

**IMPACTS OF LIBERALIZATION ON THE COMPETITIVENESS AND
EFFICIENCY OF THE CASHEW SYSTEM IN NUSA TENGGARA BARAT
PROVINCE, INDONESIA:**

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Summary

Cashew is an increasingly important export commodity for Indonesia. Indonesia's foreign exchange earnings from cashew exports increased substantially during the last five years, from US\$ 19.1 million in 1997 to US\$ 34.8 million in 2002

As a part of its attempts to promote cashew production, the government has stimulated further extension of small-holders' cashew farms by creating a cashew development project. Under the project, the government provides technical and financial support to small-holders for land clearing and title, cashew seed, fertilizer, tools, and 'young plant' care. The average cost of the cashew development project was 1,705,144 Rupiah (about US \$ 170) per hectare in 1998.

The PAM analysis, based on commodity budgets, shows that both the monoculture and interplanted cashew systems in NTB Province are strongly competitive (relative to comparable commodity systems) and efficient (in resource use) because they generate very high positive private and social profits. The monoculture system earned a private profit of 11,764,556 Rupiah per hectare and social profit of 10,242,158 Rupiah per hectare, whereas the intercropping system earned a private profit of 20,194,868 Rupiah per hectare and a social profit of 18,434,768 Rupiah per hectare. These profits were calculated as the present value of total profits earned for 25 years (year 1 to year 25).

Existing policies – a 20 percent tariff on pesticide and insecticide inputs and 2.35 percent local tax on output – had little impact on private profits. Pesticides and insecticides accounted for less than 2 percent of production costs. Because these policies created such minor distortions, simulations to liberalize policy had almost no effect on private profits.

Because both existing cashew systems were very competitive and efficient in resource use, policy makers should consider the expansion of cashew plantations as one of the best options to improve the incomes of smallholders, particularly those living in dry land areas. Cashew trees are well known for their ability to survive in challenging physical environments. Emphasis should be given to expanding the intercropping system of cashew production, rather than monoculture system, because intercropping cashews with corn leads to higher productivity of cashews and substantially higher private and social profits for cashew farmers.

1. Introduction

1.1. Background

Cashew is an increasingly important export commodity for Indonesia. Indonesia's foreign exchange earnings from cashew exports substantially increased during the last five years, from US\$ 19.1 million in 1997 to US\$ 34.8 million in 2002 (Bank Indonesia 2000; The National Agency for Export Development 2003). In *Nusa Tenggara Barat* (NTB) Province, 51,719 hectares of small-holder cashew farms produced 11,154 tons of dried cashew nuts in 2002 (NTB Provincial Office of Plantation Department 2003). The smallholders apply either of two cropping systems – monoculture or intercropping with seasonal plants such as corn.

Indonesia has liberalized its economy by eliminating interest rate controls and reducing tariffs and input subsidies. Interest rate controls on saving and credit with bank have been fully eliminated since 1992 with the introduction of a new Banking Law (Budastra 2003). Indonesian tariffs on agricultural products have been gradually reduced, in accordance with the agreed tariff reduction schedule under international trade agreements. Under the WTO agreement, Indonesia is supposed to reduce its average tariff on agricultural products to 24 percent by 2005. Under APEC and AFTA, Indonesia is scheduled to eliminate its tariff on agricultural products, including cashew nuts, by 2020.

Indonesia also has undergone decentralization (*Otonomi Daerah*). District governments are given more autonomy in managing local economies, including local taxation. Higher costs of cashew production result from the taxation increase. For instance, the district governments of NTB province apply a 2.5 percent tax on the values of agricultural output transported out of the province.

Indonesia has not committed itself to any reduction in its domestic support to its agriculture sector, including the cashew industry, in the form of technical and financial assistance and project input subsidies. As a part of its attempts to promote cashew production, the government stimulates further extension of small-holders' cashew farms in Indonesia through the cashew development project (Bank Indonesia 2000). Under the project, the government provides technical and financial support to small- holders for land clearing and title, cashew seed, fertilizer, tools, and 'young plant' care. The average cost of the cashew development project was 1,705,144 Rupiah (about US \$ 170) per hectare in 1998 (unpublished statistics of NTB Provincial Office of Plantation Department). This project lowers the costs of cashew production. In contrast, the reduction of government subsidy on major agricultural inputs, such as: fertilizers and fuel, has increased the costs of producing agricultural products.

1.2. Objectives

The research objectives are:

- To examine the competitiveness and efficiency of the current cashew monoculture and intercropping systems; and

- To examine the likely impacts of selected scenarios of local tax rate on output (a consequence of decentralization) and reduction of input price subsidy and protection (liberalization) on the competitiveness of the two cashew systems.

The results of this research should have several implications for policy makers, cashew processors, importers, farmers, researchers, and importing countries. The level of competitiveness and efficiency of the two cashew systems under the existing policy environment should provide helpful information to: (a) policy makers in their attempts to develop the cashew system and smallholder income while meeting the country’s commitments to liberalization; (b) cashew processors in their investment and market development decisions; (c) farmers in their uses of land and commodity choices; (d) researchers in their research issues and interpretation of results; and (e) importing countries in their cashew import decisions and policies.

2. Research Methodology

2.1. Framework

To achieve its objectives, the study uses the Policy Analysis Matrix (PAM) as the research framework. A simplified model of PAM is given in Table 1. A PAM accounts for the revenues, costs, and profits of a commodity system based on both private and social prices, permitting estimation of the effects of divergences (market failures or distorting policies). As a policy analysis tool, the strong points of PAM are its ability in providing information on commodity competitiveness and efficiency. More important, PAM allows the researcher to estimate the likely impacts of liberalization on the competitiveness of the cashew system. Data necessary for PAM analysis includes input-output relationships at farm level, transportation and handling to wholesale markets, private prices, and information necessary for estimating the social prices.

Table 1
The Policy Analysis Matrix

Prices and Divergence	Revenues	Costs		Profits
		Tradable Inputs	Domestic Factors	
Private Prices	A	B	C	D
Social Prices	E	F	G	H
Divergence effects	I	J	K	L

Source: Monke & Pearson (1989: p.19).

Notes: Profit is revenue minus cost; Divergence effect is private price minus social price

The competitiveness and efficiency of the cashew system are reflected by the private profitability (D) and the social profitability (H), respectively (Monke and Pearson 1989: p. 20). Competitiveness refers to the private profit of the system, at current technology, prices, and policy environment. A positive private profit indicates competitiveness while a negative private profit suggests non-competitiveness. Efficiency refers to profitability when all resources are valued at social prices—prices that reflect social opportunity costs. In this regard, world trade prices are used to value tradable outputs and inputs.

The likely impacts of liberalization on the competitiveness and the efficiency of the cashew systems were estimated by applying selected scenarios of anticipated policy changes (resulting from the liberalization process) to the PAMs. Liberalization refers to the reduction of policies distorting the market for inputs and outputs of the cashew system.

2.2. Sampling

Cashew is one of the dominant plantation commodities in NTB province. The other important plantation commodities in the region are coconut, coffee, and Virginia tobacco. Cashew plantations are found in each district of NTB province, except Mataram city district.

Farm level information was collected from a sample of cashew farmers in two districts – West Lombok and Dompu – where most of the province's cashew production occurs. One sub-district was selected from each of the two districts and then one village was selected from each of the two sub-districts. The selected sub-districts are Kayangan for West Lombok and Pekat for Dompu. From each of the sub-districts, 30 farmers were selected using a stratified random sampling technique based on land size. A total of 60 farmers were interviewed – 33 farmers (55% of the sample) with cashew plantations of 2 hectares or less and 27 farmers (45%) with cashew plantations of more than 2 hectares.

2.3. Data Collection

Empirical information was obtained from both primary and secondary sources. The data needed for the PAM approach included: (i) input use and output per hectare; (ii) private prices of inputs and outputs; (iii) social prices of inputs and outputs; (iv) incidences of tariff, subsidies, and taxes; (v) export prices for cashew (f.o.b.); (vi) historical data on cashew areas and production; and (vii) exchange rates and interest rates. The primary data were collected through a combination of structured surveys and focus group discussions (FGD). The structured surveys collected input-output information at farm level (from farmers). The FGDs gathered information from selected stakeholders, regarding problems and opportunities to achieve better competitiveness and efficiency of the cashew systems. The FGDs involved policy makers, processors, traders, and end-users at the sub-district, district, and provincial levels.

2.4. Method of Analysis

The PAM procedure involves estimation of farm-level private budgets, social budgets, and PAMs of the cashew systems under the existing policy environment. Two farm-level PAMs were constructed. One represented the monoculture cashew-farming system, and the other the intercropping system.

The difference between private revenues and private costs gave the private profitability of the cashew system, which reflected competitiveness. Similarly, the difference between social revenues and social costs gave the social profitability of the cashew system, which reflected efficiency. In a PAM model, the private and social profitability are denoted with D and H (Table 1). Comparison of the profitability

measures between the two cropping systems indicates the more competitive cropping system.

The likely impacts of liberalization on the competitiveness of the two cashew systems were estimated by simulating scenarios of anticipated changes in subsidy, tariff, and tax rates (resulting from the liberalization process). Comparison of the profitability measures (D and H) under these scenarios of a more liberal policy environment and those under the existing policy environment gave the likely impacts of the liberalization on the competitiveness of the cashew systems.

3. Research Results and Analysis

3.1. Cashew Systems

Cashew is a dominant plantation commodity in NTB Province; in 2002, 144,667 farm households produced cashews on 51,185 ha. In comparison, coconut, coffee, and Virginia tobacco were grown on 66,946, 18,016, and 10,593 ha, respectively. Cashew plantation was first introduced in NTB in the 1970s. During the 1990s, an effective cashew extension program helped to create sustained cashew plantations. All current production is from smallholder farms, and the average age of the trees is 10 years. A large, private cashew plantation has recently been developed in the region, but its cashew trees are not yet producing. The distribution of cashew area and production in NTB province for 2002 is shown in Table 2.

Table 2
Areas and Production of Cashew Plantations in NTB Province, 2002

No	Districts	Plantation Area (hectares)	Production (Tons)
1	West Lombok	21252.16	3973.88
2	Central Lombok	3534.70	242.72
3	East Lombok	4238.00	1509.00
4	Sumbawa	9201.00	1160.00
5	Dompu	12898.60	3915.84
6	Bima	4395.00	442.10
7	City of Mataram	0.00	0.00
Total		51719.46	11243.54

Source: NTB Provincial Office of Plantation Department (2003).

Cashew production was concentrated in two districts – West Lombok and Dompu – which together produced more than two-thirds of provincial output in 2002. In 2002, Dompu had much higher yields (750 kg of cashew nut in shell per hectare) than West Lombok (453 kg cashew nut in shell per hectare). Dompu cashew plantations are located around the fertile slope of Tambora Mountain, whereas West Lombok cashew plantations are concentrated around less fertile areas on the north coast. The Dompu cashew plantations were planted in a tropical dense forest, while the West Lombok plantations were planted in formerly unproductive dry land.

The cashew plantations in NTB Province generally use simple technology with low use of inputs (labor and capital). Weeding and fertilizing were done minimally

once the cashew trees started producing. Progressive amounts of fertilizers were applied during the first three years (when the plantations were still under the cashew extension program), and constant levels were applied thereafter. The input levels applied on the cashew plantations (year 1-year 4) in the research areas are given in Table 3.

Table 3
Input Use on One Hectare of Cashew Plantation

INPUT	Year 1	Year 2	Year 3	Year 4
Fertilizer				
Urea (kg)	14	28	55	100
TSP/SP36 (kg)	14	17	50	50
KCl (kg)	12	24	48	50
Pesticide & Fungicide (Rp/package)	37750	37750	37750	37750
Labor				
Land Preparation & Planting (Rp/package)	5250000	-	-	-
Fertilizing (Man-day)	2	2	2	4
Insect & Fungus Protection (package)	2	2	2	2
Other Care (man-day)	13	13	13	13
Harvest & Post Harvest (Rp/kg produce)	-	-	-	500
Capital				
Working capital	0	0	0	872101
Investment capital	1335558	1274663	1410433	317000
Land (ha)	1	1	1	1
Others				
Cashew seed (tree)	217	-	-	-
Tool & equipment (Rp/package)	10000	10000	10000	10000

Source: Primary Data, Median Values of 60 farmer respondents

3.2. PAMs for the Cashew Systems

Cashew is a permanent tree crop, and production occurs over a period of 25 years. An analysis of competitiveness and efficiency requires that these results be discounted to net present values. The present value, farm-level PAMs for the two cashew systems in NTB Province under the current policy environment are presented in Table 4.

Table 4
Farm Level PAMs for Cashew Systems (Rp/Ha, Present Value Year 1-25)

	Revenue	Tradable Inputs	Domestic Factors				Profit
			Labor	Capital	Land	Others	
							<i>Monoculture</i>
Private Price	35,502,079	3,113,314	11,107,668	3,685,395	5,628,805	202,342	11,764,556
Social Price	34,341,450	3,048,285	11,107,668	3,685,395	6,055,603	202,342	10,242,158
Divergence	1,160,629	65,029	0	0	-426,798	0	1,522,399
							<i>Intercropping</i>
Private Price	48,636,397	3,129,848	14,824,518	4,450,030	5,628,805	313,383	20,194,868
Social Price	47,126,586	3,048,285	14,824,518	4,450,030	6,055,603	313,383	18,434,768
Divergence	1,509,811	81,563	0	0	-426,798	0	1,760,101

Source: Own Calculations Based on Primary Survey Data

The cashew systems were highly privately and socially profitable for both monoculture and intercropping. There were small divergences between private and social prices for revenue, tradable inputs, land, and profits for both cashew systems.

Divergences can result from either distorting policies or market failures. The measured divergences were due to distorting policies and data errors. No indication of market failures was found in the research areas. Respondents reported that there was no difficulty in accessing either input or output markets. Obtaining fertilizers, insecticides/pesticides, labor, finance (capital), and land for their plantations was relatively easy. Similarly, they found no difficulty in selling their produce. Variation in input and output prices among the farmers did exist but it was mainly due to variation in transportation costs and payment systems. Among the current distorting policies were a tariff of 20 percent on imported pesticides and insecticides and a local tax of 2.35 percent on cashew output. No tariff was applied to other tradable inputs (fertilizers).

3.3. Competitiveness and Efficiency of the Cashew Systems

The strong competitiveness of both cashew systems indicates that the cashew plantations give returns to investment much higher than the cost of capital, at current technology, prices, and policy environment. Hence, the cashew plantations are expected to expand, given land available at current costs. The efficiency of the cashew systems indicated that the cashew systems used the resources efficiently and also earned high social returns, since the input and output valuations considered the scarcity value (the social opportunity costs) of the resources. Therefore, further development of the cashew system is socially profitable.

Of the two cropping systems, the monoculture system earned lower profits. As a percentage of revenue, the monoculture cashew system earned private profits of 33 percent and social profits of 30 percent, whereas the intercropping cashew system earned private profits of 42 percent and social profits of 39 percent. The higher profitability of the intercropping system was mainly due to higher productivity of cashew and additional revenues from intercropping crop (corn). The input uses and prices were relatively the same between the cropping systems. The intercropping system generated 37 percent higher total revenues (including those from corn) and 18 percent higher revenues (from cashew alone) than the monoculture system did. The higher productivity of the intercropping system was related to the care of the intercrop, such as tilling and weeding. The future expansion extension of intercropped cashew plantations should improve the competitiveness and efficiency of the cashew production, given the current policy environment.

3.4. The Impacts of Liberalization on Competitiveness and Efficiency

The future direction of macroeconomic policies in Indonesia, as in many developing countries, is toward more liberalized policies as the world economy moves toward globalization. Recent liberalization in Indonesia includes the adoption of market interest rates, the establishment of an independent monetary authority within a democratic government, and the making of commitments to major international free trade agreements and subsidy reduction. Hence, the likely future includes a greater

role for market forces and a smaller role of government in influencing prices and the allocation of resources.

Three types of liberalization – of tariff, taxation, and subsidy policies – are likely to influence the cashew systems. Therefore, several policy scenarios are set to represent different degrees of liberalization, taking into account past, present, and anticipated future policies. The policy scenarios are as follows:

Scenario 0: The current policy environment

The present policy environment is quite liberal because only two small interventions exist. There is a 20 percent tariff on imported pesticide and insecticide and a 2.35 percent local tax on output.

Scenario 1: Fully liberal policy environment

As the liberalization process continues, it is expected that there will be no tariffs on inputs.

Scenario 2: Interest rate subsidy for cashew extension

The past policies on extension of cashew plantation involve interest rate subsidy on investment capital, which covered the first three years’ costs of plantation development. The interest rate subsidy is about equal to the market rate minus the transaction costs (4% per year). With current nominal interest on investment 17% per year, the interest rate subsidy is 13% (17%-4%), and the interest rate charged on the investment capital is 4% (equal to the transaction costs).

Scenario 3: Increased output taxation

As decentralization matures, the local governments will hope to increase their local income. Hence, it is assumed that the local government will increase the current local tax rate from 2.35 percent to 5 percent.

Scenario 4: A combination of policies under scenarios: 1, 2 and 3

The likely impacts of the anticipated policy changes on the competitiveness of the cashew systems are summarized in Table 5. No changes occur in social profits (or efficiency) because policy simulations do not change social valuations.

Table 5
The Private Profits of the Cashew Systems Under Selected Policy Scenarios

Scenario	Private Profit	
	Monoculture	Intercropping
Scenario0	11,764,556	20,194,868
Scenario1	11,764,556	20,194,868
Scenario2	12,679,254	21,111,010
Scenario3	11,764,556	20,194,868
Scenario4	12,679,254	21,111,010

Source: Own calculations

These results show that the private profits likely to be generated by the two cashew-producing systems are very robust to likely changes in policy. None of the envisioned scenarios causes more than a ripple in the competitiveness of these systems. This result follows directly from the very small degree of existing taxes on cashew production and from the modest degree of new taxes simulated in the policy scenarios.

4. Conclusions

Under the existing policy environment, both cashew systems in NTB Province are strongly competitive (relative to comparable commodity systems) and efficient (in resource use) because they generate very high positive private and social profits. The monoculture system earned a private profit of 11,764,556 Rupiah per hectare and social profit of 10,242,158 Rupiah per hectare, whereas the intercropping system earned a private profit of 20,194,868 Rupiah per hectare and a social profit of 18,434,768 Rupiah per hectare. These profits were calculated as the present value of total profits earned for 25 years (year 1 to year 25).

Existing policies – a 20 percent tariff on pesticide and insecticide inputs and 2.35 percent local tax on output – had little impact on private profits. Pesticides and insecticides accounted for less than 2 percent of production costs. Because these policies created such minor distortions, simulations to liberalize policy had almost no effect on private profits.

Both existing cashew systems were very competitive and efficient in resource use under the existing policy environment and under projected liberalization of policies. Policy makers thus should consider the expansion of cashew plantations as one of the best options to improve the incomes of smallholders, particularly those living in dry land areas. Cashew trees are well known for their ability to survive in challenging physical environments. Emphasis should be given to expanding the intercropping system of cashew production, rather than monoculture system, because intercropping cashews with corn leads to higher productivity of cashews and substantially higher private and social profits for cashew farmers.

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