UNIVERSITI PUTRA MALAYSIA

BIONOMIC ASSESSMENT OF THE MARINE FISHERIES IN THE NORTHERN COAST OF CENTRAL JAVA

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BIONOMIC ASSESSMENT OF THE MARINE FISHERIES IN THE NORTHERN COAST OF CENTRAL JAVA

by

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A thesis submitted in partial fulfilment of the requirement for the degree of Master of Science in the Faculty of Resource Economics and Agribusiness, Universiti Pertanian Malaysia

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Tesis ini dipersembahkan untuk para nelayan kecil pantai utara Jawa Tengah. Perjuangan hidup mereka, yang berat serta penuh bahaya guna mencari sesuap nasi untuk kelangsungan hidup keluarga mereka dari hari ke hari, mendorong diri untuk lebih berkarya bagi meningkatkan kesejahteraan hidup mereka.

(This thesis is dedicated to the small-scale fishermen of the northern coast of Central Java. Their considerable hardship, struggle and the dangers they face daily for a piece of bread to sustain their families encourages me to work harder in order to enhance their welfare).

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LIST OF ABBREVIATIONS

DB	=	Dug-out Boat
HP. D.	=	Horse Power Day/s
IPB	=	Inboard-Powered Boat
LPB	=	Large Plank-built Boat
MPB	=	Medium Plank-built Boat
MEY	=	Maximum Economic Yield
MSY	=	Maximum Sustainable Yield
NB	=	Non Boat
NPB	=	Non-Powered Boat
OAE	=	Open Access Equilibrium
OPB	=	Outboard-Powered Boat
SPB	=	Small Plank-built Boat
SYC	=	Sustainable Yield Curve
TCE	=	Total Cost of Effort
TRE	=	Total Revenue of Effort

ABSTRACT

An abstract of the thesis presented to the Senate of Universiti Pertanian Malaysia in partial fulfilment of the requirements for the degree of Master of Science.

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The Central Java fishing industry has been operated for decades under the policy of open access management. Present fishery policy in the area emphasizes resource development in order to improve the fishing industry. However, development programmes place some pressure on the resource use that could lead to depletion.

This study was undertaken to evaluate the status of the fisheries resource utilization of the northern coast of Central Java. Temporal or static fishing models were used to assess maximum and economic sustainable yields. Multiple input models of

Schaefer and Fox were used but failed to produce the expected results. However the single model of Schaefer was able to do so.

Results of the static single input model analysis showed that the fisheries resource were, in fact, highly exploited. The actual effort nearly approaches the estimated effort for Maximum Sustainable Yield. However, the existing effort was far higher than the estimated effort for the Open Access Equilibrium. The fact that the fishermen still continue fishing while economic rent had already dissipated, indicates that they were forced to do fishing. This could be due to the absence of alternative incomes sources for them.

Evaluation of the Central Java marine fisheries development programmes using Smith's Table of effect on the development on traditional fisheries showed that rural development method for alternative incomes sources (the appropriate development method to increase fishermen's income) received little attention. Therefore, this method is strongly recommended. The specific programmes recomended are development of the backward and forward-linkages of the fishing industry, the establishment of other rural industries which creates employment and generates income to local fishermen and out-migration of local fishermen to less-populated islands in Indonesia.

ABSTRAK

Abstrak tesis dikemukakan kepada Senat Universiti Pertanian Malaysia sebagai memenuhi sebahagian daripada syarat-syarat untuk mendapatkan ijazah Master Sains.

PENGUKURAN BIONOMI UNTUK PERIKANAN LAUT DI PANTAI UTARA JAWA TENGAH

Oleh

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1982

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Industri perikanan di Jawa Tengah telah diusahakan untuk beberapa dekad di bawah dasar pengurusan perairan terbuka. Dasar perikanan masa kini mengutamakan pembangunan sumber untuk meningkatkan industri perikanan. Walaupun begitu adalah dijangkakan bahawa dasar tersebut telah menekan penggunaan sumber dan seterusnya menuju kepada kepupusan sumber.

Kajian ini dilakukan untuk mengukur tahap penggunaan sumber perikanan di pantai utara Jawa Tengah. Model-model perikanan temporal atau statik telah digunakan untuk mengukur penghasilan maksimum dan ekonomi yang berkekalan. Model berbilang kemasukan dari Schaefer dan Fox telah digunakan, tetapi gagal memperlihatkan keputusan yang dijangkakan. Bagaimanapun penggunaan model

kemasukan tunggal Schaefer telah berjaya memperlihatkan hasil yang diperlukan.

Hasil analisis model kemasukan tunggal yang statik memperlihatkan bahawa eksploitasi terhadap sumber perikanan telah menghampiri penghasilan maksimum yang berkekalan. Walaupun begitu usaha-usaha penangkapan ikan yang dijalankan pada masa ini adalah terlalu jauh di atas paras keseimbangan pengurusan perairan terbuka. Berdasarkan kepada kenyataan bahawa para nelayan masih mengusahakan penangkapan ikan walaupun keuntungan ekonomi sudah tidak ada lagi menunjukkan bahawa mereka berbuat demikian kerana mereka tidak mempunyai pilihan lain selain menjadi nelayan.

Penilaian terhadap rancangan-rancangan pembangunan perikanan laut di Jawa Tengah yang menggunakan Jadual Smith mengenai kesan-kesan pilihan pembangunan terhadap industri perikanan secara tradisional memperlihatkan bahawa pembangunan desa untuk mendapatkan punca pendapatan lain (yang merupakan satu kaedah pembangunan yang paling sesuai untuk meningkatkan pendapatan para nelayan) adalah kurang diberikan perhatian. Oleh itu adalah dicadangkan rancangan-rancangan pembangunan desa untuk memberi pilihan punca pendapatan lain harus mendapat perhatian sepenuhnya. Rancangan-rancangan yang lebih spesifik seperti pembangunan industri yang berkaitan dengan industri perikanan dan industri desa serta transmigrasi nelayan sebaiknya dilakukan.

CHAPTER 1

INTRODUCTION

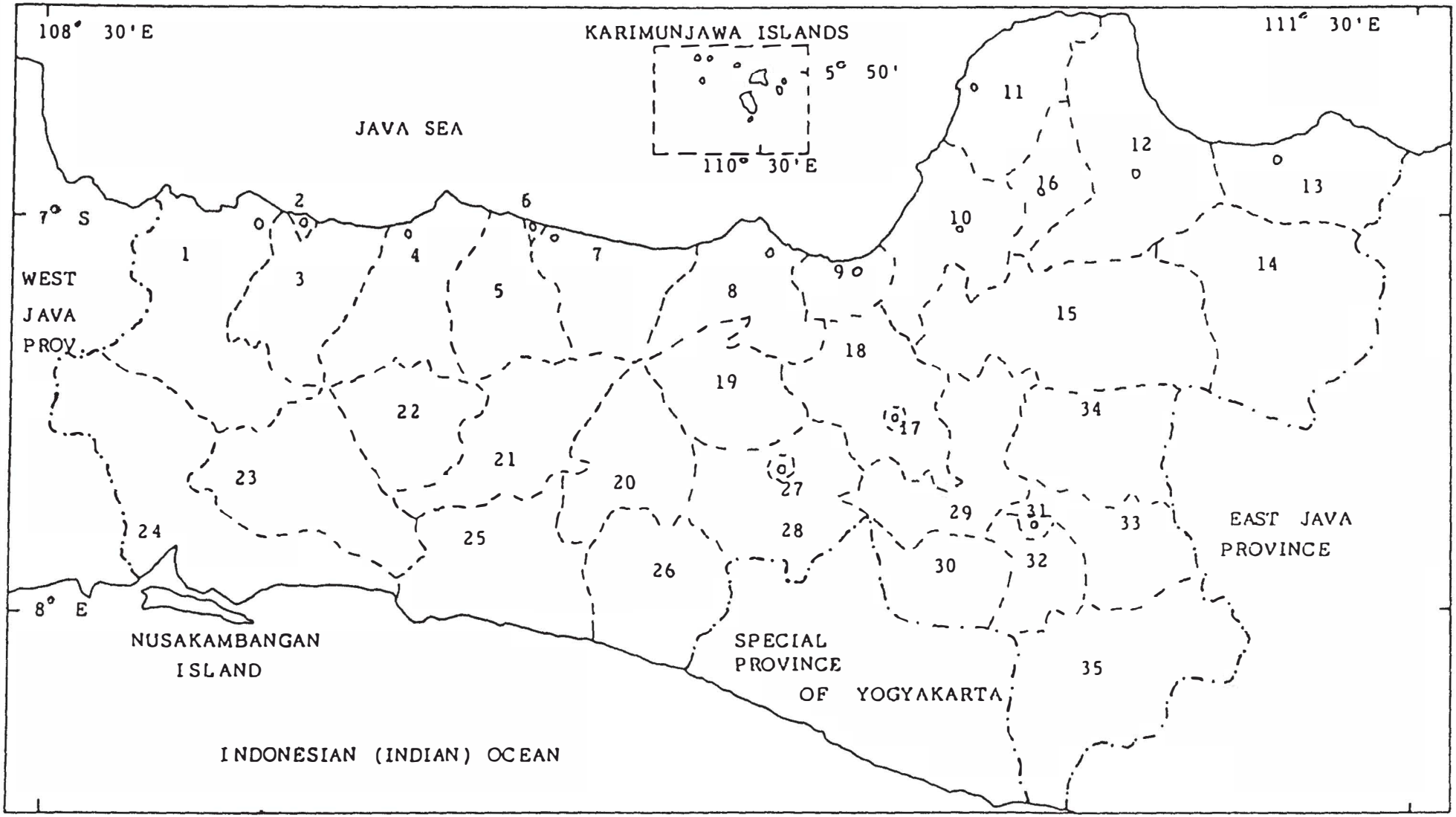
The Central Java Province lies between 108°- 111° east of the meridian and 6°- 8° south of the equator. It is bordered by Java Sea on the north, East Java Province on the east, Indonesian (Indian) Ocean on the south, and West Java Province on the west. There are 35 Regencies (Kabupaten) and Municipalities (Kota Madya) in Central Java Province (Figure 1.1). The Municipality of Semarang is the provincial capital.

Along the northern coast, there are 13 Coastal Regencies and Municipalities. In these coastal areas there are several fishery landing places. The major landing place, from west to east, are Pelabuhan, Pekalongan, Batang, Ujung, Morodemak, Jobokuto and Tasikagung which lie in the Municipalities of Tegal and Pekalongan, Regency of Batang, Municipality of Semarang and Regencies of Demak, Jepara and Rembang, respectively. The Municipality of Pekalongan is the largest in terms of production and landing facilities for fish.

The catch distribution by species in the northern coast of Central Jaya for 1982 is shown in Table 1.1. The Table shows that the Fin Fish dominated the production, with 96.1 % of the physical total catch or 81.7 % of the value of the total

FIGURE 1.1

MAP OF CENTRAL JAVA PROVINCE BY REGENCY AND MUNICIPALITY



—·—·— = Provincial Border

— — — — — = Regencial/Municipalitial Border

1 = Brebes Regency
2 = Tegal Municipality
3 = Tegal Regency
4 = Pemalang Regency
5 = Pekalongan Regency
6 = Pekalongan Municipality
7 = Batang Regency
8 = Kendal Regency
9 = Semarang Municipality
10 = Demak Regency
11 = Jepara Regency
12 = Pati Regency
13 = Rembang Regency
14 = Blora Regency
15 = Grobogan Regency
16 = Kudus Regency
17 = Salatiga Municipality
18 = Semarang Regency
19 = Temanggung Regency
20 = Wonosobo Regency
21 = Banjarnegara Regency
22 = Purbalingga Regency
23 = Banyumas Regency
24 = Cilacap Regency
25 = Kebumen Regency
26 = Purworejo Regency
27 = Mangelang Municipality
28 = Magelang Regency
29 = Boyolali Regency
30 = Klaten Regency
31 = Surakarta Municipality
32 = Sukoharjo Regency
33 = Karanganyar Regency
34 = Sragen Regency
35 = Wonogiri Regency

TABLE 1.1

THE CATCH DISTRIBUTION BY MAJOR SPECIES
IN THE NORTHERN COAST OF CENTRAL JAVA 1982

Species	Physical Catch		Value of Catch	
	ton	%	Rp	%
- Fin Fish	100,744.4	96.1	31,377.7	81.7
- Demersal	19,086.5	18.2	5,964.7	15.5
- Pony Fish	6,516.4	6.2	1,079.2	2.8
- Marine Catfish	2,321.5	2.2	808.9	2.1
- Croakers	2,925.4	2.8	816.0	2.1
- Other Demersal Fishes	7,329.7	7.0	3,260.6	8.5
- Pelagic	66,284.2	63.2	22,354.0	58.2
- Scads	15,334.8	14.6	5,416.0	14.1
- Fringescale Sardinella	14,915.6	14.2	2,781.9	7.2
- Indo Pacific Mackeral	9,425.6	9.0	4,908.8	12.8
- Other Pelagic Fishes	26,614.7	25.4	9,247.3	24.1
- Other Fin Fishes	15,367.2	14.7	3,059.0	8.0
- Crustaceans	3,400.9	3.2	6,829.8	17.7
- Molluscs	603.5	0.6	186.5	0.5
- Others	110.0	0.1	2.0	0.1
Total	104,858.8	100.0	38,396.0	100.0

Source : Central Java Fisheries Statistics Yearly Book 1982. Provincial Fisheries Office of Central Java.

catch. Most of the Fin Fish are pelagic species (63.2 % of physical total catch or 58.2 % of the value of the total catch). Crustacean has a special place among the Central Java marine fishery products due to its high price. However, it contributes only 3.2 % of the physical total catch, although in terms of value it contributes 17.7 % of the value of the total catch.

General Features of the Fishing Industry

In 1981, Central Java fisheries exported US$ 21.5 million or 31.8 % of the provincial's export (Indonesia, 1982). In terms of employment, 76,342 people were in marine fishing occupation in 1981 (Indonesia, 1982) and many others were in backward-linked industries such as in dockyard and ice factories, and forward-linked industries like fish processing and marketing.

Fishermen of Central Java use various kinds of fishing gears in their fishing activities. Some of the fishing gears such as cast net, beach seine, line and shell rake are operated without boat while some others are by dug-out and plank-built non-powered boats such as line, trap and gill net. Examples those that are run by outboard and inboard powered boats are line, gill net, boat seine, purse seine and trawl.

The introduction of more efficient gears such as trawl[1] and purse seine in the 1970's, resulted in multiple increase in fish landing. Central Java's marine fish production increased 3.2 fold from 39,918 tons in 1970 to 97,713 tons in 1981[2]. In 1981, 73.3 % of the Central Java fish production came from the marine fisheries (Indonesia, 1982) and this accounted for 7.0 % of the national marine fishery products (Indonesia, 1983). The use of trawl, however, was forbidden in 1981. The reason for the trawl banning was that there was an overlapping of fishing grounds between the trawl and traditional gears which resulted in conflicts between the two types of operators.

Trawling is considered to be one of the most efficient gears in increasing landings especially that of the demersal. In Indonesia, trawling was introduced in 1950's and became popular in the 70's due to the favourable enviroment provided for by the Foreign Investment Law. The high price of shrimp not only encouraged foreign investors but local entepreneurs as well. The difference between the two type of investors was that the foreign investors or joint venture investors invested in sophisticated 100 - 200 GT steel trawlers while their local counterparts invested in 20 - 30 GT wooden trawlers equipped only with relative simple facilities on board.

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[1] See Appendix A for illustrations.

[2] Source: From the record of Provincial Fisheries Office of Central Java, by personal contact.