ECONOMIC ANALYSIS OF SMALLHOLDER RUBBER AGROFORESTRY SYSTEM EFFICIENCY IN JAMBI

INDONESIA

THESIS

ATUAIRE RODGERS

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BOGOR AGRICULTURAL UNIVERSITY

GRADUATE SCHOOL
DECLARATION of AUTHORSHIP

I, Atuhaire Rodgers, declare that this thesis and work presented in it are my own work with the research topic entitled,

“ECONOMIC ANALYSIS OF SMALLHOLDER RUBBER AGROFORESTRY SYSTEM EFFICIENCY IN JAMBI”

Therefore I confirm that;
1. This thesis was done wholly while in candidature for Master of Science degree in Agricultural Economics at this University;
2. Where I have quoted from the work of others, the source was given. With the exception of such quotations, this thesis is entirely my own work;
3. I have acknowledged all main sources of help;
4. This work was done under the guidance of Prof. Dr. Ir. Bonar M. Sinaga, MA and Drs. Suseno Budidarsono, M.Sc (Bogor Agricultural University and World Agroforestry Center). Supervisor’s contribution to this research and thesis was consistent with normal supervisory practice
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Bogor, September, 16th, 2008

ATUHAIRE RODGERS

REGISTRATION NUMBER: H353078211
ABSTRACT

Atuahire Rodgers, 2008. ECONOMIC ANALYSIS OF SMALLHOLDER RUBBER AGROFORESTRY SYSTEM EFFICIENCY IN JAMBI (Bonar M. Sinaga as the Chairman, and Suseno Budidarsono as the Member of the Advisory Committee).

The objectives of this research were; (1) to analyze production efficiency and profitability of smallholder rubber monoculture and smallholder rubber agroforestry systems, and (2) to find out the effects of policy distortions towards rubber production under smallholder monoculture and smallholder agroforestry. Smallholders are not only judged by yield per hectare; economic efficiency is not only a matter of returns to land and returns to labor but smallholders can adopt low input strategy, continue making profits at prices that would be economically viable. Such flexibility offers the possibility of efficient resource allocation in response to diversification of economic opportunities.

The Policy Analysis Matrix (PAM) with the Domestic Resource Cost (DRC) results under the baseline scenario indicated that the use of domestic resources in production of rubber was efficient and socially profitable under the two systems but more desirable under monoculture system given the current prices for physical inputs, outputs, technologies and policy transfer. However, even with sensitivity analysis of 10% increase in the price of rubber holding other factors constant does not make rubber agroforestry system more efficient than its counterpart and a 20% fall in price of rubber made rubber production under agroforestry system less efficient and undesirable. All measures are compared to the alternative policy indicators currently used. Therefore, recommendations made from this study relate to the need for diversification into better practices that can sustain efficient rubber production under the agroforestry system, encouraging private sector participation and reducing disincentives to rubber production.

Key words: Smallholder Rubber Agroforestry, Economic Efficiency, Policy Analysis Matrix
EXECUTIVE SUMMARY

Based on the entire objectives of this research, the Policy Analysis Matrix (PAM), as an attractive organizational policy framework was used to analyze production efficiency and profitability using farm budget analysis comparing multi-year land use system budgets (smallholder rubber monoculture and smallholder rubber agroforestry systems) calculated at private and social prices and NPV valued at private prices as an indicator for production incentive and then Social prices that remove the impact of policy distortion (taxes, subsidy and other local levies). PAM indicators especially Domestic Resource Cost ratio (DRC) and Private Cost Ratio (PCR) were used as well. In other words, with DRC < 1 indicating that the use of domestic factors was socially profitable. PCR < 1 indicating that there was value added to the use of the domestic resources. All of these components were combined to provide a measure of total profitability, economic efficiency and effect of policy distortions from the existing divergences. Therefore, all results were consistent with the existing policies.

The study reveals that most of the labor costs were spent under rubber garden maintenance and its related activities mostly done by hired laborer. Under smallholder rubber monoculture system the total expenditures spent on rubber garden maintenance was Rp 4 344 million (23% out of the total cost) while, under smallholder rubber agroforestry system farmers spent Rp 2 630 million (31% out of total cost).

The discounted operational costs for both systems were financially ranging from Rp 24 797 million under agroforestry to Rp 48 168 million under monoculture, and economically ranging from Rp 37 977 million under smallholder rubber agroforestry system and 75 224 under smallholder rubber monoculture system. Based on farm budget calculation, the study also revealed that monoculture system in managing the plantation during rubber establishment has higher returns, employs more labor and also more profitable than smallholder rubber agroforestry traditional systems.

Based on the macroeconomic parameters of 2007, returns to land per hectare at private prices are 46 737 million for smallholder rubber monoculture system and 18 254 million for smallholder rubber agroforestry system respectively. Economically (farm budget calculation valued at social prices), returns to land for these systems are Rp 119 492 million (smallholder rubber monoculture system) and
Rp 52 389 million (smallholder rubber agroforestry system). Similarly, for returns to labor, both systems provide more than double of the wage rate in Sumatra. These estimates indicated that establishing rubber is very attractive for farmers to operate.

The analysis further reveals that with baseline scenario monoculture has a comparative advantage in the production of rubber than its counterpart, as indicated by DRC’s of 0.31 and 0.37 respectively. However, even with a 10% increase in the price of rubber holding other factors equal, agroforestry system remained less efficient than monoculture system i.e. with the DRC values of 0.35 and 0.28 respectively. This indicates that smallholder monoculture system has efficient use of resources especially when farmers get an increase in price of rubber with the prevailing rubber prices.

Social profits, which are an efficiency measure, are all positive under both systems, and indicate that scarce resources were well utilized by producing at social costs that did not exceed the importation costs. Monoculture system had a bigger NPV as compared to Agroforestry system and therefore, monoculture was found to be more efficient under the existing technologies and efficient policies.

Factor transfers show negative values, which imply positive incentives for smallholder rubber farmers under both systems. This can be attributed to the primary factors of production. Therefore factor transfers may include some effect of the policies and market imperfections that influence the profitability of alternative crops. With regard to output transfers, all values were found to be negative, which is a reflection of disincentives to farmers.

It was noted that not all policies distort the allocation of resources; some policies however, endorse to improve efficiency by correcting failure of the product. A negative transfer in the total revenue indicated that the smallholders were receiving less than the border parity price for the commodity. A negative transfer in the domestic factors represents a positive transfer to the producers.

The value of tradable input transfer was negative for both smallholder rubber monoculture and smallholder rubber agroforestry and the NPCI of these systems were less than one this indicated that producers in both systems were not taxed when tradable inputs were bought.

The general conclusion from this analysis is that even with the assumption and alteration in farm gate price of rubber and real interest rate (i.e. private and
Price distortions reduce production of rubber under smallholder rubber agroforestry system. A 20% decrease in parity price of rubber made the crop undesirable from the social point of view. The opposite is also true (i.e. with a depreciating RER, profits realized in excess of normal returns to domestic resources will decrease). When the price of rubber falls, smallholders under rubber agroforestry system reallocate factors of production (i.e. capital and labor) in order to meet their daily expenses and resume tapping when there is an increase in rubber prices again. Whereas; Smallholders under monoculture system maintain their tapping schedule and maintenance schedule of rubber plantations.

While more intensive rubber monoculture offers better productivity (yield and profitability), it also requires much higher capital and input that is beyond reach for smallholders under rubber agroforestry especially during the immature period. Finally, Rubber agroforestry system has the capacity to provide smallholder farmers with diversified income and a range of non timber forest products than monoculture although for more economic benefits, monoculture stands out to be a better option compared to their counterpart.

Social) smallholders under monoculture still remained to be more efficient as compared to their counterpart.
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ECONOMIC ANALYSIS OF SMALLHOLDER RUBBER AGROFORESTRY SYSTEM EFFICIENCY IN JAMBI INDONESIA

ATUHAIRE RODGERS

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Bogor, September 16th, 2008
Atuhaire Rodgers
CURRICULUM VITAE

The author of this thesis was born on 9th June 1979, in Kyeitembe village, Bushenyi District in the western part of Uganda. He is the first born out of five children of Mrs. Perry Karamuzi and late Paddy Karamuzi.

He completed his primary school in 1993 at Kyeitembe primary school, Bushenyi. In 1997, he completed Uganda Certificate of Education at Muntuyera High School, Ntungamo district. In 1999 he finished Uganda Advanced Certificate of Education at Valley College, Bushenyi District. In 2000 he won His Excellency Martin Brennan and family scholarship to pursue undergraduate’s degree in Environmental Management at Makerere University finished his studies in 2003. In 2004 he won another scholarship from Capacity Building International (INWENT) to pursue an advanced training course in wind energy applications at Kassel University of Technology in Germany. He was also an intern at the World Wind Energy Association headquarters where he wrote a book entitled, “Africa’s Renewable Energy Sustainability Guidelines”. In 2005 he was appointed as the Country Representative of Africa Wind Energy Association – Uganda.

In 2006 he won a scholarship to pursue Masters Degree in Agricultural Economics at Bogor Agricultural University, in the same year he worked as an intern at the Center for International Forestry Research (CIFOR) focusing on biofuels and environment. He was also selected to take part in His Excellency Horst Koehler’s initiative, “Partnership with Africa” between Africa and Germany under the group
theme, “Protecting the Environment and Natural Habitat” www.partnerschaft-mit-afrika.de

In 2007, he was invited for a roundtable discussion under the Civil Society and the Joint EU–AU Strategy to discuss how EU can handle Africa’s problems (http://europafrika.files.wordpress.com/2007/04/tn_liste200407fin.pdf). In the same year he was among the winners of World Agroforestry and Roy Joy Memorial Master Thesis Research Fellowship.

In 2008, he was crowned as the Best Presenter in Bogor Agricultural University International Students Conference and now expects to graduate in October 2008.
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