

PN- ABR 992

NATURAL RESOURCES MANAGEMENT PROJECT 89277

BAPPENAS – Ministry of Forestry
Assisted by
USAID

**EFFECTIVE PROTECTION AND NATURAL
RESOURCE MANAGEMENT IN INDONESIA**

Associates in Rural Development
for
Office of Agro–Enterprise and Environment
USAID – Jakarta

AID Contract No. 497 – 0362

October 1993

REPORT NO. 26

TABLE OF CONTENTS

List of Tables	i
Preface	ii
Acknowledgements	iii
Executive Summary	iv
I. Introduction	1
Background	1
Link between Industrialization and Rapid Economic Growth	1
Strategies for Achieving Industrialization	2
The Link between Trade Policy and Natural Resource Use	3
II. Protection and Industrialization in Indonesia	6
III. Measuring Protection of Tariffs and Trade Regulations	8
Introduction	8
Nominal Tariff Protection	8
Effective Protection	9
Previous Studies of the Structure of Protection in Indonesia	11
IV. An Overview of Trade Policy in Indonesia	12
Tariffs	12
Import Surcharges	13
Licensing Arrangements	14
Local Content Requirements	15
Quantitative Restrictions and Import/Export Bans	17
Other Non-trade Measures that Impact on Trade	18
V. An Assessment of Indonesia's Structure of Nominal and Effective Protection	20
The Structure of Nominal Tariffs Across Sectors in the Indonesian Economy	21
Indonesia's Structure of Effective Protection	24
Protection in the Forestry- and Fisheries-based Sectors	26
VI. Conclusion	33

Appendices:

Appendix 1 : Terms of Reference

Appendix 2 : Timetable of Consultancy

Appendix 3 : People Contacted

Appendix 4 : Nominal Protection Rates of Tradeable
Goods Sectors, 1991

Appendix 5 : Effective Rates of Protection of Tradeable
Goods Sectors, 1991

Appendix 6 : Bibliography

LIST OF TABLES

Table 1:	Nominal Rates of Protection of the Indonesian Economy, 1991	23
Table 2:	Effective Rates of Protection of the Indonesian Economy, 1991	25
Table 3:	Nominal and Effective Rates of Protection of the Forestry, Forestry-based, and Fishery Sectors, 1991	28

PREFACE

This report is one of a number of reports produced under the Government of Indonesia's Natural Resources Management Project (NRM) that is assisted by the United States Agency for International Development (USAID).

The NRM Project, working with the Indonesian National Planning Board (BAPPENAS) and the Department of Forestry (Departemen Kehutanan), provides through a specially established project Policy Secretariat advice to BAPPENAS on natural resource issues relating to long term and short-term national planning. In addition, working with the Department of Forestry the NRM project carries out field activities in two pilot project areas one in West/Central Kalimantan and one in North Sulawesi including the preparation of management plans for the Bukit Baka - Bukit Raya National Park in Kalimantan and the Bunaken National Park in North Sulawesi. Each report addresses an aspect of the planned NRM project activities that are agreed on and laid out in an annual NRM Implementation Plan and each report aims at providing specific recommendations for future work in the area addressed.

This report examines the tariff structure and trade framework of the Indonesian economy in 1991, and its impacts on the management and sustainable development of Indonesia's natural resources, namely, the forestry and fishery resources. Based on the methodology presented in this report, further analyses of the Indonesian trading framework is expected to be completed by the NRM project for other years with the incorporation of additional data. Recognizing that trade policies impact on resource flows, this report serves to complement other ongoing studies within the NRM project and thereby contribute to an improvement in current knowledge of and enhancement of the project's advisory role to the Indonesian government regarding natural resource uses and sustainability.

ACKNOWLEDGEMENTS

I would like to thank Erik Scarsborough for his guidance throughout the undertaking of this study. In addition, his comments on an earlier draft of this report were invaluable and helped to make this report a more cohesive and comprehensive one. Comments received by representatives from the Ministry of Forestry, BAPPENAS, USAID, and the Trade and Investment Policy (TIP) project at the presentation of this report were also valuable. Special thanks go to the members of the research teams who worked diligently to meet the data requirements of this report and without whom this work would not have been completed in the short time frame of this consultancy. Lastly, thanks go to the support staff of the NRM project in Jakarta who assisted in many different ways to make the work go smoothly.

EXECUTIVE SUMMARY

- Tariff and trade policies affect the incentive structure which drive resource flows into and out of sectors, and thereby have an impact on the use and management of resources, including natural resources such as forests.
- Both the nominal and effective rates of protection for sectors in the Indonesian economy in 1991 show a bias of higher protection for manufactured vs agricultural sectors, and for import-competing vs. export-competing sectors.
- In the forestry and wood-based sectors, there is a bias towards higher protection of more processed goods. Wood and other forest products receive *negative* effective protection, whereas the manufactured wood products receive significantly high levels of effective protection (in some cases close to 100 percent).
- Among the manufactured wood products, the source of the high effective protection differs. For plywood, which is not protected by nominal tariffs (1.1 percent), is the subsidy received on wood inputs that arises from the export ban on logs and the restriction that necessitates log concessionaires to have access to downstream processors of the logs. For other manufactured wood products, the high level of effective protection arises from the high tariff on their outputs.
- The different sources of high protection has resulted in an ordinate amount of wood resources being channeled into plywood manufacture, with no accounting for the different values of differentiated wood species. That is, high-quality woods such as teak, ebony, and mahogany are being used to manufacture plywood.
- At the same time, the other wood-using sectors must compete in the "open" market for which the price of wood is believed to be much higher than that paid by the plywood manufacturers. Because of the protection on their output (as well as the higher priced paid for logs as compared to plywood makers), producers in these markets have no incentive to produce for the export market (since they can receive a higher protection, and price, in the domestic market), and thus no incentive to be as efficient as possible. In the longer run, this makes them unable to compete in international markets.
- What is needed is a reduction in these distortions, if not for the entire economy, at least across the forestry sectors themselves. A good starting point would be to reform existing policies such that the use and management of wood resources

are responding to the different (social) values of the different wood species. This would begin the process of achieving a more efficient allocation of resources.

- It is also important that the distortions across the different wood-using sectors be reduced. That is, plywood manufacturers, furniture makers, and builders of wooden structural materials should be allowed to compete for the different types of wood. In this way, a more efficient allocation of resources can arise with the high-quality wood being put to its highest valued uses (for example, mahogany used for furniture), and low-quality woods being used for production of commodity-grade plywood.
- Thus, improved natural resource management in Indonesia can come about without necessarily resulting in reduced export earnings, slowdown in growth, and greater unemployment. A "win-win" situation is possible, whereby with some policy reforms, growth can continue at the same time that allocation of natural resources and its management can be improved.

I. INTRODUCTION

Background

Indonesia, the fourth most populous country in the world and the largest member of ASEAN, is blessed with an abundance of natural resources. The largest archipelago in the world, Indonesia is composed of more than 13,000 islands, stretches across more than 5,000 kilometers, and covers 4,000 square kilometers. There is a bountiful supply of oil, natural gas, and minerals such as copper and tin. Its rich, fertile soils have also allowed Indonesia to become a world-class producer of such products as copra, nutmeg, mace, coffee, tea, rice, pepper, cloves, and wood products. Indeed, for some of these products, Indonesia is recognized as being one of the top exporters in the world. Indonesia's relative abundance of natural resources enabled it to maintain respectable rates of economic growth during the 1960s and 1970s, a period during which Indonesia actively pursued industrialization.

Link Between Industrialization and Rapid Economic Growth

Rapid increases in per capita national income and a more equitable distribution of income have been priority goals of the Indonesian Government since the country's independence in 1950, and today there is a broad consensus among Indonesian policymakers that industrialization is the key to both. This view naturally results from a basic fact of economic history, i.e., that few countries have ever achieved a high level of per capita income with a reasonably equitable income distribution without industrializing their economies.¹ The reasons for this are explained below.

Indonesia's current economic setting is typical of that faced by most developing countries today. That is, Indonesia has a fixed supply of land and natural resources on the one hand, and a large and rapidly growing labor force that must be provided with employment on the other. In pre-industrial economies, each unit of land and natural resources must be combined with ever-increasing amounts of labor if economic growth is to continue over time. Because technical factors limit the amount of labor that can be combined with each unit of land or natural resources, when the labor force becomes large relative to the fixed supply of land and natural resources, the rate of economic growth slows and may cease.

¹ New Zealand is the only exception. However, the special circumstances that allowed New Zealand to reach a high level of per capita income with relatively equitable income distribution without industrializing are vastly different from the conditions faced by today's developing countries. Thus, the New Zealand case is not replicable in Indonesia or other 20th-century developing countries.

On the other hand, industrialized economies do not face this constraint to growth. This is because industrial-based production primarily combines labor with machines and technology rather than land or natural resources. Because machines and technology are reproducible commodities, the supply of both is limitless, not fixed. Thus while it is possible for pre-industrial economies to "run out" of land and natural resources with which to combine with labor, industrial economies never "run out" of machines or technology. This allows growth to continue indefinitely.

Further, unlike land or natural resources, machines and technology are highly tradeable commodities. Thus both can be imported in the early stages of industrialization. At more mature stages of industrialization, these products can be produced domestically and perhaps even exported to become a source of foreign exchange earnings. It is these two attributes of machines and technology--i.e., reproducibility and tradeability--that make industrialization the preferred pathway to rapid income growth and more equitable income distribution.

Strategies for Achieving Industrialization

Two basic strategies for promoting industrialization are in use in the world today: (a) import-substitution industrialization, whereby industrial growth is based on expansion of domestically produced manufactured goods that replace imports of similar items, and (b) export-oriented industrialization whereby industrial growth is based on growth of goods destined for the export market. While the ultimate goal of both strategies is the same, i.e., industrialization, there is a marked difference in the policy regime used to encourage industrialization under these two strategies.

The strategy of import-substitution industrialization employs policies and devices that artificially raise the level of profitability of industries targeted for rapid expansion. Most of these policy devices are instruments of trade policy. Typical examples include tariffs, import bans on certain commodities, quotas, import licensing, and export bans on raw material products.

All of these interventions widen the profit margins of domestic producers, thus protecting them from more price-competitive foreign producers. The artificially induced high levels of profitability in the target industries cause investible resources to flow from non-protected productive activities into the protected industries. Part of the cost to society of protecting the target industries is thus the output that is given up when non-protected productive activities shrink as a result of these resource flows. Thus an import-substitution industrialization policy regime distorts the pattern of resource allocation in such a way that resources may, in

fact, flow into activities in which the country does not naturally have a competitive edge.

In addition to distorted resource use patterns, industrial expansion based on artificially high levels of profitability has two disadvantages. First, because of the high profit margins they enjoy, producers in protected industries do not have any incentive to use society's scarce resources efficiently. This typically results in low levels of efficiency in the protected industries, which, in turn, result in the target-industry producers being unable to compete with foreign producers in international markets. Because of this, the goods and services produced by these "hot-house" industries can usually only be sold in the domestic market. Import-substitution industrialization is thus often referred to as an "inward-looking" development and industrialization strategy.

The second disadvantage of import-substitution industrialization is that since the goods produced by protected industries are not competitive in world markets, once the home-country market becomes saturated, economic growth will slow and may cease altogether. Thus the growth stimulated by import-substitution industrialization is not sustainable in the long run.

In contrast, the more outward-looking, export-led growth and industrialization strategy relies more on market forces to determine the flow of resources into and out of economic activities and sectors. While distortions of resource incentives do occur under an export-oriented development and industrialization approach, the reliance on exports implies competition with foreign producers in world markets, and hence a stronger incentive for producers to be economically efficient. Because the limits of the world market (as opposed to the domestic market) are not as bounded, a slowdown in the expansion of export-oriented industries due to saturation of markets is highly unlikely.

During the late 1950s, 1960s, and 1970s, the strategy of import substitution was the development approach followed by most developing nations in the world. Indonesia was no exception in this regard. However, since the mid-1980s, the Indonesian Government has increasingly favored export-oriented growth and industrialization.

The Link Between Trade Policy and Natural Resource Use

The point of the above discussion is that trade policy is *not* simply about which goods should be imported or exported, and in what quantities. Rather, trade policy permeates virtually all aspects of the economy by virtue of its ability to drastically alter the relative profitability of individual productive activities, industries, or even entire economic sectors. And of the entire set of trade policy instruments available to

policymakers, the most transparent (though not necessarily the most potent) is tariff policy, which sets import tax levels for all goods entering the economy legally.

Further, tariff policy operates at a highly disaggregated level. Indonesia's 1991/1992 tariff schedule, for example, contains more than 9,000+ product lines, with sometimes narrowly-defined commodities. Tariff policy thus has the capability of vastly altering profitability in a highly specific way or across a broad range of commodities and industries.

Therefore, in the discussion of tariff policy that follows, the tariff levels assigned to particular commodities or commodity groups should be thought of as instruments for artificially channeling investible resources into the production of commodities affected by the tariffs. Higher levels of tariff protection for particular commodities thus imply more grossly-altered levels of profitability in the industries to which they pertain, while lower tariff levels imply weaker inducements for expanding production activities for commodities to which the tariffs apply. Further, because such resource flows are artificially-induced, tariff levels that differ significantly from the average tariff level clearly distort the system of economic incentives that would exist if tariffs were all set at the same level.

Finally, it must be remembered that artificially high profit margins never provide producers with incentives for the sparing use of resources. As a result, wasteful and inefficient patterns of resource use are likely to arise and be maintained. Such waste is never in the best interest of society as it implies a deadweight loss to the society which no individual can obtain and which can never be recovered.

Because the Indonesian economy is--and for some time to come will likely remain--a natural resource-dependent economy, incentives for wasteful use of resources in the natural resource-intensive sectors are of particular interest to this study. A basic assumption of the study is that the key to improved natural resource management in Indonesia lies not in mandating reduced resource depletion rates, but rather in improving the efficiency with which Indonesia's natural resources are used.

Perhaps one of the most important results of this study is that in the area of tariff protection alone, there exists vast scope for policy changes that, if adopted, would simultaneously result in improved natural resource management, a more sustainable growth path, and more rapid expansion of both national income and employment opportunities. This suggests that opportunities for "win-win" policy options--i.e., policy reforms that would both benefit growth and improve natural resource management--abound in the Indonesian economy.

This is particularly good news to policymakers who formerly were concerned that improved management of Indonesia's natural resource base would automatically translate into a slower pace of economic growth. The results of the present study demonstrate that high levels of protection are afforded to key natural resource-intensive activities, and that these high levels of protection encourage the inefficient use of Indonesia's natural resources.

Clearly, if Indonesia's scarce natural resources are to be used as efficiently as possible to promote rapid growth, it goes without saying that all incentives that encourage wasteful or inefficient use of the natural resource base should be eliminated. While the present study focuses mainly on tariff protection, the statement in the sentence directly above pertains as much to non-tariff protection as it does to tariff instruments.

Finally, it should be mentioned that the results of the present study are consistent with those of complementary studies performed in a large number of countries. The results of these studies point out that more often than not, it is the inefficient use of natural resources resulting from existing policy distortions that constrain improved natural resource management, not the desire for rapid economic development *per se*. This makes it apparent that the "growth-environment" tradeoff that still worries so many developing-country policymakers may in the end turn out to be irrelevant, or at the minimum, a gross simplification of the choices facing economic planners and policymakers.

The results of this study and others suggest that sound natural resource management, efficient use of natural resources, removal of allocative distortions, and acceleration of economic growth may all be achievable simultaneously. This is because policy distortions that encourage inefficient use of natural resources ultimately hasten depletion or destruction of the natural resource base.

II. PROTECTION AND INDUSTRIALIZATION IN INDONESIA

As mentioned above, Indonesia's relative natural resource abundance enabled it to maintain respectable rates of economic growth by means of import substitution industrialization during the 1960s and 1970s. However, the import substitution policy stance adopted during that period did not give domestic producers appropriate incentives to use Indonesia's productive resources efficiently. Nevertheless, because of Indonesia's relative abundance of natural resources, inefficient use of natural resources could be tolerated. During this period, exports of raw materials were used to finance imports of capital and equipment necessary for sustaining the import-substitution approach to development and industrialization.

As is typical of countries pursuing this development strategy, the Indonesian Government intervened heavily in key sectors such as agriculture, the manufacturing industries, and finance markets. There was also a distinct import-substitution orientation to the Government's trade and domestic policies. Both imports and exports were heavily regulated through tariffs and non-tariff measures to protect certain "strategic" domestic industries. The low ratios of imports and exports to the country's gross domestic product (GDP), which were in the vicinity of 12-16 percent during the 1970s, reflect the country's relatively inward-looking approach during these years.

It was not until the mid-1980s, following significant downturns in commodity and oil prices, worldwide recession, and movement towards a more open economic environment by other developing countries that hoped to emulate the success of the Asian newly industrializing economies (NIEs), that the shift in Indonesia's development strategy occurred. Rather than stimulating economic growth and industrialization through import substitution, the Government's policy stance now took on a more outward-looking orientation, including an emphasis on growth and development of non-oil exports, especially manufactured goods.

Of particular interest to Indonesian scholars and officials was the growth and development of natural resource-based manufactured goods, which have higher value added than the natural resources themselves which used to be, and in some cases remain, major revenue earners for the Indonesian economy. The desire to increase value added of Indonesian exports, combined with the cries from the environmentally conscious on the sustainability of the forests and marine life given existing practices in the wood and fisheries industries, led to measures and regulations that at least on the surface were aimed at promoting the development of resource-based manufactured exports which had higher value added and the

management of natural resources for long-run sustainability. As part of the domestic policies, regulations on the trade of products from the primary and manufacturing sectors were also implemented. The ban on raw, unprocessed logs is one example of the government's attempts in this regard.

The transformation of the Indonesian economy that resulted from this change in policy stance is clear. Throughout the 1960s and much of the 1970s, the primary sectors--i.e., agriculture, forestry, fishery, and mining--contributed the bulk of Indonesia's gross domestic output. During the 1980s, however, the share of the primary sectors began to decline; by 1985, these sectors accounted for only about 40 percent of Indonesia's domestic output. By 1990, the share of the primary sectors had fallen to less than 35 percent of real output.²

The shift in Indonesia's development strategy also impacted on the structure of Indonesian trade, in particular, the rising significance of manufactured goods exports. From less than 2 percent in the 1970s, the share of manufactured goods exports expanded throughout the 1980s. However, even as late as 1985, the export share of manufactures remained less than 13 percent. And it was not until the reforms in the mid-1980s that growth in manufactured exports surged upwards at a tremendous pace. By the early 1990s, the share of manufactured exports had climbed to more than 40 percent. Among manufactured exports, the most significant are resource-based manufactures which made up more than 14.1 percent of total merchandise exports in 1991.

Thus it would appear that the shift in Government policies and regulations, including trade policies and measures, have succeeded in achieving the goals of further industrialization of the Indonesian economy and increased export growth and diversification. However, these policies have in some ways negatively impacted Indonesia's natural resource base.

While deregulation has spurred growth and diversified exports, it has not necessarily resulted in improved management of the natural resource base. Further, because the impact of deregulation has not been even across economic sectors, and because in some instances deregulation fell short of its goal of fully opening the markets, the economy remains distorted in certain sectors. This has in some cases allowed allocation of resources to remain distorted, and this has had clearly negative impacts on Indonesia's natural resource base.

² Data were obtained from James, Naya, and Meier (1987) and Asian Development Bank (1992).

III. MEASURING PROTECTION OF TARIFFS AND TRADE REGULATIONS

Introduction

The discussion above described how tariff protection can be used to artificially alter the level of profitability of producing particular commodities or commodity groups as a means of causing society's resources to flow into targeted industries. As was pointed out above, the profitability associated with high levels of protection strongly encourage expansion of the activity or commodity affected, whereas lower levels of protection lead to more moderate rates of expansion of such activities.

To facilitate interpretation of the study results below, this chapter presents a brief discussion of the various quantitative measures of tariff protection used by international trade experts in measuring how varying levels of tariffs impact the channeling of investible resources within the economy. The discussion focuses on the difference between two measures of tariff protection: nominal protection and effective protection.

Nominal Tariff Protection

Nominal tariff rates are simply the rates of tax levied on imported goods when they enter the country. In Indonesia in recent years, tariffs have been expressed in *ad valorem* terms, that is, as a percentage of the total value of the good before the tax is paid. For example, the tariff rate on maple syrup in 1991 was 15 percent.

If we ignore the costs of transport and insurance as well as the markups of local distributors and freight handling agents, the nominal rate of tariff protection as published in the tariff schedule is a measure of the degree to which a domestic producer may increase the selling price of the locally-produced version of the imported commodity in question. Since tariffs are taxes levied *only* on imported goods, a tariff of only, say, 15 percent allows the domestic producer significant scope for increasing his or her profit margin.

Strictly speaking, the imposition of a tariff on the imported version of a good that is also produced domestically increases the profitability of the domestically-produced version of the good. This is so because tariffs on goods sold to consumers do not change the cost of producing such goods. Imposition of a tariff thus causes a transfer of wealth from consumers to someone else in the economy.

The consumer buying the imported version of the good in question transfers a portion of his wealth to the Government since the tax levied at the point of import ultimately gets passed on to the consumer in the form of a higher retail price. If the consumer instead buys the domestically-produced version of the good in question, the consumer transfers a portion of his/her wealth to the domestic producer because the producer's higher profit margin arising from the tariff protection (and the protection from foreign competition) will be incorporated into the retail price paid by the consumer.

Nominal rates of tariff protection thus provide us with a quantitative measure of the degree to which the profit margin relevant to the good in question is artificially increased. Thus, other things being equal, the profit margin on production of good with a 100-percent nominal tariff would be substantially higher than the profit margin on a good faced with only a 15 percent nominal tariff.

Effective Protection

Analyzing the differences in nominal rates of tariff protection offered to various locally-produced commodities provides us with a sort of rough-and-ready guide to differences in the degree to which various goods are protected in Indonesia. Nevertheless, nominal tariff rates alone do not necessarily give us an accurate assessment of the degree of protection offered to protected goods. In fact, the nominal tariff measure suffers from two serious drawbacks.

First, it ignores the possibility that some of the inputs used to produce the protected good may themselves enjoy substantial tariff protection, minimal tariff protection, or even negative tariff protection. If the domestic producer of a highly protected good must also pay high tariffs on imported inputs necessary for producing the protected good, then the level of protection offered to this producer will be less than that suggested by the nominal tariff rate.

Second, the nominal tariff measure ignores all forms of non-tariff protection such as import licensing, official monopolies, import or export quotas or bans, and similar arrangements. Dozens of studies have clearly demonstrated that these non-tariff trade policy instruments can profoundly alter the degree of protection suggested by the nominal tariff measure alone.

Thus, to better clarify the implications of the existing structure of tariffs and non-tariff barriers to trade, and the ramifications of this structure on natural resource management, this study employs the effective protection measure of tariff protection. Whereas the nominal protection rate (NPR) measures the protection

of any good by the difference between the border price and the domestic price of the good, the effective rate of protection (ERP) measures the difference between domestic value added and international value added and takes into account not only the nominal tariff on the good itself, but also the nominal tariffs of the inputs used to produce the good.

An example of the difference between the NPR and ERP as a measure of protection would be helpful here. Consider an automobile which sells in the international and domestic market for \$10,000. Components make up one-half of total inputs into the automobile, and hence, domestic value added is equal to \$5,000. Now suppose an import duty of 10 percent is assessed on the automobile. Then the domestic price rises to \$11,000; but since the price of components remains unchanged (i.e., there is no import duty on components, and so the value of components remains at \$5,000), this implies a rise in value added from \$5,000 to \$6,000. Thus, as a result of the 10 percent nominal tax on the output, i.e., the automobile, the value added associated with the activity of producing the automobile rises by **20 percent** ($(\$6,000 - \$5,000) / \$5,000$). Since the domestic price of the inputs (i.e., the components) has not changed but the price of the output has risen by 10 percent, the total rise in the domestic price of the output accrues to the value added in the automobile industry. Thus, we can say that the ERP of the automobile industry is 20 percent.³

While criticisms of effective protection have been raised on both theoretical and empirical levels,⁴ the ERP provides a measure of the degree of distortion that exists in the trading framework that goes beyond an assessment of nominal tariffs and the tax on consumers. By incorporating the impacts of tariffs on intermediate inputs and other non-tariff elements on the protective structure of the economy, a ranking of the effective rates of protection across industries provides an indication of the resource pulls (pushes) into (out of) particular activities that will occur as a result of the protective structure. These different levels of effective

³ Using this same example, if a 10 percent tariff on components were assessed in addition to the 10 percent tariff on the automobile, then the calculations would be as follows:

	domestic price of automobile
\$11,000	
	domestic price of components
5,500	
	value added
	5,500

and the change in value added would be equal to $(5,500 - 5,000) / 5,000$ or 10 percent. That is, if the tariff on all inputs is equal to the tariff on the output, then the protection to the activity of producing the output, the ERP, is equal to the NPR of that output and also equal to the NPR of the inputs. That is, $ERP_j = T_j / T_i$, where ERP_j = effective rate of protection in the production of the j th good, and T_j and T_i are the nominal tariffs assessed on the j th output and the i th inputs used in producing the j th output.

⁴ For more on the merits and criticisms of the effective protection theory, see Balassa (1965), Corden (1966, 1971), Johnson (1965), and Bhagwati and Srinivasan (1973).

protection across the various industries imply an allocation of resources that may be suboptimal in comparison to that which would have resulted under free trade. That is, scarce resources may be drawn towards highly protected sectors that may not necessarily be the same sectors in which the country has a comparative advantage. The implications of the ranking of ERPs as derived in this study on resource allocation, in particular, allocation of natural resources, is the main objective of this inquiry.

Previous Studies of the Structure of Protection in Indonesia

The theory of effective protection is not new and much has already been done in terms of theoretical and empirical studies. In Indonesia, analyses of the structure of effective protection have been completed for a number of years.⁵ However, following the government's moves towards deregulation of the economy in the mid-to late 1980s, the pace of deregulation has quickened and 1990, 1991, and 1992, new reform packages were unveiled. Thus, the estimates of effective protection derived by many of the studies are outdated and do not reflect the current situation.

Moreover, while the World Bank has estimated the ERPs of Indonesian sectors on an annual basis in the past few years, the methodology with which the estimates of effective protection are obtained in this study are more comprehensive in that all product and tariff lines are incorporated into the analysis.⁶

Lastly, in the aforementioned studies and a study by Togashi (1993) which incorporates 1992 tariff data, the main objective was to obtain a general picture of the overall structure of protection in the Indonesian economy. This study goes beyond and gives more attention to those sectors that have direct implications for the management of natural resources, i.e., the wood and forestry sectors including wood manufactures and industries that use wood as a major input, and the fishery and marine sectors.

This study is thus more comprehensive and more pertinent to the focus of the Natural Resources Management Project. At the same time, it is only fair to note that for certain data requirements, the information garnered from the aforementioned studies as well as other research work were utilized. Wherever possible, price comparisons between international and domestic prices were used to determine the impacts of certain non-trade regulations and practices. However, where this was not possible, estimates from other studies were employed.

⁵ For example, studies have been conducted by Pitt (1981), Fane and Phillips (1987, 1991), Pangestu and Boediono (1986), the World Bank (1991), Wymenga (1991), and Togashi (1993).

⁶ In contrast, the World Bank studies consider only a specific number of items within each I-O sector that are deemed to be representative of the entire sector.

IV. AN OVERVIEW OF TRADE POLICY IN INDONESIA

While Indonesia has made significant progress in improving its macroeconomic and trading environment, the Indonesian economy remains characterized by a complex trade framework with numerous impediments to trade that serve to effectively shield the domestic market from foreign competition. These impediments include tariffs, import surcharges, licensing arrangements, quantitative restrictions, health and safety standards, and various types of taxes, to name just a few. To assist in understanding the myriad of rules and regulations governing the import and export of goods, this section provides an overview of the various measures that exist in the Indonesian system and the extent to which the measures impact on the free import and export of goods. The implications of these impediments to trade are important, for their impacts on the relative cost of acquiring or exporting an item will need to be incorporated into the analysis of the "true" protection of sectors in the Indonesian economy.

Tariffs

With the exception of the preferential treatment that Indonesia gives to its ASEAN neighbors for qualified products,⁷ tariffs are applied to all imports on a most-favored nation (MFN) basis (i.e., the imposition and level of the tariff does not depend on the country source of the imports).⁸ In addition, tariffs have generally been assessed ad valorem,⁹ and unlike other developing countries in the world, Indonesia has never resorted to the use of alternate tariffs, seasonal tariffs, or variable levies on imported goods.

Since the mid-1980s, the average MFN tariff rate has generally followed a declining trend. From 35 percent prior to 1985, the average tariff rate fell to 27 percent in 1985, 24 percent in 1988, jumped up in 1989 to 27 percent, but fell thereafter to 22 and 20

⁷ Qualified products are those goods that satisfy the ASEAN content requirement of 40 percent that was set forth in the ASEAN Preferential Trading Arrangement.

⁸ Note, however, that in some cases, imports from a certain source country can and has been discriminated against. Indonesia is able to do this under MFN rules by considering the import of a particular item from country A as a separate and unique product from the import of the same item from country B, and assessing different tariffs on the two imports.

⁹ Specific taxes were assessed on a limited number of products in years prior to the 1990s.

percent in 1990 and 1991.¹⁰ The latest figure indicates that the average MFN rate has held steady at about the 20 percent mark in 1992.¹¹

For the purposes of this study, the annual MFN tariff schedule for 1991 was employed to derive the ERP estimates for this year.¹² The tariff data, which consisted of 9,000+ product lines, were obtained from *Customs Tariff 1991* which is published by the Directorate General of Customs and Excises, Department of Finance. As all 1991 tariff data were ad valorem rates, no adjustments were necessary for their incorporation into the derivation of the ERP estimates.¹³ Trade data from the *Indonesia Foreign Trade Statistics 1991*, Vol. 2: Imports, published by the Central Bureau of Statistics, were also utilized in calculating the effective rates of protection.

Import Surcharges

Import surcharges, which were expressed as ad valorem rates of duty in 1991 and which affect the price of imports in much the same way as do tariffs, are also assessed on several goods entering the country. Like tariffs, the import surcharges raise the price of imports and allow domestic producers of import-substitutes some protection from import competition.

Import surcharges are basically viewed as serving two main functions. First, the surcharge can be used as a temporary measure to compensate domestic producers for a reduction in protection that may have occurred from other trade-related policies. For example, the relaxation and removal of import licensing controls following the reform packages of the early 1990s were accompanied by an increase in import surcharges to assist domestic producers in adapting to the new situation. Another function served by import surcharges is the protection of domestic infant industries from fluctuations in world prices. This rationale has been used for the

¹⁰ The jump in the MFN rate in 1989 is partly due to the conversion of from the CCCN Nomenclature of classifying imports and exports to the Harmonized Commodity Description and Coding System (HS). The conversion to the HS system resulted in an increase in the number of tariff lines from just over 5,000 to more than 9,000.

¹¹ These average tariff data come from Soesastro, Pangestu, and Togashi (1993).

¹² Calculation of effective rates of protection for other years, including 1985 and 1992, are presently underway and should be completed in the forthcoming months. Calculations for previous years are more complex as the data are reported under different tariff and trade classification schedules. To match the trade, tariff, and input-output data, concordance tables between the different classification schemes are being constructed by the research teams for the purpose of deriving ERP estimates for those years.

¹³ For years other than 1991 and 1992, specific duties (rather than ad valorem rates) were assessed on a number of imports. In order to calculate the ERPs for these products, it will be necessary to estimate an ad valorem equivalent using available data on the total duties collected and the number and value of items imported.

imposition of surcharges on such items as iron and steel goods, vegetable oils, chemicals, pharmaceuticals, and footwear to name a few.

It should be noted that although import surcharges were intended to be temporary measures lasting for only one year (extensions were permitted for special cases), the Indonesian government has not strictly enforced this time limit, and most import surcharges have, in fact, been in existence for more than one year.

With the Indonesian government's move toward deregulation of the trade environment, however, import surcharges were abolished for most product lines. As a result, only 2.4 percent of all tariff lines were subject to surcharges in 1991. While this low value suggests that the extent of surcharges is not significant as a whole, for specific items, the addition of the surcharge to an already high tariff implies a much higher implicit tariff on the good, and, in turn, a higher degree of protection to domestic producers of substitutes for the imports. A case in point can be found in the manufacture of other tobacco products, where several products faced with a 30 percent import tariff are also assessed import surcharges of 20 percent, thereby raising the implicit nominal rates of protection to 50 percent.

Licensing Arrangements

Perhaps one of the most difficult to quantify is the impact of the extensive licensing system for the import and export of goods that prevails in Indonesia on the protection of the various sectors. For imports, the different licenses--they include (1) the general importer license (IU or IU+), (2) the importer-trader (IT) license, (3) the producer-importer (PI) license, (4) the importer-producer (IP) license, and (5) the sole agent license (AT)--imply some market power to the enterprise holding the license.

The most restrictive of licenses is the AT license which is issued to sole agents that are appointed by the Indonesian government and act as national distributors. Typically, enterprises in this category are national companies that have been designated as the overseas principals to import, promote, distribute, and carry out after-sales service of specific products. Thus, owners of AT licenses are, in effect, monopolists of their products in the Indonesian market.

An IT license effectively provides an enterprise with monopoly power over the import of a product. Six state-owned trading companies--PT Kerta Niaga, PT Pantja Niaga, PT Mega Eltra, PT Tjipa Niaga, PT Dharma Niaga, and PT Sarinah--hold IT licenses for the import of such items as apparel and accessories, as well as alcoholic and non-alcoholic beverages.

Producer-importers (i.e., PI license holders) are allowed to import goods which compete with their own output. Examples of organizations holding PI licenses include BULOG, the government organization in charge of domestic production, marketing, and distribution of basic foodstuffs; Krakatau Steel, the state-owned enterprise producing steel products; Dahana, a state-owned company which produces explosives; and Pertamina, the state-owned enterprise which produces petroleum and gas products.

Firms that wish to import items that are necessary inputs in their production processes but which are not available domestically must obtain an importer-producer (IP) license. Most IP licenses can be found in the iron and steel, and electrical machinery industries.

For imports of all other items, a general importer license (IU or IU+) is required. More than 85 percent of all items that can be imported by an individual/enterprise with a IU or IU+ license can be imported without restriction. However, other items that are catalogued in the Restricted Goods list can only be imported by the holder of the license under which the commodity is classified.

Licenses are not restricted to import activities, and for a number of Indonesian goods, a license is required in order to export the item. These goods are typically those that are subject to international import or production quota arrangements (for example, textiles which is covered by the Multifiber Agreement and petroleum which is governed by Indonesia's commitment to OPEC) or goods that can only be exported once domestic requirements have been met (items in this group include rice, wheat flour, and fertilizers).

To incorporate the impacts of these licensing arrangements into the derivation of ERPs, i.e., to quantify the effects in terms of a kind of tariff equivalent, is difficult and in some cases, given the limited availability of data, is impossible. Wherever possible, for sectors which are characterized by a homogeneous good that is traded in international markets--for example, the markets for corn, rice, wheat, and other raw materials--a comparison of the domestic (i.e., Jakarta) price and the international price was used to determine the implicit nominal tariff, i.e., the "true" gap between domestic and international prices. For other sectors, estimates of the licensing arrangement impacts derived by other studies if available were employed.

Local Content Requirements

In local content schemes, a certain amount of inputs used in the production of a good must be sourced from domestic suppliers. Thus, local content programs endow producers of components, for example, some measure of protection from foreign competition as a certain level of demand for their products is, in effect,

guaranteed by the scheme so long as the producer of the final good remains in business.

In Indonesia, components that are not on a Master List must be sourced locally. This program has been applied in the production of motor vehicles, electrical equipment and home appliances, agricultural machinery, and machine tools. However, in line with its recent trade deregulation, the Indonesian government has eased some of the local content requirements and made others more flexible. For example, some deleted components can now be imported at the specified tariff rates (which may be prohibitively high, making this relaxation in the local content scheme less effective in terms of opening the domestic market to competition) and assemblers can now choose which local components to substitute in production provided the overall local content requirement is met. Thus, while the local content schemes continue to afford protection to producers of component items, the relaxation of the rules governing the scheme have reduced the level of protection.

The electrical and non-electrical machinery sectors as well as the motorcycles sector are sectors in which local content schemes have been employed. Because the impacts of the scheme are difficult to quantify without detailed surveys of firms in each of the industries, no adjustments were made to the NPRs of the products in these sectors. However, the impacts of the scheme were accounted for by differentiating between components and final goods in each of the product lines, and determining the input and output tariffs of the two groups. That is, since domestic assemblers were allowed greater flexibility in their sourcing of inputs in order to satisfy the overall local content threshold, one could presume that the choice of inputs follows economic logic, i.e., the combination of inputs chosen will be optimal insofar as the domestic assembler is concerned about maximizing profits.

A related regulation is the existence of mixing requirements in the dairy industry. According to government regulations on dairy products, one unit of locally produced milk must be purchased for every two units of milk that are imported. This implies protection of about 33 percent for the domestic dairy industry.¹⁴ In fact, the Indonesian farming industry has not been able to meet the resulting high demand for domestic milk and the Indonesian government has been compelled to provide concessional loans to farmers for imports of milk livestock to increase herd quantity and quality. Hence, the nominal rate of protection in the milk

¹⁴ Since the ratio of domestic to imported milk is 1:2, domestic milk makes up one-third of every unit of milk. Thus, the protection to the milk-producing activity is 33 percent.

livestock industry must be adjusted to reflect the impacts of these loans.¹⁵

Quantitative Restrictions and Import/Export Bans

Indonesia explicitly prohibits the import and export of certain products, and sets restrictions as to the quantity that can be imported or exported of other goods. For imports, the rationale for the bans and quantitative restrictions are to protect the domestic assembly or processing industries (the basic reasoning behind the bans on transport equipment), to protect national security and culture (the rationale for the ban on rice imports and the restrictions on batik imports), and to protect the community's health (the rationale for the ban on pesticides imports). On the other hand, bans on exports have typically been justified by concerns about the environment and the promotion of higher value added exports (and higher export revenues). The most notable of these is the export ban of raw and unprocessed logs.

The impact of bans and quantitative restrictions on imports is to effectively protect domestic producers of import-substitutes from international competition. That is, although the tariff applying to a particular product may be low, if a ban is in place, then the domestic price of the product is likely to be much higher than the border price and tariff combined. A case in point is the motor vehicles sector, where the tariff on final goods is not much higher than the tariff on component products, but the import of motor vehicles is banned while components are not.¹⁶ Thus, for automobiles, the import ban appears to be the binding constraint on the import of automobiles (and not the tariff). Fane and Phillips (1991) found that the price of finished motor vehicles to all other users was 100.0 percent above the border price. Using this estimate, the nominal tariff rate of motor vehicle outputs was adjusted to 100 percent.

Export bans have the effect of increasing domestic supply of the commodity facing the ban, and this can have implications on downstream producers who use the commodity as an input in their production activities. This is particularly important in the wood

¹⁵ In the studies by Fane and Phillips (1991) and Wymenga (1991), the protection afforded to milk products was assumed to apply to milk livestock as well, and the output-equivalent nominal rates of 33 percent and 100 percent were assumed for the input and output NPRs of milk livestock. However, a more conservative estimate of 10 percent is used in this investigation as the output equivalent of the concessional loans for imports of milk livestock. The rationale behind this lower estimate is that the estimated impacts of concessional loans to farmers in food crops ranged from zero to 5 percent in the aforementioned studies, which is much lower than the 33 percent rate. Note that this implicitly assumes that the government's support of the individual markets in the agricultural sector is generally more similar than different.

¹⁶ In 1993, the ban on built-up motor vehicles was replaced with a tariff. While the tariff was prohibitively high, the change nevertheless suggests a movement toward greater tariffication of the Indonesian trading framework.

and wood-based industries as the Indonesian government maintains an export ban on raw and unprocessed logs and wood. In addition to the export ban, each log concessionaire is required to have direct access to log-processing facilities. The combination of these two regulations implies a biasedness (i.e., negative protection) against log producers and an input subsidy (i.e., positive protection) to the downstream log-processing facilities, though not necessarily to all industries that use wood as an input (this will be discussed in further detail in the section on implications for natural resources).

Other Non-trade Measures that Impact on Trade

Indonesia has an extensive system of technical, safety, and health standards for imports of certain products. However, in most cases, Indonesia's standards are less stringent than international standards and hence, do not pose too great an impediment to trade.

A uniform value-added (VAT) tax of 10 percent is assessed on most goods, with the exception of some agricultural products. In addition, a luxury sales tax is assessed on specific luxury goods such as alcoholic and non-alcoholic beverages; cosmetics and toiletries; certain transport, electrical and photographic equipment; and household furniture. Both the VAT and the luxury sales tax are assessed on both imported and domestically-produced goods; hence, the tax structure, while impacting on the consumer price and therefore consumption of these goods, does not affect the relative prices of imports (vs. domestic substitutes). Thus, in obtaining estimates of the effective protection rate, the implicit tariff did not incorporate the VAT and luxury taxes.

However, in one particular case of the excise tax, the tax does discriminate between imports and domestically produced items, and hence implies a certain level of protection to the domestic industry. The export tax (which is assessed on consumption of a number of products including sugar and specific artificial sweeteners) differentiates between imported cigarettes and domestically produced cigarettes. In particular, imported cigarettes are assessed an excise tax of 70 percent which is 30-35 percentage points higher than the excise tax paid on domestically-produced white cigarettes. This discrimination on imported cigarettes is taken into account by adjusting the NPR for the good by +30 percent.¹⁷

¹⁷ This is a conservative estimate. It is also interesting to note that domestically produced kretek cigarettes—i.e., cigarettes which are made of high-quality cloves and tobacco, and dominate domestic consumption of tobacco products—are assessed an even lower excise tax than imported and domestically produced white cigarettes.

Still another non-trade measure that impacts on trade is the subsidies offered by the government in terms of lower prices on inputs, including petroleum, natural gas, fertilizers, and irrigation facilities, and concessional credit schemes. Input subsidies are most notable in the agricultural sector where farmers are subsidized by lower fertilizer prices, concessional credit, and use of irrigation facilities at below-cost. As precise measures of the impacts of these subsidies on the different farm crops is beyond the scope of this study, estimates of the impacts of these studies on the various agricultural sectors from Fane and Phillips (1987, 1991) were employed in assessing the implicit nominal rate of protection. The lower-than-world prices for petroleum and natural gas, the distribution of which is regulated by the government, also act to subsidize energy-intensive sectors. This is taken into account by adjusting the input NPR for petroleum and natural gas by -50 percent.

V. AN ASSESSMENT OF INDONESIA'S STRUCTURE OF NOMINAL AND EFFECTIVE PROTECTION

Given the nature of Indonesia's tariff structure and the significant number of non-tariff barriers currently in force, effective protection analysis is indispensable in arriving at an accurate picture of the many resource pulls (and pushes) that result from the current policy structure.

This section opens by analyzing how rates of nominal tariff protection currently in force vary across economic sectors. While such analysis does not provide a comprehensive picture of Indonesia's structure of protection and its implications for natural resource management, it does provide a useful starting point for understanding the current structure of protection. The analysis in this section therefore explains how great a range currently exists between maximum and minimum nominal tariff levels, and how this range is dispersed across the entire economy, and across economic sectors as defined by the 1985 Indonesian input-output table.¹⁸ The discussion also includes comparison of average levels of nominal tariff rates for import-competing and export-competing sectors.¹⁹

Following the above, the rankings of effective rates of protection the study derived for both the economy as a whole and the aggregated sectors are then discussed.²⁰ The estimates of average ERPs derived by this study are then compared with those of studies relating to previous years in order to determine the degree to which the Government's ongoing program of trade liberalization has led to changes in the structure of protection.

¹⁸ Of the 169 sectors in the Indonesia 1985 Input-output Tables, the first 138 sectors were considered to be sectors producing tradeable goods. The remaining 31 sectors were non-tradeables, i.e., goods that are not traditionally considered to be traded across national borders; these would include such items as barber services, education, and national defense.

¹⁹ Of the 138 tradeable goods sectors, 28 sectors were deemed to be sectors producing goods that compete in international markets (i.e., export-competing), while 110 sectors were classified to be sectors producing goods for the domestic market that compete against imports (i.e., import-competing).

²⁰ During the term of the consultancy, inversion of the 168x168 input-output matrix could not be executed due to limitations in the software available at NRMP. While this implied that the ranking of ERPs for the entire 168 sectors (the 169 sectors less the sector for public administration and defense) could not be estimated, a smaller matrix which included the more detailed sectoral breakdown of the wood products sectors was used for the calculation of ERPs. It is this 88 sector subset of the 1985 I-O tables from which the ERP results that are specified in the remainder of this report were obtained. The rankings of ERPs derived from the 88 sector analysis can be found in Appendix 2.

Due to the importance of forestry and marine resources to the Indonesian economy, the focus of the discussion then turns to an in-depth analysis of nominal and effective protection in the forestry and forest-based sectors, and due to data limitations, to a lesser extent, the fishery and fishery-based sectors. The implications of the ERP estimates for management of Indonesia's forest and marine resources are then discussed.

The Structure of Nominal Tariff Rates Across Sectors in the Indonesian Economy

The first step in analyzing the structure of effective protection in the Indonesian economy was to accurately estimate nominal rates of tariff protection for the 9,000+ commodities included in the 1991/1992 tariff schedule. Estimation of these individual tariff rates is made difficult by the fact that the MFN rates specified in the tariff schedule are not necessarily representative of the "true" tariff levied on a particular commodity.

The "true" tariff levied on a particular commodity is simply the margin by which the final price paid by Indonesian consumers is greater or less than the price that would have been paid by consumers in the absence of the tariff. The study thus estimated the "true" tariffs for each commodity by comparing the domestic (i.e., Jakarta) price with the price of the same good when sold on the international market. While this procedure was used wherever possible, for cases for which no such data was available, the MFN tariff rates were adjusted using data from other studies if available. In other cases, adjustments were made that reflect all factors that might reasonably impact the final price of the good in question were taken in account.

For the economy as a whole, the study found the average nominal rate of protection to be 7.1 percent for 1991. This result is consistent with those from studies of tariff protection in Indonesia performed by Fane and Phillips (1991) for 1987 and Wymenga (1991) for 1989. The Fane-Phillips study estimated the average rate of nominal tariff protection for 1987 at 11.5 percent, the Wymenga study for 1989 at 9.3 percent. Thus the Government's ongoing program of trade liberalization appears to have clearly impacted Indonesia's average level of nominal tariff over the period 1987-1991.

While average nominal tariff protection of 7.1 percent for Indonesia is low by developing-country standards,²¹ it should be noted that Indonesia's NPR rates vary significantly across sectors. For example, NPR averages for the 150 tradeable sectors examined by

²¹ To illustrate, even Singapore, which is recognized as an open economy with few trade barriers, had an average nominal tariff of 6.4 percent in 1983 (James, Naya, and Meier 1987).

the study range from a high of 100 percent for motor vehicles to a low of -27.0 percent for the wood sector.²²

Nominal protection levels were lowest in the agricultural and mining sectors, and in some cases, even negative. As a group, the agriculture, forestry, and fishery sectors are offered average nominal protection of 9.9 percent (Table 1). However, the forestry sector (which includes the wood, non-timber forest products, and hunting) stands out as the only sector of this group receiving negative protection. Protection in the mining sector was relatively low, averaging only 0.3 percent. This finding is consistent with the Fane-Phillips and Wymenga studies on Indonesia's trade regime referred to above, and with other studies of the trade regimes of a large number of developing countries in that low or negative levels of protection were found for the primary sectors.

In contrast to the low nominal protection of the primary sectors, this study found the nominal rate of protection offered the manufacturing sector as a whole to be more than double that afforded all sectors of the economy taken together: 17.2 percent as opposed to 7.1 percent. A much higher level of protection (47.7 percent) occurs in the transport sector, with significantly higher-than-average levels of protection in the food, beverages, and tobacco (21.4 percent), textiles and footwear (23.9 percent), and paper and paper products (21.1 percent) sectors. Manufacturing activities receiving relatively low levels of protection include the manufacture of wooden products (8.0 percent), chemicals (7.8 percent), and the petroleum refining and liquified natural gas sectors (3.2 percent).

When the 138 tradeable sectors are grouped into import-competing and export-competing sectors, it is apparent that the Indonesian trading framework protects import-competing sectors far more heavily than the export-competing sectors. The study found the average NPR for all import-competing sectors to be 19.3 percent, while that for the export-competing sectors was a scant 0.45 percent. This clear bias against the export-competing sectors (and toward the import-competing sectors) suggests that the Government has a way to go yet in reaching its stated goal of promoting exports as the engine of growth in the Indonesian economy. In fairness, it should be mentioned that this anti-export bias is often found in analyses of the trade regimes of developing countries.

²² For a complete listing of the NPRs derived for the 138 tradeable goods sectors, see Appendix 4.

Table 1
Nominal Rates of Protection of the Indonesian Economy, 1991

Sector	Nominal Rate of Protection	
All tradeables sectors		7.1
Agriculture, forestry, and fishery		9.9
Agriculture	11.6	
Forestry	-24.4	
Fishery	15.4	
Mining		0.3
Manufacturing		17.2
Food, beverages, and tobacco	24.7	
Textiles and footwear	23.9	
Wooden products	8.0	
Paper and paper products	21.1	
Chemicals	7.8	
Petroleum and LNG	3.2	
Rubber and plastic products	13.0	
Non-metallic mineral products		10.1
Metal products		13.8
Non-electrical and electrical machinery	15.7	
Transport equipment	47.7	
Other manufactured goods	17.2	
Import-competing sectors		19.3
Export-competing sectors		0.5

Indonesia's Structure of Effective Protection

This study estimates Indonesia's level of effective protection for the overall economy in 1991 at 10.9 percent, which is slightly higher than its average level of nominal protection of 7.1 percent. When compared with the findings of other studies for earlier years, it becomes apparent that Indonesia's level of effective protection has fallen markedly since 1987. Fane and Phillips (1991) found an average ERP of 18.5 percent for 1987, and Wymenga's (1991) result showed an average ERP of 15.0 percent in 1989.

The average ERP of 10.9 percent for Indonesia found by this study is low compared to similar results for other developing countries.²³ On the other hand, this study's results show wide variance in levels of effective protection across sectors of the Indonesian economy, with some sectors showing extremely high levels of effective protection and other sectors being offered negative protection. Examples include effective protection in excess of 600.0 percent for the motor vehicles and motorcycles sectors, and negative protection of -66.0 percent for petroleum refining and natural gas.²⁴

Paralleling the findings of relative protection using NPRs, the manufacturing sector as a whole enjoys significantly higher protection (35.7 percent) than do the primary sectors (see Table 2). While agriculture, forestry, and fisheries taken together are offered an average level of effective protection of 13.0 percent, separate calculations for each of these show that the forestry sector receives negative protection of -3.3 percent. The average ERP of 1.7 percent afforded the mining sector shows that protection for this sector is negligible. The above results parallel the findings for nominal rates of tariff protection discussed in the section directly above.

Analysis of the individual manufacturing sectors shows that some manufacturing activities such as transport equipment enjoy extremely high levels of effective protection. Even when the 600 percent ERPs for motor vehicles and motorcycles are netted out, the average ERP for transport equipment remains at a high 58.8 percent. Rubber and plastic products also enjoy a high average level of effective protection of 62.4 percent. When taken together as a group, the non-petroleum-refining manufacturing sectors show average levels of effective protection one to three times as high as the average level afforded the entire economy.

²³ For example, an average ERP of 100 percent was found for Turkey in 1989, while effective rates for most manufactured goods were in excess of 100 percent (Togashi 1993).

²⁴ The finite value of 600 percent was used as the limit for extreme levels of positive effective protection.

Table 2
Effective Rates of Protection of the Indonesian Economy, 1991

Sector	Effective Rate of Protection	
All tradeables sectors		10.9
Agriculture, forestry, and fishery		13.0
Agriculture	15.5	
Forestry	-3.3	
Fishery	17.3	
Mining		1.7
Manufacturing		35.7
Food, beverages, and tobacco	36.8	
Textiles and footwear	53.9	
Wooden products	25.3	
Paper and paper products	33.4	
Chemicals	15.0	
Petroleum and LNG	-66.0	
Rubber and plastic products	62.4	
Non-metallic mineral products		48.3
Metal products		32.3
Non-electrical and electrical machinery	23.6	
Transport equipment	58.8	
Other manufactured goods	40.5	
Import-competing sectors		30.6
Export-competing sectors		-0.6

Most startling perhaps is the sharp contrast between the average levels of effective protection afforded the import-competing and export-competing sectors. The import-competing sectors enjoy an average ERP of 30.6 percent, or nearly three times the average level of effective protection given all sectors as a group. By contrast, the average ERP for the export-competing sectors was negative 0.6 percent.

This clear bias against export-competing sectors (and toward import-competing sectors) parallels the findings of the analysis of nominal rates of protection reported in the section directly above. As the nominal rate analysis above showed low, but positive protection to the export-competing sectors, the ERP findings both corroborate the NPR findings and suggest that the latter understate the Indonesian economy's persistent anti-export bias, the Government's ongoing of trade liberalization and export promotion notwithstanding.

Protection in the Forestry- and Fisheries-based Sectors

Comparison of rates of nominal protection in the forestry- and fisheries-based sectors shows that processed goods in these sectors clearly receive much higher levels of protection than do unprocessed goods.²⁵ For forest-based products, the average level of protection is -24.4 percent while the average NPR for manufactured wood products is 12.1 percent. For the fisheries sector, the average NPR is 15.4 percent, while the NPR for processed and preserved fish alone is 26.0 percent (Table 3).

With respect to the forestry-based sectors--which include wood (I-O sector 033), other forest products (sector 034), sawn and processed wood (sector 084), plywood (sector 085), wooden construction materials (sector 086), wood and cork products (sector 088), and paper and cardboard (sector 038)--a negative NPR is found for wood, primarily as a result of the export ban on logs. As noted earlier, an export ban implies a bias *against* the commodity which is banned (and the producers of the commodity as well) since the sales market for the commodity is effectively limited to the domestic economy.

For forest-based manufactured products, both the sawn and processed wood and plywood sectors are given nominal protection of only 1 percent. The nominal protection given to wood and cork products is significantly higher at 13 percent, and wooden construction materials, wooden furniture and fixings, and woven goods (which include rattan and bamboo pleating) enjoy relatively high rates of nominal protection of 30 percent or more. Paper and cardboard receive nominal protection of 21.1 percent. The above findings

²⁵ This tariff escalation, whereby tariffs rise with the degree of processing, is characteristic of tariff schedules in many countries.

from this study are comparable with those of previous studies in terms of the NPR rankings across these sectors.

For the fisheries sectors—which include sea fish and the like (I-O sector 036), freshwater fish (sector 037), dried and salted fish (sector 038), and processed fish (sector 055)—the nominal tariff levels range from moderate to moderately high. The sea fish and dried fish sectors show NPRs of 11-12 percent, while the freshwater fish and processed fish sectors receive nominal protection levels of 25-26 percent. Again, the NPR rankings suggested by these results parallel those of previous studies on nominal protection in Indonesia.

The levels of effective protection given to forestry and forest-based products vary widely, with the level of protection roughly paralleling the degree of processing. The wood and non-timber forest product sectors show *negative* rates of effective protection of -28.4 and -17.6 percent, respectively. For manufactured wood products, however, a positive though relatively low level of effective protection was found for saw mills (4.4 percent). Other wood products show a moderate level of effective protection of 27.0 percent, and high levels of effective protection were found for wooden building materials (114.6 percent), furniture (93.2 percent), rattan and bamboo (66.1 percent), plywood (56.1 percent), and paper and cardboard (33.4 percent).

While the estimated effective protective rates resulting from this study are similar to those of Fane and Phillips (1991) and Wymenga (1991), the ERP for the plywood sector differs significantly. Both the Fane-Phillips and Wymenga studies found effective protection of approximately 25 percent (or about one-and-a-half to two times the average ERP for the overall economy). However, the ERP derived from this study is 56.1 percent, or about **five** times the average ERP for the economy as a whole. That is, whereas the Fane-Phillips and Wymenga studies found only a moderate level of protection for plywood (and a relatively high level of protection for other wood manufactured products), this study finds plywood production to be a highly protected activity.

This difference in ERP estimates for plywood results from a difference in the way the inputs to the plywood sector and other wood manufactures sectors are treated in the analysis. Both the Fane-Phillips and Wymenga studies assumed that all users of raw logs and sawn wood faced identical tariffs on these inputs. This implies that all users of these inputs face identical implicit nominal prices for these inputs. However, this study adjusted the nominal rates such that the prices faced by plywood manufacturers for their raw logs and sawn wood is, in fact, much lower than the prices faced by other users of these inputs.

Table 3
Nominal and Effective Rates of Protection of the Forestry,
Forestry-based, and Fishery Sectors, 1991

Rate Sector	Nominal Rate of Protection	Effective of Protection
Forestry	-24.4	-3.3
Wood	-27.3	-28.4
Other forest products	9.3	-17.6
Manufactured wood products	12.1	27.3
Saw mills	0.7	4.5
Plywood	1.1	56.1
Wooden bldg. materials	39.5	114.6
Furniture	39.3	93.2
Other wood products	13.2	27.0
Rattan and bamboo	30.0	66.1
Paper and cardboard	21.1	33.4
Fishery	15.4	17.3

The difference in the prices of raw logs and sawn wood faced by different classes of users of these inputs results from distortions created by (1) the log export ban and prohibitive export taxes on sawn wood, and more importantly, (2) existing regulations, the effect of which is to vertically integrate the activities of timber concessionaires, saw mill operators, and plywood producers.

The export ban limits the sale of logs by concessionaires to the domestic market. This effectively increases the supply of logs to the domestic market, thus artificially depressing log prices below their world market levels. This is reflected in the downward adjustment of the nominal tariff rate for the wood sector (to -27 percent).

The artificially depressed log prices resulting from the log export ban also depress the per-unit profit margins of timber concessionaires. However, the second restriction--i.e., that each timber concessionaire must have direct access to log-processing facilities--has effectively integrated log production and plywood manufacturing.

This seemingly vertical integration between log production and plywood manufacture on balance implies a positive profit margin of the integrated activity. That is, because the level of protection received by plywood manufacturers is greater than the negative protection faced by log producers, the two activities combined result in a profitable activity. The end result of this integration is thus a profit margin for the integrated activity that is higher than that which would occur in the absence of both the log export ban and the requirement that timber concessionaires must have direct access to log-processing facilities.

As the factors described above constitute a subsidy to plywood manufacturing, they result in more timber resources flowing into the manufacture of plywood than would occur in the absence of this subsidy. More importantly from the standpoint of the NRM project, is that these artificially-elevated flows of scarce forest resources into plywood manufacturing are channeled not into high-value uses such as finished products, but rather into commodity grade plywood. Thus in part because of this subsidy, the end-use of Indonesia's high-quality forest resources is the production and export of commodity-grade plywood rather than high-value finished wood manufactures.

In economic jargon, the log export ban causes the prices paid by plywood producers for their log and sawn wood inputs to be only a fraction of the true value of these inputs to Indonesian society. As a result, plywood producers have less of an incentive to use Indonesia's forest resources as efficiently as possible, for example, using high-quality wood for the manufacture of goods for which high-quality wood is valued. If, on the other hand, the price of these scarce forest resources actually reflected the true

value of these inputs, plywood producers would be given the incentive to conserve on the use Indonesia's scarce forest resources and to use them efficiently.

Producers of non-plywood manufactured wood products, on the other hand, are compelled to buy logs from the "open" market supplied solely by the small amount of logs that do not get channeled into plywood production (Arief 1992). While no data on the volume and prices at which logs are traded in this "open" market are available, there is little doubt that the logs and wood in this market are, in fact, simply residual logs that are for whatever reason unused by plywood manufacturers and logs obtained from illegal harvesting of timber.²⁶

Because of the restricted supply to this "open" market, log prices are significantly higher than those faced by plywood producers. This, combined with the fact that imports of logs into Indonesia are negligible suggests that when the price of logs on the international market is adjusted by transport, freight, and insurance costs, importing logs into Indonesia is an unprofitable activity.

Thus, domestic producers of other non-plywood wood manufactures compete with one other in obtaining the raw materials, i.e., the logs and unprocessed wood. Because producers of wood manufactures do not enjoy the same kind of arrangements with log concessionaires and saw mills as do the plywood manufacturers, the input prices faced by the other wood products producers are not as low as the prices faced by plywood manufacturers. On the other hand, it is also true that the prices of these inputs are not as high as the prices of logs if obtained in the international market taking into account the cost of transactions involved in importing goods into the country. That is, the log price paid by furniture makers, for example, must lie somewhere between the low price paid by plywood producers and the higher price associated with imports. To adjust for this phenomenon, the NPR of the wood sector was adjusted to zero for all sectors except the plywood sector which enjoys a subsidy on the good (i.e., the NPR of wood for the plywood sector is assumed to be -27 percent).

As a result of the differential tariff for the wood sector as an input into plywood production and production of other wood-based products, the effective level of protection for plywood is not moderate as was found by previous studies, but is, in fact, substantial relative to the other wood products sectors and the economy as a whole.

²⁶ While there is no empirical evidence to support this, discussions with individuals knowledgeable of the forestry industry suggest that there is some agreement on this anecdotal piece of information.

While the high ERPs for these wood-based sectors suggest that resources will flow into these highly protected markets for all but the plywood market, the high levels of protection results in resources flowing into production of these goods only to the extent that the goods are destined for the domestic market. That is, because of the high levels of protection, producers in these sectors have no incentive to produce for the export market as the profit margins on the good in the domestic market is so much higher.

While this protection affords the producers of the protected markets a higher margin, it also does not provide any incentives for producers to produce for exports and therefore maximize efficiency and be competitive in world markets. That is, in the longer run, this protection permits inefficiencies to continue and typically there is a lack of innovation and minimal or no gains (and, in some instances, a loss) in productivity.

If the "playing field" within the wood-based sectors were made more even by reducing tariffs on the outputs of these sectors to a uniform percentage, and preferably one that is close to the average level of protection for the overall economy, and by loosening restrictions that currently act to channel wood resources solely to the plywood sector, then resources would flow to those sectors that value the wood resource most highly. That is, low-quality wood would tend to be used for the production of commodity-grade plywood, since consumers of plywood are not willing to pay a higher price for plywood that has used mahogany as an input. That is, plywood is perceived by the users as being basically a homogeneous good, i.e., plywood made from different qualities of wood are not differentiated from one another. On the other hand, high-quality teak and mahogany which are more highly valued will be put to use in other sectors such as furniture where the implicit value of the high-quality woods can be passed on to consumers who are willing to pay a premium for furniture made with better-quality wood.

Moreover, the relative price elasticities of plywood and other wood manufactures suggest that Indonesian society as a whole may benefit from channeling more resources into the other wood-using manufacturing sectors. As plywood is relatively price inelastic, changes in the price of plywood do not result in large changes in quantities purchased. A 10 percent decrease in price, for example, may result in an increase in the quantities sold, but by less than 10 percent; as a result, total revenue does not necessarily rise. On the other hand, items such as wooden structural materials and, in particular, furniture are more price elastic so that purchases of such items are relatively sensitive to changes in the price. Thus, a 10 percent decline in the price of such products will lead to a more than 10 percent increase in the quantities consumed, and an increase in total revenues of the producer.

Thus, a leveling of protection across the forestry and forest-based sectors need not necessarily imply a loss of revenues for Indonesia as a whole. The decline in plywood revenues may be more than offset in the longer run as the efficiency and productivity of the other wood manufacturing sectors, which will then have access to wood inputs and will become better able to compete in world markets, rises, and thereby stimulating growth and income in these sectors. More importantly, the cutting of logs in Indonesia's forestland will occur with greater awareness and responsiveness to the social value of the different types of logs that are harvested.

The point here is that resources should be allowed to their most valued uses, and equally important, that the private value of those resources should be equal or close to the social value of the commodity. That is, under the current structure and framework for the uses of wood, plywood manufacturers have, through government policies in the past, amassed a tremendous amount of market power in not only the plywood market but also the market for wood and output of saw mills. Even if the playing field were leveled at this point in time, there is an incentive for the plywood manufacturers to outbid the smaller producers of furniture, wooden building materials, and other wood products for the existing supply of logs. Thus, in the short run, the playing field is likely to continue to be "un-level". Nevertheless, while a more level playing field is not a sufficient condition for a more efficient allocation of resources within the forestry and wood-based sectors, it is a condition that is absolutely necessary for improvement in the allocation and use of forestry resources.

IV. CONCLUSION

Given the current estimate that Indonesia will have exhausted much of her supply of forests within the next 35-40 years, a more careful and critical assessment of existing domestic policies is crucial. While natural resource policies have a direct and clear impact, other domestic rules and regulations also have significant consequences on the use and management of natural resources. In particular, a country's trade policies and framework provides incentives for resources, including natural resources such as wood, other forest products, and fishery products, to flow into and out of specific sectors.

To this end, this study has shown that trade policies can and do impact on the efficient use and allocation of natural resources that goes beyond affecting only the amount of imports and exports of a commodity such as wood. Rather, an important message of this report is that the tariff and trade policies of a country affects the incentive structure upon which resource flows into and out of sectors and activities in the economy. Thus this study examines the existing tariff and trade framework of the Indonesian economy and employs the concept of the effective rate of protection in assessing the impacts of the country's trade policies on the incentive structure and, in turn, the use and management of natural resources.

It is also interesting to note that among manufactured wood products, plywood, which is the largest sector in terms of output and exports, is relatively capital-intensive compared to some of the other wood-using sectors. One indication of this higher capital intensity of the plywood sector is the high proportion of depreciation expenses (which is used as a proxy for the "price" of capital) relative to gross value added (GVA) of the sector. The 1985 input-output tables show that for plywood, depreciation expenses amounted to 10.7 percent of total GVA; the proportion of depreciation expenses in the other sectors are in the vicinity of 4-6.5 percent.²⁷

Given the priority of the Indonesian Government to provide employment to the growing labor force, the expansion of more labor-intensive sectors should be promoted. Unfortunately, the input-output data only provide information on wages and salaries and not employment.²⁸ Nevertheless, it is nevertheless interesting to note

²⁷ The exception is other wood products, which also had a high proportion of depreciation expenses to GVA (of 12.6 percent).

²⁸ However, with additional data on the average wage in each sector, further implications for employment can be deduced.

that as a share of gross value added, compensation for employment in the plywood sector was on the lower end of the scale for the wood manufactures sectors. The ratio of employment compensation to GVA is remarkably low for furniture makers; however, this may in part reflect the much lower wages in this sector which is for the most part an informal one.

It is not the purpose of this study to denounce deforestation of Indonesia's rain forests or suggest that cutting of logs cease. Rather the point of this report is that policies, including tariff policies and other regulations affecting trade, should be adjusted so as to allow resources to be used in their most efficient manner. In the case of the wood and wood-intensive sectors, the different qualities of wood would be used most efficiently if the policies allow for the more high-quality woods, which in world markets are also those that command higher prices, to be used in the manufacture of wooden building materials and furniture, for example, rather than plywood.

A possible starting point would be to reform existing policies in such a way that at the very least, use of wood resources is responding to the different (social) values of the different wood species. That is, rather than treating all wood species with the same implicit price—as is the case under the existing regulations and structure of the wood-based industries—the reforms should first ensure that the higher valued wood is **recognized** as having a higher value than other wood species by those who are cutting down the trees. This would allow for a more efficient allocation of resources.

In addition, it is also important to try and even out the distortions across the different wood-using sectors. As noted in this study, the high ERPs in the plywood sector arises not from protection via a high tariff on plywood output, but because of the implicit subsidy on its wood inputs. In contrast, the high ERPs of the other wood-using manufactures sectors arise from the high tariffs on their outputs, but not a subsidy on wood inputs (the tariff on their wood inputs is zero), which contributes to their inability to increase efficiency and become internationally competitive. Thus, the high ERPs occur for different reasons; hence, different actions are required to correct for the distortions.

By reducing the subsidy on wood inputs for plywood makers, i.e., by reforming the policies which generally tie log concessionaires to plywood manufacturers, and at the same time, reducing the output tariff on outputs of wood-based manufactured products, the distortions across the forest-based sectors can be reduced. In this way, a more efficient allocation of resources can arise with high-quality wood being put to its highest valued uses and simultaneously result in an increase in value added, efficiency, and labor use in the Indonesian economy.

Thus, improved natural resource management in Indonesia can come about without necessarily resulting in reduced export earnings, slowdown in growth, and greater unemployment. A "win-win" situation is possible, whereby policy reforms can benefit growth and at the same time, improve the allocation of natural resources and its management.

**APPENDIX 1: TERMS OF REFERENCE
TRADE AND EXCHANGE RATE POLICY STUDY
TARIFF POLICY ANALYST**

I. Introduction

As approved by the NRM Project Coordinating Committee, the Policy Secretariat is undertaking a series of studies that analyze the natural resource management implications of various aspects of current economic development policy. This particular study focuses on the natural resource impacts of Indonesia's trade and exchange rate policy regime over the past two decades, and on how such policy is likely to impact the natural resource base over the Second Long-Term Development Plan (SLTDP) period.

Individual components of the study will analyze the following issues:

- (a) How Indonesia's composition and direction of trade have changed over the past two decades, the likely future course of both over the SLTDP period, and the natural resource management implications of both of these.
- (b) How changes in Indonesia's system of tariff protection have impacted the natural resource base over the past twenty years, and the natural resource management implications of alternative tariff protection scenarios over the SLTDP period.
- (c) How changes in Indonesia's system of non-tariff-barrier protection against imports since 1973 have impacted the natural resource base, and the likely impact on the natural resource base of alternative policy scenarios vis-a-vis non-tariff-barrier protection over the SLTDP period.
- (d) How Indonesia's exchange rate regime since the first oil shock has impacted the natural resource base, and the likely natural resource impacts of continuing the present regime of exchange rate liberalization over the SLTDP period.
- (e) How exogenous international effects relating to Indonesia's external trade relations have impacted the natural resource base over the past two decades, and the likely course and impact of such effects over the SLTDP period. (The term "exogenous international effects" in the context of these TORs refers to variables with a substantial impact on home-country trade, but which for the most part reflect policy decisions made by bodies

other than the home-country government [e.g., trade bans by importing countries, multilateral or bilateral international agreements such as those concluded under the General Agreement on Tariffs and Trade, etc.]).

Pragmatic, implementable policy recommendations are expected to result from this study. However, an important precondition to formulating such policy recommendations is correct implementation of the analysis described in component I. (b) above, and sound interpretation of the results resulting from it. This will require recruitment of an international expert with special expertise in tariff policy in the Indonesian context.

II. Tasks

This expert will perform the following tasks:

- (a) Collect data necessary for completion of the analysis described in component I.(b) above from GOI counterparts and government departments, CPIS, and donor-funded projects working in this area.
- (b) Provide guidance relating to the acquisition, extraction, collation, and aggregation of all data and information required for completion of the analysis described in component I.(b) above.
- (c) Provide guidance relating to the manipulation and transformation of data and information as necessary for successful completion of the analysis described in component I.(b) above.
- (d) Provide overall guidance to, and interpret the results of, the analysis described in component I.(b) above. The goal of this analysis will be to facilitate formulation of sound, implementable policy recommendations that will lead both to increased allocative efficiency and improved management of the natural resource base.
- (e) Act as the principal expert responsible for execution of the analysis described in component I.(b) above, both as it relates to the historical context of the previous two decades, and to Indonesia's likely development path over the SLTDP period. The focus of the analysis and the manner in which the results resulting from it are interpreted should be that of facilitating the formulation of sound, implementable policy recommendations that will lead both to increased allocative efficiency and improved management of the natural resource base.

III. Outputs

- (a) Completed analysis of data.
- (b) Completed draft final report and revised final report.
- (c) Completed discussion of findings with GOI counterparts, USAID and NRM/ARD advisors.

IV. Level of Effort

Up to 24 working days.

V. Timing

Early September 1993

VI. Location

Jakarta

VII. Reporting

The consultant will report to the NRM/ARD Chief of Party and will work closely with BAPPENAS counterparts and the NRM/ARD Macroeconomist on a day-to-day basis. The final report will be submitted to the NRM/ARD Chief of Party for forwarding to the GOI and USAID.

VII. Qualifications

The successful candidate will have:

- (a) a PhD degree in economics or an economic policy-related field
- (b) 5 years experience working in an economic development-related field, and at least 2 years working experience relating to southeast Asia, preferably with Indonesia as the major country of focus. Previous work on tariff policy would be an addition advantage
- (c) Preferably knowledge of Bahasa Indonesia

APPENDIX 2: TIMETABLE OF CONSULTANCY, SEPTEMBER 13 – OCTOBER 9, 1993

Upon arrival in Jakarta on Monday (Sept. 13) afternoon, I met with Erik Scarsborough to discuss (1) the overall goals of the project, (2) my role within the project and the expected output of the consultancy, and (3) the data and computer software and hardware requirements for the carrying out of the terms of reference (see Appendix 1).

On September 14, I was introduced to the research teams (research teams 1 and 2) to determine the extent to which the data that were needed was available, what additional data would be required, and the expected timetable for the completion of the data and calculations that were being requested. An outline of the final report was drafted and submitted to Dr. Scarsborough for discussion. Following a 2-hour excursion visiting national statistical offices and United Nations departments in Jakarta, it also became apparent that additional information that was needed to proceed with the ERP calculations was not available in Jakarta. After discussion with Erik, it was determined that the best option was to send a fax to Honolulu for a copy of the UN publications that were needed.

A fax message was sent to Dr. Pearl Imada of the East-West Center requesting assistance in obtaining the necessary UN publications on September 15. Throughout the remainder of the week (i.e., September 15-18) and the next Monday and Tuesday, the introductory sections of the report were worked on. At the same time, daily contact with the research teams were made to ensure that progress was being made on the data and calculations.

On September 22, the UN publications arrived at the NRMP offices and I began to work on disaggregating the trade and tariff data to develop a concordance table between the trade and tariff data (consisting of 9,000+ product lines) and the input-output sectors. Work on this continued throughout the remainder of the week. On Friday (October 1), a draft of the initial sections of the report was submitted to Erik for review and comment.

During the week of September 27 – October 2, several meetings with the research teams were held to teach a new procedure in Lotus 1-2-3 which allowed the matching of trade and tariff data according to HS codes between two different databases (this was the \Data Extract Query and related commands). And throughout the week, meetings were held with the research teams to answer questions about the new procedure and to ensure that the procedure was being executed properly.

During the same week, it was also determined that the spreadsheet packages available to the project (i.e., Lotus 1-2-3 and Quattro Pro) would not be able to invert the 168x168 matrix, a necessary step in calculating the effective protection rates of the 169 sectors. Meyer Siahaan, an NRMP consultant, suggested the use of Shazam, an econometrics package. Unfortunately, the Shazam program was found to be limited to inversion of a maximum 150x150 matrix. Discussions with Erik led to the strategy that work on the ERPs should continue using the 88x88 matrix that was employed in my dissertation (which also looked at the forestry and wood-based sectors in as much detail as the 169 sector analysis would) to complete the report.

On Friday (October 1), I was introduced to Dedi Nuryana, who would be assisting me in calculating the effective rates of protection. At this time, it was learned that Dedi may be able to invert the 169x169 matrix using a statistical analysis package called SAS.

By the end of the week (Saturday, October 2), calculations of the average nominal rates of protection for the 169 input-output sectors were completed by the research teams. Over the next few days (October 3-5), the structure of nominal protection was analyzed and the analysis was added to the draft report. In the meantime, Erik's comments on the initial sections of the report were incorporated and the draft amended.

On October 5, with the assistance of Dedi, the ERP calculations for the 88x88 sector matrix was completed. Analysis of the ERPs derived was conducted on October 6, and this section was added to the report. A copy of the sections on nominal and effective protection was submitted to Erik for review and comments.

October 7th was spent preparing for the presentation to NRMP staff and invited guests which included representatives from the Ministry of Forestry, USAID, and the TIP project. The presentation was held the following morning at 10 am.

Finalization of the report was completed on October 8th, upon the conclusion of the consultancy. A draft copy of the final report

APPENDIX 3: PEOPLE CONTACTED

Dedy Riyadi
Kepala Biro Penyiapan dan
Analisa Proyek Pembangunan
BAPPENAS
Republic of Indonesia

Ikhwanuddin Mawardi
Ban. Asmen Bidang Keserasian
Lingkungan dan Pembangunan
BAPPENAS
Republic of Indonesia

Sritua Arief
Economic Consultant
Natural Resources Management Project
BAPPENAS, Ministry of Forestry
Republic of Indonesia

Colin MacAndrews
Chief of Party
Natural Resources Management Project
BAPPENAS, Ministry of Forestry
Republic of Indonesia

Erik Scarsborough
Macroeconomist
Natural Resources Management Project
BAPPENAS, Ministry of Forestry
Republic of Indonesia

Kenneth J. Leathers
Resource Economist
Natural Resources Management Project
BAPPENAS, Ministry of Forestry
Republic of Indonesia

Meyer Siahaan
Consultant
Natural Resources Management Project
BAPPENAS, Ministry of Forestry
Republic of Indonesia

Pearl Imada
Research Fellow
International Economics and Politics Program
East-West Center
Honolulu, Hawaii
United States of America

William (Ted) E. James
Chief of Party
Trade Implementation and Policy (TIP) Project
Ministry of Trade
Republic of Indonesia

Professor Seiji Naya
Chairman
Department of Economics
University of Hawaii at Manoa
Honolulu, Hawaii
United States of America

H. J. Plunkett
Trade Implementation and Policy (TIP) Project
Ministry of Trade
Republic of Indonesia

**APPENDIX 4: NOMINAL PROTECTION RATES OF
TRADEABLE GOODS SECTOR, 1991**

Nominal Protection Rates of Tradeable Goods Sectors, 1991

Sector	Input-output Code	Type	NPR
Paddy	001	I	15.0
Maize	002	I	54.9
Other cereals	003	I	3.9
Hand-pounded rice	004	I	0.0
Cassava	005	E	0.0
Other root crops	006	I	20.0
Dried cassava	007	E	0.0
Peanuts	008	I	30.0
Soybeans	009	I	70.0
Other beans	010	I	14.8
Fresh vegetables	011	I	10.9
Fresh fruits	012	I	29.6
Rubber	013	E	-24.9
Sugar cane	014	I	0.0
Brown sugar	015	I	75.0
Coconut	016	E	4.0
Coconut oil	017	E	1.9
Oil palm	018	E	1.9
Fiber crops	019	I	5.0
Tobacco	020	I	15.0
Coffee	021	E	0.0
Tea	022	E	7.6
Clove	023	I	5.0
Pepper	024	E	2.1
Nutmeg	025	E	0.0
Other estate crops	026	E	4.8
Other crops	027	I	7.3
Livestock products	028	I	7.7
Slaughtering	029	I	-20.0
Milk-producing livestock	030	I	17.7
Poultry and its products	031	I	3.4
Other livestock	032	I	12.4
Wood	033	E	-27.3
Other forest products	034	E	9.3
Hunting	035	I	0.0
Sea fish and the like	036	E	11.3
Fresh water fish	037	I	24.9
Dried and salted fish	038	I	11.8
Coal	039	I	5.0
Crude oil	040	E	0.0
Iron sand	041	I	-10.0
Tin ore	042	E	-10.0

Nominal Protection Rates of Tradeable Goods Sectors, 1991 (cont.)

Sector	Input-output Code ^a	Type	NPR
Nickel ore	043	E	0.0
Bauxite ore	044	I	5.0
Copper ore	045	E	-10.0
Gold and silver ore	046	E	-2.6
Other non-ferrous metals	047	E	4.8
Chem. and fert. min. mining	048	I	0.3
Crude salt mining	049	I	0.5
Asphalt	050	I	5.0
Quarrying, all kinds	051	I	7.3
Canned and preserved meat	052	I	28.4
Dairy products	053	I	18.5
Canned and pres. fruits and veg.	054	I	18.8
Proc. and preserved fish	055	I	26.0
Vegetable and animal oils	056	E	6.8
Milled and polished rice	057	I	3.0
Other milled cereals	058	I	10.0
Wheat flour	059	I	0.0
Other flour	060	I	8.9
Bread and bakery products	061	I	34.1
Noodle, macaroni, and the like	062	I	37.2
Sugar factory	063	I	62.3
Chocolate and sugar confectionery	064	I	33.5
Syrup, all kinds	065	I	12.2
Ground coffee	066	I	34.5
Processed tea	067	E	0.7
Processed soybean	068	I	30.0
Other foods	069	I	19.6
Animal feed	070	I	12.1
Alcoholic beverages	071	I	34.0
Non-alcoholic beverages	072	I	37.5
Cigarettes	073	I	60.0
Other proc. tobacco products	074	I	17.7
Spinning	075	I	13.0
Weaving mills	076	I	28.8
Textile goods, except wearing apparel	077	I	18.0
Knitting mills	078	I	30.0
Wearing apparel	079	I	35.4
Carpet/rug/rope and the like	080	I	13.6
Other textile goods	081	I	26.2
Tanned and finished leather	082	E	0.8
Footwear and leather products	083	I	20.2

Nominal Protection Rates of Tradeable Goods Sectors, 1991 (cont.)

Sector	Input-output Code ^a	Type	NPR
Sawn and processed wood	084	E	0.7
Plywood	085	E	1.1
Wooden construction materials	086	I	39.5
Wooden furniture and fixtures	087	I	39.3
Wood and cork products	088	I	13.2
Rattan and bamboo	089	I	30.0
Paper and cardboard	090	I	22.4
Goods made of paper and cardboard	091	I	29.2
Printed and published materials	092	I	16.1
Non-fertilizer basic chemicals	093	I	5.2
Fertilizer and pesticides	094	I	9.3
Synthetic resins and plastics	095	I	6.9
Paint, varnish, and lacquer	096	I	18.3
Drugs and medicines	097	I	3.5
Soaps and cosmetics	098	I	19.1
Other chemicals	099	I	8.5
Oil refinery and its products	101	E	4.6
Liquified natural gas	102	E	0.1
Oth. coal products	103	I	9.7
Smoking and crumb rubber	104	E	5.0
Tires and tubes	105	I	35.6
Other rubber products	106	I	18.7
Plasticware	107	I	16.2
Ceramic and earthenware prod.	108	I	28.5
Glass and glassware	109	I	16.6
Clay and ceramic bldg. mat.	110	I	10.1
Cement and limestone	111	I	4.4
Oth. non-metallic mineral prod.	112	I	11.2
Basic iron and steel	113	I	13.3
Non-ferrous basic metals	114	I	7.4
Kitchen apparatus	115	I	30.0
Cutlery and agricultural tools	116	I	11.1
Metallic furniture and fixtures	117	I	36.3
Structural metal products	118	I	23.3
Other metal products	119	I	8.6
Non-electrical machinery	120	I	12.6
Electrical machinery	121	I	14.3
Comm. equip. and apparatus	122	I	23.2
Household elec. appliances	123	I	32.8
Other electrical appliances	124	I	24.5
Manufacture of batteries	125	I	30.0

Nominal Protection Rates of Tradeable Goods Sectors, 1991 (cont.)

Sector	Input-output Code ^a	Type	NPR
Shipbuilding and its repair	126	I	2.6
Train and its repair	127	I	3.2
Motor vehicles	128	I	100.0
Motorcycles	129	I	90.6
Other transport equipment	130	I	30.2
Aircraft and spare parts	131	I	0.0
Professional, scientific, and measuring equipment	132	I	9.9
Photographic and optical equip.	133	I	12.2
Watches, clocks and the like	134	I	9.3
Jewelry articles	135	I	13.8
Musical instruments	136	I	26.6
Sporting goods	137	I	39.9
Other manufactured goods	138	I	24.3

Note: a. Sector 100, native medicines, was deleted as there was insufficient data in this sector.

**APPENDIX 5: EFFECTIVE RATES OF PROTECTION OF
TRADEABLE GOODS SECTORS, 1991**

Effective Rates of Protection of the Tradeable Goods Sectors, 1991

Sector	Input-output Code	Type	ERP
Paddy	001	I	15.6
Hand-pounded rice	002	I	-28.3
Maize	003	I	64.0
Root crops and flour	004	E	4.6
Vegetables and fruits	005	I	18.2
Other farm food crops	006	I	99.0
Rubber	007	E	-28.5
Sugar cane and brown sugar	008	I	118.8
Coconut	009	E	5.3
Crude coconut and palm oil	010	E	1.7
Tobacco	011	I	20.3
Coffee	012	E	-0.3
Tea	013	E	8.1
Clove	014	I	5.0
Pepper and nutmeg	015	E	1.1
Other estate crops	016	E	5.1
Other crops	017	I	6.1
Livestock	018	I	24.5
Slaughtering	019	I	-61.6
Poultry and its products	020	I	0.7
Wood	021	E	-28.4
Other forest products	022	E	-17.6
Fishery	023	I	17.3
Coal and metal ore mining	024	E	10.6
Crude oil and natural gas	025	E	0.3
Other mining and quarrying	026	I	25.2
Manuf. of food products	027	I	52.6
Manuf. of animal and veg. oil	028	E	17.6
Cereal mill products	029	I	-26.1
Manufacture of flour, all kinds	030	I	4.4
Sugar factory	031	I	75.1
Manuf. of other food products	032	I	49.4
Manufacture of beverages	033	I	45.0
Manufacture of cigarettes	034	I	65.7
Yarn spinning	035	I	27.9
Weaving mills	036-76	E	77.6
Textile goods, except wearing apparel	036-77	I	17.8
Knitting mills	036-78	I	61.5
Wearing apparel	036-79	I	62.2
Carpet/rug/rope and the like	036-80	I	25.4
Other textile goods	036-81	I	73.8

Effective Rates of Protection of Tradeable Goods Sectors, 1991
(cont.)

Sector	Input-output Code	Type	NRP
Tanned and finished leather	036-82	E	42.1
Footwear and leather prod.	036-83	I	42.0
Sawn and processed wood	037-84	E	4.4
Plywood	037-85	E	9.9
Wooden construction mat.	037-86	I	114.6
Wooden furn. and fixtures	037-87	I	93.2
Wood and cork products	037-88	I	27.0
Rattan and bamboo	037-89	I	66.1
Paper and cardboard	038	I	33.4
Fertilizer and pesticides	039	I	25.7
Chemicals	040	I	15.0
Petroleum refinery	041	E	-66.0
Manuf. of rubber and plastic products	042	I	62.4
Manuf. of non-metallic mineral products	043	I	51.3
Cement and limestone	044	I	42.7
Basic iron and steel	045	I	28.9
Non-ferrous basic metal prod.	046	I	25.5
Fabricated metal products	047	I	41.4
Non-electrical machinery	048-120	I	13.4
Electrical machinery	048-121	I	12.8
Comm. equip. and apparatus	048-122	I	30.9
Household elec. appliances	048-123	I	62.2
Oth. electrical appliances	048-124	I	38.4
Manufacture of batteries	048-125	I	83.9
Shipbuilding and its repair	049-126	I	1.3
Train and its repair	049-127	I	1.4
Motor vehicles	049-128	I	600.0
Motorcycles	049-129	I	600.0
Other transport equipment	049-130	I	59.2
Aircraft and spare parts	049-131	I	-0.9
Other manufactured goods	050	I	40.5

APPENDIX 6: BIBLIOGRAPHY

- Arief, Sritua. 1992. The Employment Impact of Government Policies: A Case Study of Wood-processing Industry in South Sumatra. Report prepared for the Natural Resources Management Project, Ministry of Forestry, Republic of Indonesia.
- Asian Development Bank. 1992. *Key Indicators of Developing Asian and Pacific Countries*. Manila: Oxford University Press.
- Balassa, Bela. 1965. Tariff Protection in Industrial Countries: An Evaluation. *Journal of Political Economy* (June):573-94.
- Bhagwati, J. N., and T. N. Srinivasan. 1973. The General Equilibrium Theory of Effective Protection and Resource Allocation. *Journal of International Economics* 3(3): 259-81.
- Corden, W. M. 1971. The Substitution Problem in the Theory of Effective Protection. *Journal of International Economics* 1(1): 37-57.
- Corden, W. M. 1966. The Structure of a Tariff System and the Effective Protection Rate. *Journal of Political Economy* (June):221-37.
- Fane, George, and Chris Phillips. 1991. Effective Protection in Indonesia in 1987. *Bulletin of Indonesian Economic Studies* 27(1): 105-25.
- Fane, George, and Chris Phillips. 1987. Effective Protection in Indonesia. A report submitted to the Department of Industry, Jakarta.
- James, William E., Seiji Naya, and Gerald Meier. 1987. *Asian Development: Economic Success and Policy Lessons*. San Francisco: ICS Press.
- Johnson, H. G. 1965. The Theory of Tariff Structure with Special Reference to World Trade and Development. In *Trade and Development*. Geneva: Institute Universitaire de Hautes Etudes Internationales.
- Pangestu, M., and Boediono. 1986. The Structure and Causes of Manufacturing Sector Protection in Indonesia. In *The Political Economy of Manufacturing Protection: Experience of ASEAN and Australia*, edited by C. Findlay and R. Garnaut. Sydney: Allen and Unwin.
- Pitt, M. 1981. Alternative Trade Strategies and Employment in Indonesia. In *Trade and Employment*, edited by Anne O. Krueger and others. Vol. 1. Chicago: University of Chicago Press.

Soesastro, Hadi, Mari Pangestu, and Janis Y. Togashi. 1993. Trade: The Future Engine of Growth for Indonesia. *PITO Business Environment in ASEAN*, upcoming report. East-West Center: Honolulu, Hawaii.

Togashi, Janis. 1993. The Structure of Effective Protection in Indonesia and Implications of the CEPT on this Structure. Ph.D. dissertation, Department of Economics, University of Hawaii at Manoa, Honolulu, Hawaii.

World Bank. 1991. *Indonesia*. Washington, D.C.: World Bank.

Wymenga, Paul S. J. 1991. The Structure of Protection in Indonesia in 1989. *Bulletin of Indonesian Economic Studies* 27(1): 127-53.

NRM/ARD CONSULTANCY REPORTS

NO.	TITLE	AUTHOR
1.	Procurement Plan For Research Equipment at Bukit Baka and Equipment Installation at Samarinda Forestry Research Station	Roy Voss
2.	Agroforestry in Bukit Baka/ Bukit Raya	W.G. Granert
3.	Pengukuran dan Pemetaan Topografi Sebagian Daerah Taman Nasional Bukit Baka/Bukit Raya	Sahri Denny, cs
4.	Applied Research Recommendations for Production Forest Management An Economic and Ecological Review of the Indonesian Selective Cutting and Replanting System (TPTI)	Lisa Curran & Monica Kusneti
5.	Balancing Forest and Marine Conservation with Local Livelihoods in Kalimantan and North Sulawesi	Jill M. Belsky
6.	Proposal to the GOI and USAID for the Development of Comprehensive Environmental and Natural Resources Accounts (CENRA) for Economic Planning and Management	Henry Peskin & Joy Hecht
7.	Bukit Baka Mini-Hydraulic System Implementation Plan	Michael Johnson
8.	Final Report: Bukit Baka – Bukit Raya 1992	Roy Voss
	Station Protocol: Bukit Baka – Bukit Raya 1992	Roy Voss
	Research Protocol: Bukit Baka – Bukit Raya 1992	Roy Voss

NO.	TITLE	AUTHOR
9.	Environmental Education and Awareness in Bukit Baka (vol.1)	Nancy Bergau
	Environmental Education and Awareness in Bukit Baka Guide to Environment and Fire Campaign (vol.2)	Nancy Bergau
10.	Recommendations for Controlled Timber Harvesting in the SBK Forest Concession	John Hendrison
11.	Cruiser Identifications at SBK and Local Uses of Trees by Local People	Jim Jarvie
12.	Community Water Supply Feasibility Study for Bukit Baka–Bukit Raya, Kalimantan	Rick McGowan & Alfonso Rieuwpassa
13.	Report on NRM Library Consultancy September – December 1992	Dachlan Cartwright
14.	Livelihoods Strategies and Marine Resource Among Residents of Bunaken National Park, North Sulawesi: Recommendations for Local Involvement in Park Management	Jill M. Belsky
15.	A Competitive Awards Scheme for Applied Forest Management and Nature Conservation	Peter R. Burbridge
16.	Design of a Management Information System for the Natural Resources Management Project	Joy Hecht
17.	Environmental Education and Awareness Strategy for Bukit Baka – Bukit Raya National Park (volume 1)	Nancy Bergau
	NGO Training for a Local Environmental Education and Awareness Strategy (volume 2)	Nancy Bergau
18.	Water Supply and Sanitation (WS&S) Program in Bukit Baka – Bukit Raya, Kalimantan Program Status Report	Rick McGowan

NO.	TITLE	AUTHOR
19.	The Role of NGOs in Supporting the NRM Project in Bukit Baka – Bukit Raya National Park	Marcel de Brune
20.	Integration of Provincial Regional Development Planning into the Bukit Baka – Bukit Raya National National Park Management Plan	E. Edwards McKinnon
21.	Communications, Information, and Education Strategy for Bunaken National Park	Nancy Bergau
22.	Report on the Preparation of a Design for a Study of the Natural Resource Impacts of Marine Sector Policy During the Second Long-Term Development Plan Period	Andrea S. Katz
23.	Management Information System for the Natural Resources Management Project Report on the Second Mission to Jakarta July – August 1993 (Volume 1)	Joy Hecht
	Management Information System for the Natural resources Management Project User Manual and Technical Documentation (Volume 2)	Joy Hecht
24	Water Supply and Sanitation Program in Bukit Baka – Bukit Raya, Kalimantan Status Report No. 2	Jonathan Hodgkin
25.	Report on Communities Living Within Reach of The Bukit Raya National Park in Kalimantan Tengah	Michael Heppell