UNIVERSITI PUTRA MALAYSIA

AN APPRAISAL OF THE ECONOMIC POTENTIAL OF MANGROVE SWAMPS

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FEP 1977 1

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by

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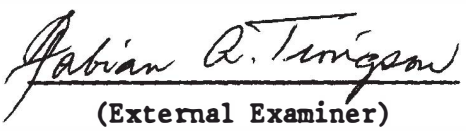
A thesis submitted in partial fulfilment of the requirement for the degree of Masters of Science in the Universiti Pertanian Malaysia

July 1977

The thesis attached hereto, entitled "An Appraisal of the Economic Potential of Mangrove Swamps" prepared and submitted by Mohd. Yussof Nair in partial fulfilment of the requirements for the degree of Masters of Science, is hereby accepted.



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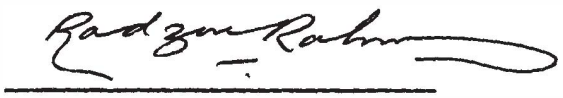

(Major Supervisor)

(Minor Supervisor)

Date: 21/6/77

ACKNOWLEDGEMENT

The author wishes to express his gratitude to Dr. Radzuan Abdul Rahman, Dean of the Faculty of Resource Economics and Agribusiness and also Chairman of his graduate committee for generating the initial intellectual impetus and for rendering excellent supervision throughout the preparation of this study. His constructive criticisms, suggestions and guidance are deeply appreciated. Special thanks also go to Dr. Wan Leong Fee, his minor supervisor, for his useful comments on the earlier drafts of the thesis.

Recognition are also due to Dr. Jaafar Ahmad, a senior economist with Bank Negara for his assistance in developing and subsequently running some of the models used in the study; Dr. J. J. Augustin of the Language Department for editing the final manuscript; Encik Abdul Wahab Mohd. Nor for the excellent rendering of the graphics and finally to Puan Aini Mohd. Yusof for typing the final manuscript.

Special thanks are also due to several members of the Faculty of Resource Economics and Agribusiness especially Encik Cheam Soon Tee and Encik Ishak Hj. Omar for their invaluable suggestions on the earlier drafts.

Finally, the author wishes to express his profound gratitude to the Agricultural Development Council, Inc., without whose financial assistance, it would not have been possible for the author to pursue his graduate program.

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ABSTRACT

Natural resources have always been in the centre of discussion since time immemorial. They are the basic building blocks of an economy just as amino acids are the basic building blocks of protein. One issue that has always been and will continue to be emphasized in future is the role of natural resources in the economic development of the country. In this respect the current preoccupation seems to be on the question of whether or not natural resources could be so managed as to support and subsequently contribute significantly to the development objectives of the country. Implicit in this is the issue of resource allocation.

This study evaluates the economics of the present alternative uses of the mangrove swamp resource base in Sabah with the view of isolating an optimal combination of resource use that is consistent with Sabah state development priorities. Specifically, the relative contributions of each alternative with respect to income, employment and foreign exchange generations are determined and then compared. This study also investigates the present domestic consumption of fish and its future requirements relative to supply.

The primary data source is a survey of two chip mills and five prawn factories in the state of Sabah in 1976. Supplemental data were obtained from published statistics. Essentially, the study employs two procedures--regression and partial investment criteria analysis. The former is used to determine the domestic consumption of fish, the derivation of production possibility curve and the maximum sustainable yield of fish landing. The latter is used to determine the tradeoff between the alternative uses.

The study reveals that if income and foreign exchange earnings were given priorities, there is a strong case for conserving the mangrove resource base for prawn fishing industry rather than for chip production. However, the reverse situation would prevail if the objective was for employment generation. The study also shows that the future requirements of fish and fish products would exceed supply.

The study concludes that given the present priorities in the state's development objective (i.e. bias in favour of income generation), it would be in the interest of the state to allocate the resource base in favour of the prawn fishing industry than in chip production. A more restrained felling of the mangrove trees is, therefore, suggested.

CHAPTER I

INTRODUCTION

ECONOMIC SETTING

Location

Sabah (previously known as North Borneo) is located on the northern end of the island of Borneo. It has an area of 29,388 square miles and a coast line of about 900 miles. Shaped roughly like a triangle, it is bounded to the west by the South China Sea, to the north and northeast by the Sulu Sea, to the east by the Celebes Sea and to the south by Sarawak and Kalimantan (See Figure 1.1).

Historical Development

Sabah's early development started with the Chartered Company rule in 1881, when Baron Von Overbeck, William Cowie and the Dent brothers, having been granted a large part of North Borneo by the Sultans of Sulu and Brunei, were given a royal charter by the British Government to administer the affairs of the territory.[1]

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[1] Hedlin Menzies and Associates Ltd., Sabah Forest Development Study, Section 1 (prepared for the Canadian International Development Agency, Canada; August 1972) p. 3.

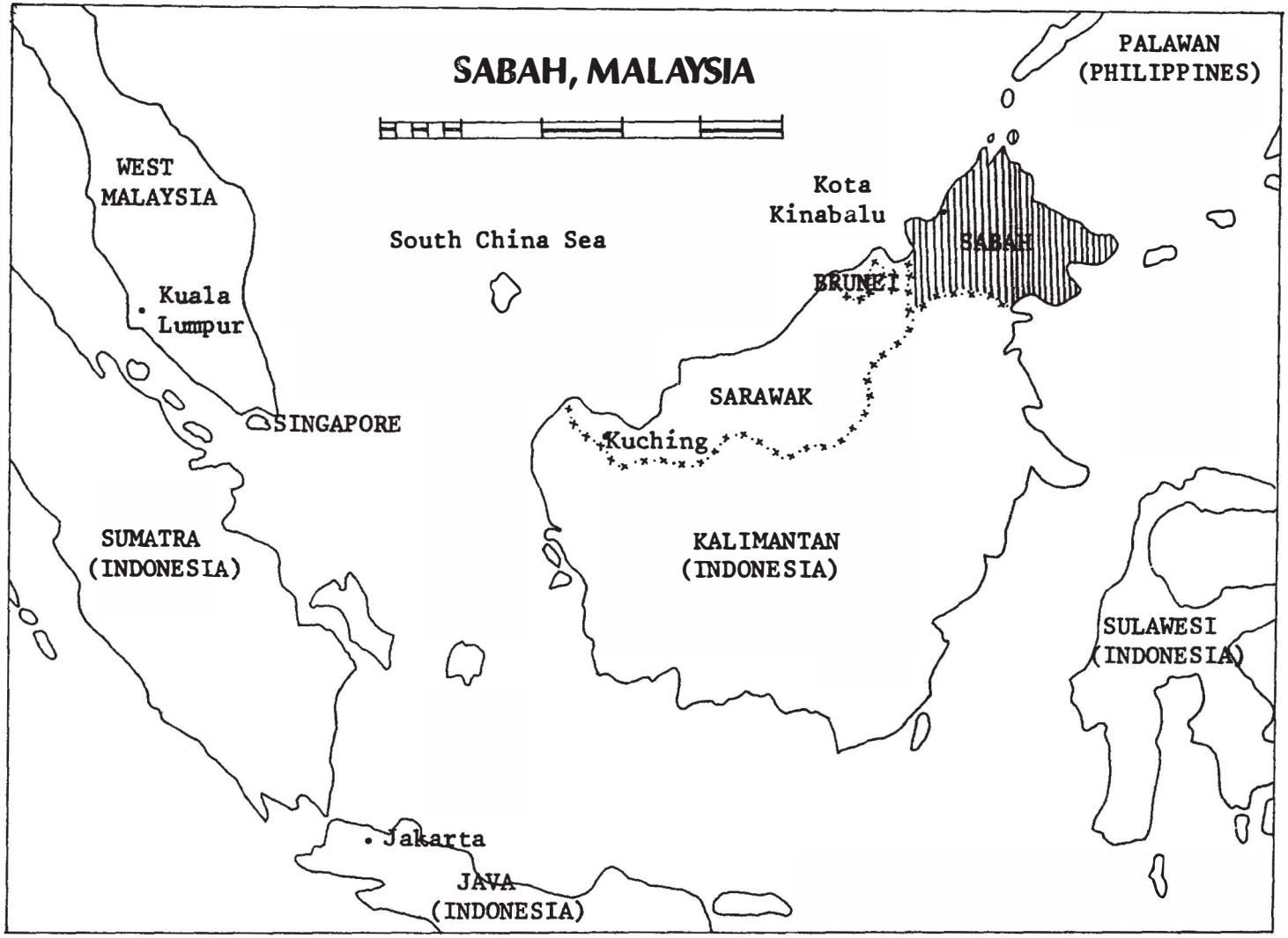

Figure 1.1. LOCATION OF SABAH

Source: I.F.T. Wong, The Present Land Use of Sabah 1970, (Department of Agriculture, 1973) p. 4.

During the period, 1881 - 1946, when the Company rule was in effect, economic activity was restricted to the exports of edible bird's nest, jungle products and tobacco cultivation.[2] However, by the early twentieth century, tobacco cultivation collapsed after the Company lost its market, when the United States of America, the major buyer, imposed a tariff on tobacco imports.[3] The Company then initiated the planting of rubber, utilizing immigrant labour from Mainland China and foreign capital from England and Europe. Rubber estates were established and a railway line was constructed on the west coast to provide the freighting needs of these estates. In 1920, a company by the name of British Borneo Timbers was given monopoly control interests in the harvesting of logs and by 1937 had exported nearly $5 million worth of hardwood logs.[4]

The Second World War brought economic stagnation to the country until 1946 when the state became a British colony. The pattern of development resembled closely that of the Chartered Company with rubber and timber remaining as the principal exports. Meanwhile, roads and ports were improved.

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[2] Ibid.

[3] Forest Development Study, p. 4.

[4] Forest Development Study, p. 5.

Towards the late 50's and early 60's, Britain began decolonizing its territories and granting them independence. During the same period, despite the development effort initiated by the Colonial Government, participation of the indigneous people, in particular the rural sector, was neglected. Meanwhile, the Malayan economy, which had gained its political independence in 1957, was engaged in massive development projects. In the field of rural development, Malaya had initiated major land development schemes, resettled families and enjoyed large production gains in rice and rubber.[5] When the concept of Malaysia was mooted in the early 60's, Bornean leaders who had witnessed these dramatic changes and who were given promises of development aid from Malaya, should they decide to join the Federation, were only too willing to accept the idea.[6] Subsequently, Sabah joined Malaysia on the 16th September, 1963, after gaining its independence about two weeks earlier. Since then Sabah's development targets followed closely Malaysia's five-year development plans.

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[5] James P. Ongkili, Modernization in East Malaysia 1960 - 1970, (Kuala Lumpur - Oxford University Press, 1972) pp. 81-84.

[6] Loc. cit.

Development Within Malaysia

The First Malaysia Plan (1966 - 1970) emphasized the development of transportation facilities and the agricultural cum rural sector. During this period 30.62 per cent ($126.6 million) of the total development expenditure of $413.48 million was spent on the development of roads and other transportation needs.[7] During the same period, agriculture and rural development accounted for 29.38 per cent ($121.47 million) of the total budget. This emphasis was continued into Second Malaysia Plan (1971 - 1975) with transportation, agriculture and rural development taking up 32.2 per cent and 25.8 per cent of the total development budget of 756.4 million dollars respectively.[8] Consequently, motorable roads increased from 1,796 miles in 1970 to 2,381 miles in 1975. More spectacular, however, were the increases in oil palm and cocoa acreages which increased by 98.48 per cent and 52.07 per cent respectively during the First Malaysia Plan and by 37.12 per cent and 117.48 per cent respectively during the Second Malaysia Plan (see Table 1.1). Export earnings from these two crops are reflected in Table 1.2.

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[7] Sabah State Government, Rebolisi Kemajuan Sabah, (Kota Kinabalu; Information Department, 1970) pp. 14-15.

[8] Loc. cit.

TABLE 1.1. COMPARISON OF MAJOR CROPS PLANTED DURING THE VARIOUS STAGES OF MALAYSIA PLAN (SABAH)

Crops	1966 Acreages (beginning of 1st Malaysia Plan)	1970 Acreages (end of 1st Malaysia Plan)	% Increase since 1966 to 1970	1971 Acreages (beginning of 2nd Malaysia Plan)	1975 Acreages (end of 2nd Malaysia Plan)	% Increase since 1971 to 1975
Rubber (a)	255,488	260,396	1.94	259,426	256,556	-1.11
Coconut	104,546	136,139	30.22	141,255	129,918*	-
Padi**	95,910	103,730	8.15	107,532	108,221	0.64
Oil Palm	47,847	94,968	48.48	106,406	145,909	37.12
Cocoa	6,531	9,932	52.07	11,161	24,273	117.48
Others	36,851	45,569	23.66	48,345	72,822	50.63
TOTAL	547,133	650,734	18.94	674,125	747,237	10.85

* Decreased due to revision.

** Padi comprises wet padi, hill padi and kendinga padi. Double cropped padi not included.

Others include: maize, potato, tapioca, sweet potato, groundnut, soya bean, banana, citrus, pineapple, vegetable, coffee, tobacco, abaca, other fruits.

(a) 1,727 acres of rubber has been deducted due to 1965 revision.

Source: Department of Agriculture, Sabah, Agriculture Statistics of Sabah, 1975, p. 9.

Whereas timber and rubber exports either stayed constant or declined as a percentage of total exports, palm oil and cocoa beans increased their respective shares.

Resource development and exploitation was also intensified in the Second Malaysia Plan period and this paid off in copper and petroleum exports. Table 1.3. indicates the expansion in the copper and petroleum industry. These two items will most probably displace timber as the major export earner as proven deposits are substantial.

Emergence of the Problem

The rapid development and the heavy emphasis on resource exploitation has underscored the need for development funds and investment capital. The Third Malaysia Plan (1976 - 1980) for example, envisages that the total development budget for Sabah will be $1,452.271 million, an increase of close to 100 per cent over the Second Malaysia Plan.[9] Of this total, $769.212 million will be from the Federal Government while the balance of $683.059 million will have to come from the state.

Coupled with the above need, is the necessity to expand exports to finance imports of capital equipment, badly needed for the development of the manufacturing sector, which so far

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[9] Government of Malaysia, Third Malaysia Plan (1976 - 1980), Kuala Lumpur; Government Printer, 1976) Appendix II.

TABLE 1.2. EXPORT VALUE OF PRINCIPAL EXPORTS (1971 - 1975)

Items / Year	Total Exports	Timber	*% of total exports	Rubber	*% of total exports	Palm Oil & Kernels	*% of total exports	Cocoa beans	*% of total exports
1971	505,935	419,447	82.9	26,392	5.22	26,691	5.3	3,583	0.7
1972	509,286	410,003	80.5	23,254	4.6	40,544	8.0	4,884	1.0
1973	949,943	809,138	85.2	54,286	5.7	43,245	4.6	8,369	0.9
1974	1,097,023	871,370	79.4	50,464	4.6	120,629	11.0	16,030	1.5
1975	803,747	568,532	70.7	40,034	5.0	139,914	17.4	16,955	2.1

*% computed.

Source: Department of Agriculture, Agriculture Statistics of Sabah, 1975, p. 14.

TABLE 1.3. EXPORTS OF COPPER AND PETROLEUM 1975 - 1976

	1975	1976
Quantity (tons)	13,068	81,469
Copper Value ($ Malaysian)	11,341,184	74,730,826
% of total exports	1.12%	3.36%
Quantity (tons)	369,917	2,415,574
Petroleum Value ($ Malaysian)	85,502,544	584,880,637
% of total exports	8.46%	26.30%

Source: Department of Statistics, Malaysia, Monthly Statistics of Sabah, January 1975, p. 18.

has been one of the slowest sectors to develop.

In addition, the need to find employment for a labour force that is expected to grow at 2.7 per cent annually[10] cannot be ignored. Given that Sabah's development efforts (at least in the immediate future) will be met largely through the exploitation of her natural resources, there is therefore, a definite need for the maximum utilization of these limited resources. This study then attempts to assess one such resource and focuses on mangrove swamps as a potential resource base for utilization.

Interest in mangrove swamps utilization came into the limelight only recently. The forest stand within the mangrove areas provide valuable timber and serve as a resource base fo the mangrove chip factories, which have in fact, been established within the state. However, the waters surrounding the swamps are also thought to provide valuable nursery and feeding areas for the offshore prawn fishing industry. Utilizing mangrove swamps for timber extraction will therefore have adverse effects on the prawn industry. Alternatively, there is also the possibility of converting areas within the swamps into ponds for the culture of marine animals, like fish and crustaceans. To date, there has been very little

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[10] Third Malaysia Plan, p. 147.

literature or studies done locally with respect to the optimal utilization of the mangrove resource, which can be used as a guideline by decision makers for policy formulation. It is precisely the existance of this problem that has prompted this research.

Objective of the Study

The main objective of the study is to determine the best alternative use(s) of the mangrove swamps in Sabah. This is to be achieved by examining and comparing the economics of the various alternative uses of the resource base with due consideration given to employment creation, income and foreign exchange generations effects of each.

Specifically, the objectives of the study will include the following:-

(a) to evaluate the economics of the mangrove chip industry.

(b) to evaluate the economics of the prawn fishing industry.

(c) to analyze the domestic consumption and supply of fish.

(d) to evaluate the economics of brackish water culture.

and (e) to determine the best use of the mangrove swamp, consistent with the state's development objectives.