two regions are corn deficit regions. These findings shows that the protection, is biased toward consumers. Sulawesi one of the most efficient producing region was penalized instead of protected. East Java the largest corn producing area was also penalized.

Table 15. Nominal protection rate (NPR) of corn by region, 1986.

Region	Import parity (Rp/kg)	Wholesale (Rp/kg)	NPR (%)
West Java	177.27	175.54	-0.98
Central Java	172.03	200.13	16.3
East Java	172.51	139.49	-19.14
Sumatera	172.31	179.38	4.10
Bali & Nusa Tenggara	172.66	186.32	7.91
South Sulawesi	173.08	140.27	-18.96
Kalimantan	173.73	212.54	22.34
Jakarta	168.31	206.54	22.71

The lowest effective protection rates are in Sulawesi and West Java. The effective protection rates in Sulawesi are even negative under the interregional and import substitution trade regimes (Table 16). As it has been mentioned earlier, corn

Table 16. Summary of effective protection and implicit tariff on corn by region and trade regimes, 1986.

Region	Effective protection (%)			Implicit tariff (%)		
	IR	IS	EP	IR	IS	EP
West Java	—	3.10	4.71	—	-32.71	-23.01
Central Java	28.46	20.60	6.86	-15.16	-24.78	-4731
East Java	31.66	-17.81	4.42	-18.11	-27.95	-21.92
Sumatera	33.30	10.49	6.08	-26.33	-32.35	-26.35
Kalimantan	24.06	24.06	0.05	—	-5.78	-0.47
Sulawesi	-21.45	-20.09	0.48	-0.20	-7.43	-3.34
Bali & Nusa Tenggara	24.03	8.24	-0.57	9.17	3.05	5.46
Tenggara						

production in Sulawesi is very efficient. Hence, inhibiting corn production in this area is a misleading policy.

The effective protection rate in East Java under the import substitution regime is also negative. This is due to the negative nominal protection rate in this region. The effective protection rates are generally very high under the interregional trade regime. The negative effective protection rate in Sulawesi is partly due to the negative nominal protection rates.

With exception to Bali & Nusa Tenggara, the implicit tariff rates are negative. This indicates that the farmers generally enjoy input subsidies. The higher subsidies received by the Javanese farmers. This is reasonable since corn farming in Java is very intensive in using fertilizers. Fertilizers are highly subsidized by the Government.

Soybean

The highest effective protection rates are for the interregional trade regime, and the lowest are for the export promotion regimes. This indicates that the protection policies are biased toward domestic producer and domestic market. This is commonly known as inward looking strategy. This is consistent with the nature of soybean production. As it has been shown previously the soybean production is most efficient in resource use under the interregional trade regime, and followed by the import substitution trade regime. Input subsidy structure has similar pattern with the effective protection (Table 17).

This analysis shows clearly that the structure of economic incentives for soybean is biased toward domestic market. The protection for the interregional and import substitution regimes come from both output price supports and input subsidies, but the protection through output price is the highest one.

Table 17. Economic incentives indicators of soybean production in 1986.

Producing Region	Effective Protection rate			Implicit Tariff		
	IR	IS	EP	IR	IS	EP
West Java	—	81.59	6.72	—	-51.04	-41.39
Central Java	100.78	62.61	1.91	-19.93	-28.22	-20.76
East Java	102.85	67.92	2.23	-18.69	-27.31	-20.67
Sumatera	—	71.20	2.57	—	-24.30	-21.00
Kalimantan	—	83.91	4.52	—	-41.37	-33.64
Sulawesi	—	42.08	1.07	—	-12.20	- 3.53
Bali & Nusa Tenggara	75.23	83.66	0.15	- 1.15	- 1.70	1.71

Note: IR = Interregional trade.
 IS = Import Substitution.
 EP = Export Promotion.

Regional structure of the incentives, however, is not quite good. The least efficient producing regions, such as West Java and Kalimantan, enjoyed the highest incentives while the most efficient producing region such as Sulawesi enjoyed the least incentives. The economic incentives should be given primarily to the most efficient region such as Sulawesi, Sumatera, Bali and Nusa Tenggara. This can be done by improving domestic market efficiency and promoting intensification program in the areas.

Table 18 shows that the highest nominal protection rate is for Jakarta reaching 90.62 percent. Jakarta is not a producing region. It is a major consuming region. The lowest nominal protection rate is for Sulawesi which is the most efficient producing region. Clearly, the structure of the nominal protection is not conducive in directing production towards the most efficient region. There is an indication that the protection is biased toward consumers.

Table 18. Nominal protection rate (NPR) of soybean, 1986 (%).

Region	Wholesale (Rp/kg)	Import Parity (Rp/kg)	NPR (%)
West Java	586.54	347.80	68.64
Central Java	538.60	343.63	56.74
East Java	553.21	344.35	60.65
Sumatera	561.00	343.38	63.38
Bali & Nusa Tenggara	586.40	344.04	70.45
Sulawesi	468.77	346.20	35.40
Kalimantan	590.87	345.03	71.25
Jakarta	639.47	335.47	90.62

Cassava

From Table 19 we can see that the nominal protection rates were positive in all regions. The lowest nominal-protection rate was in Sumatera and then followed by East Java, West Java and Central Java respectively. These four regions are the major dried cassava exporting regions in the country. This findings indicate that the higher discrepancy between border price and domestic price, the more open producing region to the world market is.

The implicit tariff of the cassava production were all positive. This indicates that the dried cassava production did not receive input subsidies. Instead, the farmers paid higher actual input prices than their economic prices. As the result, the effective protection is also negative in all region. The negative effective protection indicates that the farmers pay a positive net taxes. The effective tax rates, however, were very low. The effective protection were very close to zero in all regions. In other words, the cassava production in Indonesia practically did not

receive a net protection. As we can see from Table 19 that the effective protections were around -1.0 percent or lower in all regions.

Table 19. Summary of policy incentive indicator for dried cassava, 1986 (%).

Producing Region	Nominal Protection*	Effective Protection**	Implicit Tariff**
West Java	21.53	-0.45	5.28
Central Java	16.54	-0.40	5.02
East Java	15.76	-0.11	1.14
Sumatera	0.10	-0.61	6.81
Bali & Nusa Tenggara	53.29	-0.90	10.03
Sulawesi	87.27	-1.01	9.93
Kalimantan	31.22	-0.76	9.97

* At whole sale level; ** At border level.

Rice

The nominal protection rates for rice in each region are presented in Table 20. The table shows that in some areas like in Sulawesi, East Java, Sumatera and Bali & Nusa Tenggara have negative NPR. In Central Java the nominal protection rate is very small, only 0.75 percent. Clearly, they are two regions which enjoy protection, they are West Java and Kalimantan.

Table 20. Nominal protection on rice, 1986.

Region	Wholesale (Rp/kg)	Import Parity (Rp/kg)	NPR (%)
West Java	356.23	344.57	33.84
Central Java	343.10	340.56	0.75
East Java	308.35	340.56	-9.46
Sumatera	311.56	342.46	-9.02
Sulawesi	284.13	345.89	-17.86
Kalimantan	421.57	342.78	22.99
Bali & Nusa Tenggara	322.08	342.78	-6.04

The other incentive criteria computed in this study are effective protection and implicit tariff. The two criteria are summarized in Table 21. The data in the table show that the effective protection rates are always positive under the interregional trade regime and the implicit tariffs are negative in all region which indicate the existence of input subsidies. These two factors make positive economic incentives under the interregional trade regime.

Under the import substitution regime, the effective protection rates are positive in West Java, Central Java and Kalimantan, whereas in other regions they

are all negative. The highest effective protection rate is in Kalimantan at 28.08 percent. The absolute value of the effective protection rates in other regions are quite small, less than ten percent.

Table 21. Summary of economic incentive indicators on rice, 1986.

Region	Effective Protection (%)			Implicit Tariff (%)		
	IR	IS	EP	IR	IS	EP
West Java	6.26	6.26	2.14	-39.54	-39.54	-20.35
Central Java	—	3.99	2.08	—	-41.72	-20.67
East Java	5.31	-6.60	2.36	-44.44	-42.93	-21.66
Sumatera	24.66	-7.05	1.89	-44.82	-38.76	-19.72
Sulawesi	3.48	-4.55	2.06	-46.54	-44.23	-16.18
Kalimantan	—	28.08	0.63	—	-41.54	-6.88
Bali & Nusa Tenggara	—	-3.14	0.77	—	-43.00	-8.65

IR = Interregional Trade; IS = Import Substitution;

EP = Export Promotion.

The effective protection rates under the export promotion trade regime are positive in all regions. But the level of the protection, however, are very small. We may say that there is no significant protection under the export promotion regime and Indonesia will be competitive in the world market.

The implicit tariffs are negative in all regions and all trade regimes. This is due to the existence of a large input subsidies on rice farming. The highest input subsidies are under the interregional trade regimes. The absolute implicit tariffs under the import substitution regime are also high. The absolute value of the implicit tariff rates are much lower than under the interregional or implicit trade regimes. We may conclude that the Government incentives were largely channelled through input subsidy. The protection is biased toward domestic use of the rice production. This policy orientation is consistent with efficient resource use. As we have shown earlier, the most efficient resource cost allocations are under the interregional trade regime and then followed by the import substitution regime.

Dairy

The nominal protection rates of selected livestock products in selected regions are presented in Table 22. From the table we can see that the NPR's are generally negative except for milk products (Anhydrous Milk Fat and Skimmed Milk Powder). These show the existence of export barriers for the pork meat, beef, chicken meat and chicken egg. The wholesale prices of those livestock products are lower than their border prices. This reflects the high potential of exporting the products.

The negative NPR also indicates that the pork, beef and poultry farmings do not enjoy government protection through price support, instead they are inhibited to obtain higher prices by the existence of trade barriers.

Table 22. Nominal protection rates of livestock productions by region, 1987 (%).

Region	Swine meat	Beef carcass	Poultry meat	Chicken egg	Anhydrous milk fat	Skimmed milk powder
Central Java	-32.12	-24.89	-38.85	-11.58	158.71	137.93
East Java	-13.93	-32.70	-36.45	-22.12	161.08	141.22
Jakarta	1.70	-20.41	-38.04	-23.78	162.26	142.87
East Nusa Tenggara	-42.34	-52.38	-38.04	—	—	—
Bali	-39.40	-39.38	—	—	—	—
South Kalimantan	0	-23.40	—	—	—	—
Lampung	—	—	-42.34	24.28	—	—

The Nominal Protection Rates for milk products, however, are positive and very high (Table 22). Both anhydrous milk fat and skimmed milk powder are raw materials in producing processed milk. The high nominal protection rate for these two products demonstrates the high protection enjoyed by the dairy sector. The milk processors pay a higher price of domestic produced milk than the imported raw material. That is why they tend to use the imported raw material.

The milk import is controlled by the government through the milk ratio quota as a non tariff barrier trade policy. The milk processor may import raw milk in proportion to its domestic produced milk purchased. Clearly, this milk ratio policy is an effective way of to force the milk processors using domestic milk. Otherwise, they would use the cheaper imported raw milk. Without the milk ratio policy, the fresh milk price at the farm level would fall drastically from the present level.

Dairy industry enjoys the highest protection rates among the livestock industries (Table 23). Most of the protection come from the output price protection. This is shown by the low level of the implicit tariff rates on inputs.

The effective protection rates vary with the type of farm enterprise and breed. The corporate farming with imported breed enjoys the highest protection. For the smallholder farmer, the higher protection is also for the user of imported breed.

This finding tells us that the survival of the dairy industry merely due to the excessive protection from the Government. The industry is highly inefficient in terms of resource allocation as it has been shown in the previous section. The protection is biased toward domestic market.

This study also shows that the protection policy is biased toward the corporate farmers and the imported breed users. This is inconsistent with the resource economic efficiency criterion. From the previous section we have seen that the most

Table 23. Economic incentive criteria of milk production, 1987.

Location	Technology	Trade regimes	Location of whole sale	Effective protection	Implicit tariff
Central Java	Import breed corporate	IR	Jakarta	284.45	6.43
			Surabaya	197.21	4.98
			Bandung	226.61	5.03
		IS	Salatiga	226.60	4.78
			EP	Semarang	230.38
Central Java	Cross breed corporate	IR	Jakarta	120.49	3.25
			Surabaya	80.58	2.99
			Bandung	94.07	3.07
		IS	Salatiga	102.48	2.65
			EP	Semarang	101.98
Central Java	Imported breed smallholder	IR	Jakarta	255.74	5.84
			Surabaya	213.27	5.66
			Bandung	231.06	5.72
		IS	Salatiga	220.11	5.42
			EP	Semarang	223.33
	Smallholder	IR	Jakarta	83.87	6.68
			Surabaya	47.56	6.58
			Bandung	59.92	6.61
		IS	Salatiga	70.48	6.43
			EP	Semarang	69.62

efficient type of farming in terms of resource use are household farmings and users of cross breed. The corporate farming policy biased is not consistent with the Government objective to promote the smallholder either.

Pork

The effective protections for porkmeat are negative in all producing regions, all technologies and all trade regimes, except for interregional trade regime of swine meat production in Central Java (Table 24). Therefore, the swine production is burdened with a net effective tariff. The effective tariff rate is the highest for the household un-intensive farmer and intensive corporate. In general, the government protection is biased toward corporate and intensive farming.

The negative effective protection for the swine production is largely due to the existence of tariff on input. As we can see from Table 24, the implicit tariff rates are always positive, except for the corporate farmers in Central Java. For the intensive corporate farmers the implicit tariff rates are negative for all trade regimes.

The implicit tariff rates for the unintensified farming are generally higher than the intensive farming. This again shows that the government incentives are biased toward the corporate and intensive farmers.

Table 24. Effective protection rates (EPR) and implicit tariff (IT) of swine meat production, 1987.

Producing Region	Technology	Trade regimes	Wholesale location	Effective Protection	Implicit Tariff
Bali	Unintensified household	IR	Kalimantan	-17.74	73.26
			Surabaya	-32.85	69.43
		IS	Bali	-63.17	71.77
		EP	Bali	-63.08	71.22
Bali	Intensive	IR	Kalimantan	-8.89	45.07
			Surabaya	-19.41	38.97
		IS	Bali	-53.15	40.71
		EP	Bali	-52.98	40.34
Central Java	Intensive corporate	IR	Jakarta	7.71	-11.29
		IS	Semarang	-42.15	-10.38
		EP	Semarang	-41.96	-10.33

Part of the disincentives come from output price. This is shown by the negative nominal protection rates. The large negative nominal protection rates are due to the existence of market segmentation between the domestic and international markets. Pork meat export promotion by lifting any barriers would increase the domestic price. This higher price should give the farmers incentive to increase production. In other words export promotion is a good policy for the pork industry development. This policy is also supported by the fact that the pig farming is competitive in international market.

Beef

The economic incentive indicators of beef production are presented in Table 25. The effective protection rates are negative in all regions and all trade regimes. This reflects the existence of effective disincentive for the beef production. The disincentives vary by trade regimes. The highest disincentives are under the export promotion regime and then followed by import substitution and interregional trade regimes respectively. This, again, shows the domestic market orientation of the Government policies.

The implicit tariff rates are positive for all producing regions under all trade regimes. Clearly, a major portion of the disincentives is arising from the tariff on inputs.

Table 25. Summary of economic incentive criteria for beef production, 1987.

Location	Technology	Trade regimes	Effective Protection	Implicit Tariff
East Nusa Tenggara	Free grazing	IR	-23.80	26.70
	Smallholder	IS	-48.11	19.82
		EP	-52.12	18.70
East Nusa Tenggara	Tied System	IR	-23.80	26.71
	Smallholder	IS	-48.10	19.82
		EP	-52.11	18.70
Central Java	Fattening	IR	-43.03	63.24
	Smallholder	IS	-46.17	67.92
		EP	-51.14	67.52
West Java	Fattening	IR	-76.55	66.27
	corporate	EP	-89.44	66.08

In addition through input prices, a large portion of the disincentive is also channelled through output price. This is shown by large negative nominal protection rates. The negative nominal protection rate indicates that the domestic price is lower than international price. In other words, the producer should have received higher price if the country is open to competitive international price.

The large negative nominal protection rates are clearly due to the prohibition of beef export. Without any doubt this policy is designed to protect the domestic consumers. But this policy, of course, hurts the farmers. The large disincentives, clearly, inhibit the beef farming development. Therefore, if the government efforts to develop the beef industry these disincentives must be removed or reduced. The most important one is removing the export ban. The export promotion will give various benefits such as raise the price received by the farmers which will induce production and farmers income. At the same time the government will also receive foreign exchange that is very crucial in present condition as the oil export falling and unstable. To really develop the export potential quality of the products need to be improved.

Broiler

The broiler meat effective protection and implicit tariff rates are summarized in Table 26. From the table we can see that the effective protection rates are always negative. This is an indication of the existence of effective disincentive for the broiler farming. The rate of the effective disincentives are extremely high.

Part of the disincentives are channelled through input tariffs. As Table 26 shows, all of the implicit tariff rates are positive. These tariff rates, however, are very low

compared with the level of effectives. Hence, the larger portion of the disincentives is channelled through output export prohibitions.

A larger portion of the disincentive was arised from the depressed output price. The price depression is shown by the negative sign of nominal effective protection rates. As we can see from Table 22, the nominal protection rates for the chicken meat are the largest negative among the livestock products.

Table 26. Effective protection rates (NPR) and implicit tariff on poultry meat, 1987 (%).

Producing Region	Trade regime	Effective Protection	Implicit Tariff
Lampung	IR	-91.38	12.65
	IS	-91.99	13.17
	EP	-92.28	13.11
Tasikmalaya	IR	-82.92	12.65
	IS	-90.00	13.18
	EP	-83.02	12.68
Bogor	IR	-72.76	12.39
	IS	-83.03	12.45
	EP	-72.70	12.34

The large negative nominal protection rates indicate that the domestic price is lower than the international price. If the domestic market was open to the international price, the chicken meat price should have been higher. This is an indication that one of the reason for the wide spread of the broiler farming profit loss was the non-existence of broiler export.

From the previous section we have shown that the broiler production is very efficient. It is quite competitive in international market. The fact for this poultry meat exportation is not fully realized because it is clearly due to the existence of the effective disincentives. These disincentives are net effective support for consumers at the expense of the producers. The government policies are biased toward consumers.

The export promotion strategy is expected to help increase the price received by the farmers. This higher price is an important factor for the development of the broiler industry and the farmers income. Perhaps, the existing price of the broiler farming development could not be sustained unless the opening up of the export market.

Eggs

Financially, the egg production in Tasikmalaya and Lampung generates negative value added under all trade regimes. But, economicly it generates positive value added. This shows the existence of high effective disincentive on egg produc-

tion. The incentive criteria are summarized in Table 27. From the table we can also see that the financial value added is positive only for Lampung. The effective protection rate in Lampung is positive under the import substitution and export promotion trade regime. It is negative under the interregional trade regime. This findings indicate the existence of prohibitive disincentives on the egg production. It seems that disincentives are so large making the financial value added negative, and it means that the egg production is not a viable business. This is also shown in the previous section.

Table 27. Summary of the incentive criteria for egg production, 1987 (per 100 kg/egg).

Region	Trade regime	Value added		Effective protection	Implicit tariff
		Financial	Economic		
Lampung	IR	265	798	-66.79	18.16
	IS	1062	862	23.20	19.40
	EP	1059	839	26.22	19.33
Tasikmalaya	IR	-159	435	-136.55	17.80
	IS	-91	650	-114.00	18.79
	EP	-165	410	-140.24	17.81
Bogor	IR	-162	432	-137.50	19.60
	IS	-178	540	-132.96	19.75
	EP	-167	408	-140.93	19.51

Part of the disincentives in the egg production is channelled through the inputs. As we can see from the table that the implicit tariff rates for inputs are positive in all regions and all trade regimes. The implicit tariff rates are quite similar in all regions and all trade regimes. They are all around 19 percent clearly, this level is very small compared with the effective disincentive rates in West Java. Accordingly, a large portion of the disincentives must be arised from the effective taxation on output.

The disincentive through output price can be measured by the nominal protection rate. The negative nominal protection rate in West Java contributes to the high negative effective protection rate. In Lampung, on the other hand, the positive nominal protection rate out balances the disincentive through input tariffs which makes the effective protection rate positive under the import substitution and export promotion trade regime.

From this study we can conclude that there is a large effective disincentive on egg production. The disincentive has reached the prohibitive point which makes the production is not financially profitable. The financial value added is negative, especially in West Java, although the economic value added is positive.

In the previous section we have seen that the egg production is economically feasible in all regions and all trade regimes, except for export promotion in Tasikmalaya. The existence of the large effective disincentive prohibits realization of the economic benefit which could be generated from the egg production. Accordingly, the Government disincentives must be lifted for the development of the egg production. One of the recommended policies is promotion of the egg exportation.

CONCLUSION AND POLICY IMPLICATION

Corn production is economically feasible under the interregional trade and import substitution trade regimes. Hence, for the economic efficiency the corn domestic production should be primarily used for domestic use. More specific, the corn would be more efficient if used locally as import substitute. However, by improving yield corn production could be efficient as export promotion.

Under the export promotion regime, the corn production is not feasible in West Java and East Java. The corn production in Sumatera and Central Java is barely feasible for exportation. The corn exportation is only feasible if produced in Bali and Nusa Tenggara, South Sulawesi and Kalimantan. This again, shows that the domestically produced corn in most of corn producing region would be more beneficial economically if used for domestic consumption. By improving technology the economic efficiency can be improved.

The most efficient corn producing regions in Indonesia are Bali and Nusa Tenggara, South Sulawesi and Kalimantan. Presently, the corn production, however, is concentrated in Java and Sumatera. Various supports are also concentrated in these two islands. This biased government supports are not consistent with the economic efficiency criterion. Accordingly, the government should shift its supports toward other regions such as Bali and Nusa Tenggara, Sulawesi and Kalimantan. These three regions are highly potential for corn production not only because of production efficiency but also because of land availability. The land in these three regions is relatively more abundant than in Java or Sumatera. In addition, the corn production in these regions is still unintensified. The corn productivity could be increased significantly through intensification program. In other words, the corn production in Kalimantan and Sulawesi could be increased significantly by both increasing planted area and yield.

The suggested corn trade direction for producing region is as follows:

West Java -----	West Java
Central Java -----	— Central Java
	— Jakarta

East Java -----	— East Java
	— Jakarta
Sumatera -----	— Sumatera
	— Jakarta
Bali & Nusa Tenggara -----	— Kalimantan
	— Denpasar
Sulawesi -----	— Sulawesi
	— Export
Kalimantan -----	— Kalimantan
	— Balikpapan

Soybean is not yet economically feasible to be produced under all trade regimes in West Java. For East Java, the soybean production is only feasible under the import substitution trade regime and is not feasible under the interregional nor under the export promotion trade regimes. Clearly, West Java and East Java are not efficient in producing soybean. It would be more beneficial if the soybean farmings in these two provinces substituted with corn farmings.

The soybean production is quite efficient if produced in Sulawesi, Bali and Nusa Tenggara, Sumatera, Kalimantan and Central Java, under all trade regimes. Indonesia will be highly, competitive in the world soybean market if the soybean production is arranged properly. The most efficient producing regions are Sulawesi, Bali and Nusa Tenggara, Sumatera, Central Java and Kalimantan. The government, therefore, should promote the soybean production in these regions, and inhibit soybean production in West Java and East Java.

The soybean producers enjoy high government protection, under the interregional and import substitution trade regimes. Clearly, the government protection are biased toward domestic market. This biased policies are reasonable since the soybean production is more efficient in resource used under the import substitution and interregional trade regimes. Moreover, Indonesia is still a net importer soybean. A large portion of the government supports are channelled through inputs.

The structure of the government protection is not quite good. West Java which is the most inefficient soybean producing region, but enjoys the largest protection. Whereas Sulawesi, the most efficient producing region enjoys the lowest protection. The government protection in East Java is also high although it is not efficient in soybean production. Accordingly, the government should rearrang its corn incentive policies toward the most efficient producing regions. The efficient soybean producing regions are Sulawesi, Bali and Nusa Tenggara, Sumatera, Central Java and Kalimantan.

As expected, Indonesia is very efficient in cassava production. The domestic resource cost ratios are very low in all regions. The government incentives to the cassava producers do not exist. In fact the producers pay a positive effective net disincentives. Since it is highly efficient and competitive in the world market, the government should promote the cassava production. The cassava production may be directed for exportation, this can be promoted by deregulating and improving efficiency of the cassava marketing.

Cassava intensification program could also increase profitability of the cassava farming. In addition, it also increases production efficiency, and hence competitiveness in the world market. For this, the government may take a crucial role in promoting research on cassava seed, farming system, quality of the products and new products development.

Indonesia is quite efficient in rice production in all regions and all trade regimes. Hence, the government rice self sufficiency is consistent with the economic efficiency criterion. In terms of resource efficiency, the rice production outside Java is more efficient than in Java. But presently, most of the rice is produced in Java. The rice intensification programs are also concentrated in Java. Therefore, the government attention should be redirected toward promotion of rice production outside Java. This policy reorientation is not only important for economic efficiency but also for increasing total production, improving farmers' income and employment creation. Outside Java is more potential for increasing rice production in the future either through acreage expansion or yield enhancement.

The effective protection rates on rice are generally very low, especially under the export promotion trade regime. Under the import substitution trade regime, the effective protection rates are even negative in most of the producing regions. This indicates the existence of net disincentives on rice production. The rice producers, however, enjoy a high inputs subsidies from the government. This is shown by the negative implicit tariff.

Pork production in Indonesia is economically feasible either for domestic use (interregional trade and import substitution) or for export. The pork exportation is highly competitive in the international market. Hence it has a very good prospect for exportation. However, quality of the product have to be improved. The intensive household pig farming is more efficient than the corporate farming. This indicates that the pork production in Indonesia should be directed toward the household intensive farming. This orientation is consistent with the government objectives to increase farmers income and improve income distribution.

One of the problem with the pork production is the existence of excessive government disincentives. This study shows that the effective protection rates on pork meat are negative. The largest disincentives are faced by the household

farmers which are the more efficient producers. Since the pork production is highly competitive in the international market, all these incentives should be removed to promote the exportation and the pork industry development.

Chicken meat production in Indonesia is highly efficient and economically competitive in international market. In other words, Indonesia has a high potential for exporting the chicken meat. The efficiency differentials between import substitution regime and the other trade regimes are quite large. This reflects that the chicken meat production would be more beneficial if it primarily used for domestic consumption. The excess supply can be exported however. Presently, Indonesia has not exported chicken meat. Promoting the exports would be a very important factor in promoting the broiler industry development.

Although the chicken meat production is highly efficient economically, it is however inhibited by the government disincentives. The effective protection rates on the chicken meat are negative with high absolute values. The disincentives arise from both final product and inputs tariffs. The nominal protection rates are negative, whereas the implicit tariffs are positive. Since the chicken meat production is highly efficient economically and competitive in international market, then it should be promoted by the government. For this, the chicken meat should be open for exportation by lifting restrictions including the non tariff barriers. The trade deregulation campaigns presently conducted by the government would enhance the broiler industry development.

The chicken egg production in Lampung is much more efficient economically than in West Java. Hence the egg production in this region is highly efficient and competitive in the international market. Accordingly, the egg production in this region should be promoted either for domestic use or for exportation. Presently, the egg production is heavily concentrated in West Java. This study shows the need to redistributing the egg producing regions.

The chicken egg production in West Java is highly efficient under the import substitution regime. The egg production is not even economically feasible under the export promotion trade regime for both Tasikmalaya and Bogor. Accordingly, the egg production in West Java should be directed for domestic consumption. Financially, the egg production in West Java generates negative value added under all trade regimes. Economically, however, the value added is positive. This shows the existence of high disincentives on egg production in this region. These high disincentives have reached the prohibitive point which make the production is not financially profitable. The disincentives on egg are channelled through both output and inputs. Both the nominal protection rate is negative whereas implicit tariffs are positive. Accordingly, these disincentives must be lifted for the development of the egg production. One of the recommended policy is deregulation of both egg and feed grain markets.

Beef production in Indonesia is highly efficient and competitive in international market. The most efficient trade regime is export promotion and then followed by import substitution and interregional trade. The present trading system, where the beef produced in East Nusa Tenggara and East Java, and then transported live animal to West Java, Jakarta and other deficit regions, is not efficient economically. The more beneficial trade arrangement is exportation of the beef from the producing regions in the form of processed products.

The household beef farming is more efficient than the corporated farming in terms of resource use. Therefore, the beef farming development may be concentrated on the household farming. This is also consistent with income distribution and employment creation objectives. Without any doubt, the beef family farming is more labor intensive than the large corporate farming.

The effective protection rates on beef are negative in all producing regions and all trade regimes. The highest disincentives are under the export promotion regime and then followed by import substitution and interregional trade respectively. This indicates that the beef production is directed primarily for domestic use. The disincentives should be lifted to promote the beef farming which is proven to be highly efficient economically.

The milk production in Indonesia is not yet efficient economically, mainly due to still relatively low dairy cow productivity compared to other countries. The interregional trade regime is extremely inefficient. Accordingly, if the milk must be produced domestically, then it should be intended for import substitute. This means that the milk processing must be located in the same location with the dairy farms. This consolidation of the dairy farming and milk processing plants location is useful to reduce transportation cost.

The raw material for the deficit milk processing region may be imported from abroad, rather than transported from other fresh milk producing regions. This implies that the government should allow importation of the milk raw material to meet the deficit in the large processing industrial complex, such as Jakarta. This kind of trade and industrial location arrangement is proposed until domestic milk farming efficiency can be increased. Improving production efficiency should be the first priority for the long-term survival of the domestic dairy sector.

The dairy sector is highly protected by the government. The effective protection rates for the dairy sector are extremely high. This indicates that the survival of the dairy sector is merely due to the excessive protection. Most of the protection on milk is channelled through output.

The cross breed dairy farming is much better than the imported breed. This indicates that the cross breed is more suitable than the imported breed in Indonesia. This is especially true for the small family farming and it is more efficient than the

large corporate farming. Accordingly, the dairy farming development should be directed toward small family farming and using cross breed.

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