

OED Précis



Operations Evaluation Department

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Revitalizing Tree Crops: Rubber in Thailand

To help the Bank assess the sustainability of development assistance, OED conducts impact evaluations of projects at full development. A recent impact evaluation analyzes the Bank's support, through two investment projects, for a smallholder rubber replanting program in Thailand.* Supplies of rubber increased impressively under the program, but producers' incomes, and the finances of the rubber replanting agency, have been severely affected by falling world prices. The sustainability of project benefits will depend on increasing productivity. Using an approach originally developed to guide decision making for plantation corporations, the report analyzes the factors that influence smallholders' production decisions and recommends ways to increase productivity.

Introduction

Rubber is the main cash crop in the southern areas of Thailand—the second-poorest of the country's five regions. Most of the rubber in Thailand is grown on smallholdings of less than 8 hectares. In 1960, the Thai government recognized the need to replant old rubber holdings with modern high-yielding varieties, and established the Office of Rubber Replanting Aid Fund (ORRAF) to administer and implement a rubber replanting scheme.

ORRAF administers a replanting fund whose sources of income are

(1) a cess levied on rubber exports and (2) government budget subventions, where necessary. The fund supports smallholders with assistance in kind (high-yielding clonal varieties, fertilizers, and chemicals) and in cash (fixed grants for labor on the completion of specified tasks) before the trees come into production. The grants to mitigate hardship during the trees' long immature period were a key element, in the early years, in convincing farmers to replant with new more productive varieties.

Replanting has been extremely successful. Since the late 1950s, the stock of land planted to rubber has roughly doubled. By 1992, rubber contributed 23 percent of Thailand's agricultural exports; with 31 percent of the world market for natural rubber, Thailand was the world's largest supplier. (Chart 1.)

Over the last six years, however, world rubber prices have consistently declined in real terms. They are not expected to increase significantly in the short and medium term. To restore its basic profitability and economic viability, smallholder rubber production in Thailand will need to become more efficient.

The projects

The Bank supported the second and third time-slices of ORRAF's

Rubber

Though rubber grows better on poor soils than do many cash crops such as sugarcane and maize, it can be a difficult crop for smallholders. Rubber trees normally take five to six years to reach the stage where they can be tapped. Rubber has high establishment costs and has to be replanted every 25–30 years.

rubber replanting program through two projects: the Second Tree Crops Project (approved 1982, closed 1987) for \$142 million out of a total cost of \$359 million; and the Third Rubber Replanting Project (approved 1986, closed 1991) for \$60 million out of a total cost of \$259 million. The projects were designed to raise the incomes of smallholders, increase rubber exports, and stabilize the financial position and improve the efficiency

*"Impact Evaluation, Thailand: Second Tree Crops Project and Third Rubber Replanting Project", Report No. 13244, June 1994. OED reports are available to Bank Executive Directors and staff from the Internal Documents Unit and from Regional Information Services Centers.

of ORRAF. Each project supported the replanting of about 50,000 hectares a year over four years.

Both projects were implemented without delays; the Second Tree Crops project achieved more than its replanting target, and the Third Rubber Replanting project achieved just less than its target. Economic rates of return were 13 percent and 7.3 percent, respectively, at project completion.

The development strategy supported by the projects contributed to a sustained increase in rubber exports, in keeping with project goals. But by the late 1980s, international rubber prices were falling. This weakened smallholders' incomes and their ability to pay the cess, and it raised the bill for government subsidies. By the close of the Third Replanting Project it was clear that the replanting program would require continued attention to ORRAF's finances and administrative costs. These issues were still outstanding three years later at the time of impact evaluation.

Market changes

Rubber prices

Both projects have been affected by unforeseen declines in world rubber prices. In real terms, rubber prices in 1993 were only 25 percent of those that prevailed in 1960, when the Office for Rubber Replanting (ORRAF) was established. During the preparation of both projects, rubber prices were rising. But since 1988, which was the first potential year for tapping trees planted in the Second Tree Crops project, global oversupply has meant that world rubber prices have declined in real terms every year. (Chart 2.)

The fall in rubber prices has:

- Changed the economics of the Thai rubber sector. For many years rubber supplied government with revenue from an export tax. But the

sector now receives transfers, in that government has always viewed its share of rubber sector revenues as a residual surplus, allowing farm incomes to remain at acceptable levels. As rubber prices declined, the export tax was decreased and was eventually abolished in 1992. Consequently, direct subsidies to rubber have been increasing. (Chart 3.)

- Affected the financial viability of ORRAF, as government has sought to protect farmers' incomes. The cess no longer yields enough revenues to feed the replanting fund. Even though the replanting area has been reduced, grants to farmers have had to be increased to offset higher labor costs. The drawdown in ORRAF's reserves has affected the interest income that is the main source of funds for ORRAF's administration.

- Highlighted the need for producers to improve technology and managerial practices, if rubber is to be profitable for them. (Chart 4.)

Agency finances

For 30 years, until the closing of the Third Rubber Replanting project in 1991, ORRAF's financing sources were enough to cover its uses of funds. Since then, however, with the decline in rubber prices and subsequent decrease in revenues, ORRAF has been unable to cover its uses of funds—even with supplementary financing. The loss of revenues and increases in ORRAF's administrative costs (of 13–18 percent a year, in current terms, in 1989–92) have financially strained the replanting program.

Government has emphasized the primacy of replanting over cost recovery. But the Bank, through these loans, has stressed the need for replanting to be financially self-sufficient. Unless producers' profits increase, they are unlikely to be able to afford the full cess if it is reintroduced. Without such a source of revenue, ORRAF is unlikely to

Best demonstrated practices

The Best Demonstrated Practices (BDP) approach, developed by private consultants to guide decision making in plantation corporations, was successfully adapted for use in the smallholder sector in Thailand. The approach seeks to reflect the actual environment within which the smallholder is working. It focuses on understanding the factors which influence smallholders' decision-making and dictate production and input use, profitability, and incomes.

Experience in Thailand shows that when used to advise smallholders, the BDP approach requires careful and systematic agricultural extension work. Farmers need to be closely involved in all stages of the analysis, and the resulting advice needs to be logically presented to them. Careful monitoring is also needed

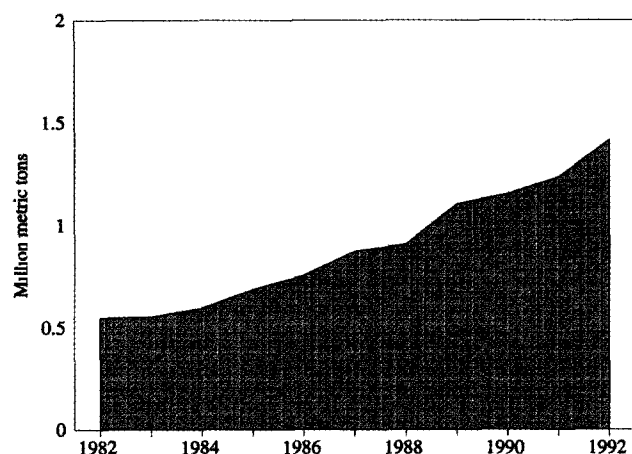
be able to recover the costs of replanting grants in future.

Labor costs, profitability

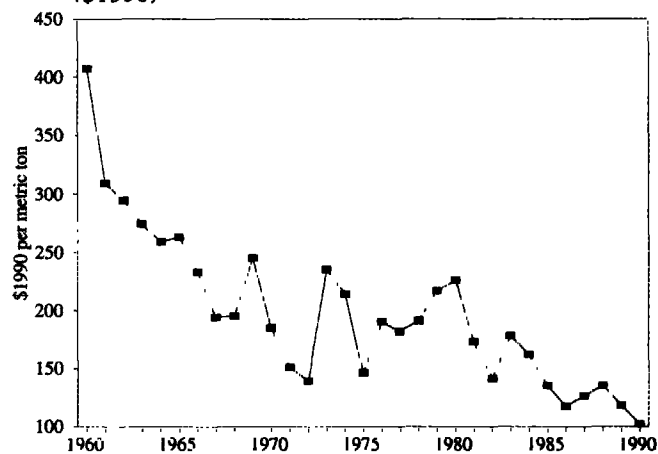
Both projects have also been affected by unforeseen increases in labor costs. The main need for labor in rubber production is for tapping, and 85 percent of rubber producers are thought to rely on sharetappers. As rubber prices have fallen, smallholders and sharetappers have tried to increase yield to maintain their incomes. Their more frequent tapping has reduced the productive life of the trees and, more significantly, reduced the latex yield per hour of tapping labor. The decline in labor productivity has caused a severe labor shortage. Farmers have been obliged to increase the implicit wages paid to sharetappers, but no measures have been introduced to make tapping more productive.

If the current labor-intensive tapping systems continue, the two projects will be unsustainable at

1. Growth in Thai rubber production, 1982-92

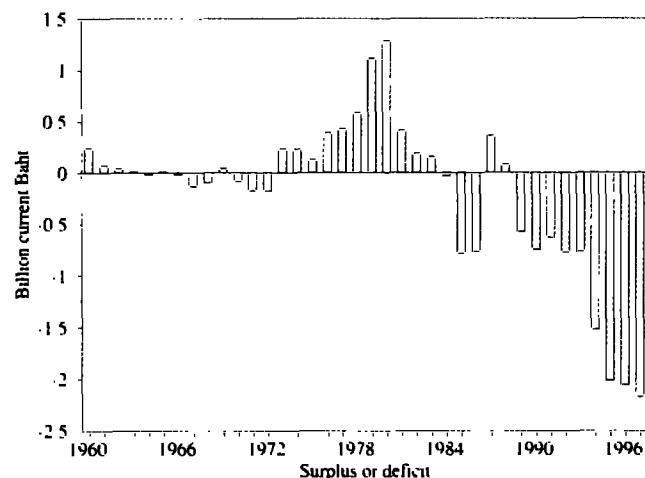


2. International rubber prices, 1960-90* (\$1990)

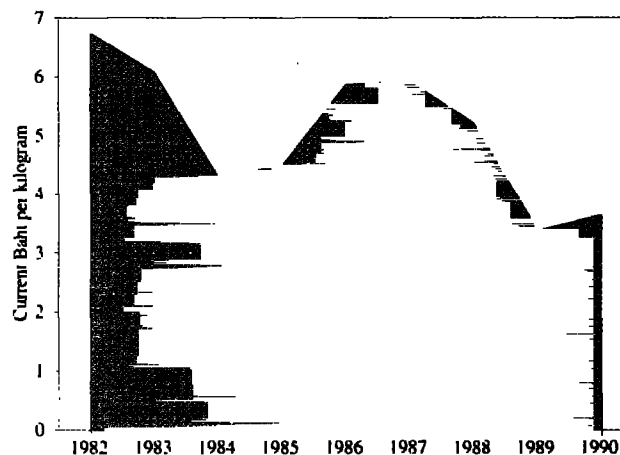


*RSS 1 in Bales. Spot New York

3. Net government revenue from rubber, past and prospective



4. Erosion in margins between f.o.b. price and farmgate price of rubber, 1982-90



both the smallholder and the national level. Smallholders doing their own tapping may be able to maintain their incomes, though the return per unit of land will decline. But it will become more and more difficult to attract sharetappers, especially as alternative jobs open up elsewhere in the economy.

Productivity

Government responses to the problems in rubber have included a series of policy measures designed to redistribute more of the economic benefits of rubber production to farmers, and to insulate

farmers from serious hardship. The replanting program has been scaled down, marketing efforts have increased, research priorities have been reoriented away from production, and floor-price-support programs introduced. Many of these measures have intrinsic merit, but the basic problem remains one of productivity. The success of the two projects will ultimately depend on the profitability of production for smallholders.

Analysis using the Best Demonstrated Practices approach (see Box) suggests three key measures for improving productivity:

- *Rationalize tapping practices* to increase labor productivity and increase farmers' profit margins. It is recommended that the number of tapping days be substantially reduced while introducing a chemical stimulant to maintain yields per unit area close to their present levels.

- *Review the replanting grant schedule*, so as to provide better incentives to smallholders to ensure that trees reach maturity within 5.5 years, rather than 7.5 years. The benefits of a new tapping technology would be compounded if trees could be made to mature earlier.

Follow-up

At the government's request, OED presented the key findings of the draft impact evaluation to officials of the major agencies concerned with rubber production in Thailand. In the subsequent discussions, there was general agreement on the conclusions of the report and on the importance of developing suitable clonal material to support the introduction of the measures advocated. The government has agreed to implement many of the recommendations in the impact evaluation, and is exploring with Bank operational staff how the recommendations can best be implemented.

Ways to shorten the maturation period include choosing modern planting material and adjusting the methods of planting and nurturing the trees.

- *Provide effective extension services* to explain the rationalization of tapping practices and other recommendations.

In their emphasis on reducing labor requirements, these measures are likely to be attractive to smallholder rubber farmers, many of whom—like trecrop farmers in several other countries—are middle-aged and not being succeeded by their children.

The recommendations call for radical changes to existing tapping systems and their introduction would pose an immense challenge to the extension services for rubber. But if they can be implemented, both farmers' and sharetappers' incomes would rise.

Farmers' incomes: Smallholders with a three hectare holding would see their incomes rise by 57 percent, largely because their labor needs for tapping would drop

far enough to be met by family members.

Sharetappers' incomes: Currently, most sharetappers earn only about half the average wage in Thailand. If the recommendations can be implemented, sharetappers' incomes would rise to close to the national average, for the next few years. Returns from tapping will dwindle, however, and sharetappers' incomes will fall behind the national average, as trees approach the end of their productive life.

In the long run, incomes from rubber tapping can only be maintained by reducing the number of workers and introducing new technologies to make tapping more productive for those who stay.

If the recommendations can be successfully introduced, the replanting cess could be reinstated, at a level that would permit replanting to be self-financing once again.

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