



**UNIVERSITI PUTRA MALAYSIA**

**WELFARE IMPACT OF IMPROVED BOAT MODERNISATION  
SCHEMES (IBMS) IN PEMALANG REGENCY, CENTRAL JAVA,  
INDONESIA**

**INDAH SUSILOWATI**

**FEP 1991 5**

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INDONESIA**

**BY**

**INDAH SUSILOWATI**

**Thesis Submitted in Partial Fulfilment of the  
Requirements for the Degree of Master of Science  
in the Faculty of Economics and Management,  
Universiti Pertanian Malaysia**

**August 1991**



Dedicated to my beloved:

Papi and Ibu,  
brothers and sisters,  
my perpetual husband Mas Udin,  
my lovely daughter Dinda (Tholit2) and,  
Simbah 'Kung and 'Ti Pernalang

## ACKNOWLEDGMENTS

I wish to thank the Dean and the entire members of the Faculty of Economics and Management for providing the opportunity and assistance during my graduate study at UPM.

I extend my sincere gratitude to my chief supervisor, Dr. Nik Mustapha Raja Abdullah, for his guidance and supervision throughout the preparation of this thesis. Despite his tight work schedule he had time for discussion and deliberation of the various aspects of this study.

My heartfelt appreciation and gratitude go to Dr. Roslan A. Ghaffar, a member of my supervisory committee for his constructive insight on data analysis. His knowledge of econometric modeling has been greatly valuable especially in the construction of the simultaneous equation model.

My deep appreciation is accorded to Prof.Dr. Mohd. Ariff Hussein, the dean and a member of my supervisory committee. His cooperation in providing crucial suggestions and constructive criticisms are invaluable to this study.

My Sincere gratitude is also extended to International Development Research Center (IDRC) for providing a two-years financial support for me to undertake this graduate study; and Universitas Diponegoro (UNDIP) for granting the study leave. My



gratitudes are extended to the Dean and entire members of the Faculty of Economics at UNDIP and to Prof. Harlan Lampe, the former coordinator of ICLARM-AFSSRN for their encouragement in pursuing my graduate studies. I would like to extend my appreciation to Prof. Dr. Sudarsono at the Economics Faculty of Gajah Mada University (UGM) for his useful advice and inspiration in planning the data collection.

My special thanks are also due to the Provincial and Pemalang Fisheries Offices in Central Java and KUD Misoyo Sari Pemalang which has permitted me to utilize their data for this study. I am indebted to its officers namely, Mr. Tjiptono, Mr. Kasadi, Ir. Djoko Setiadji, Mr. Kasdu, Ir. Ramdon, Mr. Abu Sudjangi all of whom have helped me in data collection.

I owe a great deal of gratitude to Mr. Kusairi Mohd. Noh, his guidance in the construction of programming model using TSP package and Dr. Khalid Abdul Rahim for his point of view on the 2SLS model. My sincere thanks are also given to Dr. Ishak Hj. Omar, Dr. Abd. Aziz Abd. Rahman, Mr. Siow, Encik Zol, Alias, Kak Kam, Kak Fatiah, Aziah, Noraini, Rosnani, Amirah, Zalilah, Salwana, and Encik Halwi for their cooperation during my stay.

My regards are due to Mr. Abdul Aziz Bahsir and Ms. Fadzlun Yusof, of Graduate School, UPM for editing the thesis format; Mr. Rahmat Ismail and Mr. Zulkifli Ibrahim, the provost and Manager of the Seventh College for providing good



at the UPM campus; and Mr. Kapi Sudar for administering the UPM-IDRC fellowship award. My sincere thanks are also due to my class mates, Rodel and Devendra for helping me in the editorial of earlier drafts; my country mates: Amie, Victor, Armen, Satra, Pong, Eddy, Mumuk, Syafrudin, Mr. Wiratno, and Dr. Myasto for their generosity and sympathy. My Indonesian friends at Universiti Pertanian Malaysia are remembered for their friendship and encouragement during the study.

Finally, my sincere appreciation goes to my husband Udin, and the entire members of my family in Semarang and Pemalang for their forbearance, inspiration and understanding. My tiny daughter Dinda whom I left back at the age of three months has always been in my memory during the entire period of my stay in Malaysia. Her lost hours of love can hardly be compensated. I preserve all my love for her. It is their perpetual love and encouragement which inspired me to complete my masteral studies.

Most of all, to the Almighty God, Allah, who has given me all the things I need in life, including the opportunity to undertake this M.S. studies



## TABLE OF CONTENTS

ACKNOWLEDGMENTS .....	iii
LIST OF TABLES .....	x
LIST OF FIGURES .....	xi
LIST OF ABBREVIATIONS .....	xiii
ABSTRACT .....	xiv
ABSTRAK .....	xvi
CHAPTER	
I INTRODUCTION .....	1
The Role of Marine Fisheries in Indonesia ....	2
Marine Fisheries Management and Development .....	7
The Socio-Economic Conditions of Pemalang Regency .....	13
Marine Fisheries Profile .....	15
Fish Marketing and Distribution .....	30
Statement of the Research Problem .....	33
Objectives of the Study .....	37
Hypotheses of the Study .....	38
Significance of the Study .....	38
Organisation of the Study .....	39



II	REVIEW OF LITERATURE .....	40
	Technological Change in Fishery .....	40
	Welfare Economics and Surplus Concepts .....	45
	Welfare .....	45
	Surplus Concepts .....	46
	Alternative Measurement for Producer's Welfare .....	49
	Profit .....	50
	Producer's Surplus and Quasi-Rent .....	51
	Alternative Measurement for Consumer's Welfare .....	53
	Welfare Analysis of Stable Market Condition .....	57
	Welfare Analysis of Technological Change .....	59
	Studies on Welfare Impact and Technological Change .....	62
III	METHODOLOGY .....	71
	Model Construction and Data Requirements .....	72
	Model Construction .....	72
	Data Requirements .....	78
	Estimation Procedure and Statistical Considerations .....	84
	Estimation Procedure .....	84
	Statistical Considerations .....	89
	Determination of Welfare .....	92
	Data Collection .....	95





IV	EMPIRICAL RESULTS AND DISCUSSION .....	97
	Supply Model .....	97
	Demand Model .....	102
	Forecasting Performance of Estimated Supply and Demand Models .....	108
	Estimation of Welfare Impact .....	116
	Estimation of Equilibrium Price and Quantity of Fish Before IBMS .....	116
	Supply Function .....	116
	Demand Function .....	117
	Equilibrium .....	118
	Estimation of Equilibrium Price and Quantity of Fish After IBMS .....	118
	Supply Function .....	119
	Demand Function .....	119
	Equilibrium .....	119
	Estimation of Producer's and Consumer's Surplus .....	123
	Before IBMS .....	124
	After IBMS .....	126
V	SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS ..	132
	Summary and Conclusions .....	132
	Policy Implications and Recommendations ....	138
	Limitation of the Study .....	141
	BIBLIOGRAPHY .....	143



## APPENDICES

A	Summary of Data Input .....	148
B	Specification of the Marketing Units in Pemalang Regency .....	151
C	Test of Equality Between Coefficients Obtained from Different Samples Using Chow Test .....	156
D	Identification Status of Models .....	159
E	Estimated Supply and Demand Models: Method 0 .....	162
F	Run Test for the Determination of Autocorrelation in the Models .....	165
G	Zero-order Correlation Matrix Coefficients of Estimated Supply and Demand Models .....	171
H	Determination of Numbers of the Principle Components (PC) Used in the Models Before and After IBMS .....	174
I	Derivation of Validity Measurement of the models .....	176
K	Glossary .....	183
J	Major Types of Operated Boats and Gears in Pemalang Regency .....	186
	<b>BIOGRAPHICAL SKETCH .....</b>	<b>197</b>



## LIST OF TABLES

Table		Page
1	Fish Production in Indonesia, 1970-1987 .....	6
2	Fishery Contribution to the Local Income During REPELITA IV (1984 to 1988) .....	16
3	Statistics of Potential Fisheries of North Coast of Central Java Regency, 1988 .....	17
4	Fisheries Production Composition of Pemalang Regency During REPELITA IV (1984 to 1988) .....	19
5	Composition of Fisheries Export of Pemalang Regency from 1986 to 1989 .....	22
6	Statistics of Potential Fisheries of Pemalang Regency as of 1989 .....	25
7	Code Names and Definitions of the Standardised Variables Used in the Models ....	74
8	Estimated Supply Model .....	98
9	Estimated Demand Model .....	104
10	Summary of Forecasting Performance of Estimated Models .....	109
11	Summary of Welfare Estimation Results .....	127



## LIST OF FIGURES

Figure		Page
1	Map of Indonesia by Province Showing the Location of Pemalang Regency .....	3
2	Map of Pemalang Regency Showing the Location of the Five Fish landing .....	14
3	Fisheries Production Composition of Pemalang Regency (1984-1988) .....	20
4	Composition of Fisheries Export of Pemalang Regency (1986-1990) .....	23
5	Structure of Fish Marketing in Pemalang Regency .....	32
6	Sustainable Yield Curve for the Unregulated Fishery .....	42
7	Comparative Statistics: Change in Productivity .....	43
8	The Demand Curve .....	47
9	Consumer's and Producer's Surplus .....	48
10	The Level of Production for the Firm .....	49
11	Consumer's Surplus, Compensated Variation and Equivalent Variation .....	55
12	Producer's Surplus with Different Intercept Values of Supply Function .....	58
13	Welfare Changes Obtained from Technological Improvement .....	61
14	Actual and Predicted Supply Models Before the IBMS .....	112



15	Actual and Predicted Supply Models After the IBMS .....	113
16	Actual and Predicted Demand Models Before the IBMS .....	114
17	Actual and Predicted Demand Models After the IBMS .....	115
18	Structural Changes of Estimated Supply and Demand of Fish in the Market .....	121



## LIST OF ABBREVIATIONS

CS	: Consumers' Surplus
CV	: Compensating Variation
EEZ	: Exclusive Economic Zone
EV	: Equivalent Variation
FYDP	: Five Years Development Plans (in bahasa Indonesia is called as REPELITA)
GI	: Geometric Index
GRDP	: Gross Regional Domestic Product
GT	: Gross Ton
HP	: Horse Power
IBMS	: Improved Boat Modernisation Schemes
KIK	: Kredit Investasi Kecil (small-scale credit)
KMKP	: Kredit Modal Kerja Permanen (permanent working capita credit)
MEY	: Maximum Economic Yields
MSY	: Maximum Sustainable Yields
mt	: Metric Ton
NSW	: Net Social Welfare/ loss
PC	: Principle Component
PERDA	: Peraturan Daerah (local regulation)
PS	: Producers' Surplus
RCP	: Rural Credit Project
IBMS	: Improved Boat Modernisation Schemes
TPI	: Tempat Pelelangan Ikan (fish landing and fish auction)



Abstract of thesis submitted to the Senate of the Universiti Pertanian Malaysia in partial fulfilment of the requirements for the degree of Master of Science.

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**August 1991**

Supervisor: Dr. Nik Mustapha Raja Abdullah

Faculty : Economics and Management

The overall objective of this study is to examine the welfare impact of the IBMS programme in Pemalang Regency Central Java, Indonesia. To achieve this objective, supply and demand models for fish were estimated. The simultaneous equation model consists of supply, demand, and identity equations. The Two Stage Least Square (2SLS) was utilized to estimate the model using time series quarterly data from 1976.2 to 1990.2. All the key variables in the model were found to be consistent with postulated behaviour and theoretical expectations.

All variables specified in the supply model had expected signs and significant except for the fishing effort and the probability to catch fish. As expected the supply function was



found to be positively related with respect to its own price. However, its price elasticity in pre-IBMS is greater (0.224) than in post-IBMS (0.126). This shows that the rate of increase in fish production from additional input is diminishing after IBMS as evidence to the existence of overexploitation of the resource in the study area.

All of the signs of estimated parameters in the demand model were consistent with the theory except for the lagged price of fish variable. Results also showed that all of coefficient parameters were greater than half of their standard errors except for the intercept and lagged quantity demand at pre-IBMS. Furthermore, the price of substitute goods and income were found to be the major determinants of the quantity of fish demanded. The elasticity of fish demanded with respect to its own price is greater (-0.676) at post-IBMS than at pre-IBMS (-0.295). However, the income elasticity of demand for fish was found to be more elastic before (0.740) than after (0.580) IBMS.

The welfare analysis showed that the IBMS programme was ineffective. The overall impact showed that welfare loss to the society was 142.86 percent from the original condition. The biggest loss (two-third) was incurred by consumers and the remainder was incurred by producers.





Abstrak thesis yang dikemukakan kepada Senat Universiti Pertanian Malaysia sebagai memenuhi sebahagian daripada syarat dikurniakan Ijazah Sarjana Sains.

**KESAN KEBAJIKAN DARIPADA PEMBAIKAN SKIM PEMODENAN  
BOT DI REGENSI PEMALANG, JAWA TENGAH,  
INDONESIA**

oleh

**Indah Susilowati**

**Ogos 1991**

Penyelia : Dr. Nik Mustapha Raja Abdullah

Fakulti : Ekonomi dan Pengurusan

Objektif umum kajian ini ialah untuk melihat kesan kebajikan program IBMS di wilayah Pemalang, Jawa Tengah, Indonesia. Untuk mencapai objektif ini model penawaran dan permintaan untuk ikan telah dianggarkan. Model persamaan serentak telah dibentuk yang terdiri daripada persamaan penawaran, permintaan dan persamaan identiti. Kaedah Kuasadua Terkecil Dua Peringkat (2SLS) digunakan untuk menganggarkan model di atas dengan menggunakan data siri masa suku tahun dari tahun 1976.2 hingga 1990.2. Semua variabel penting di dalam model didapati konsisten dengan gelagat sebenar dan jangkaan daripada teori.

Kesemua variabel di dalam model ini mempunyai tandaan seperti yang dijangkakan dan signifikan kecuali variabel keupayaan perikanan dan kebarangkalian untuk menangkap ikan. Seperti mana yang dijangkakan, model penawaran didapati berhubung secara positif dengan harga ikan. Walau bagaimanapun keanjalan harga bagi masa sebelum IBMS (0.224) adalah lebih besar daripada selepas IBMS (0.126). Ini menunjukkan kadar pertambahan di dalam pengeluaran ikan daripada penambahan input adalah menurun selepas IBMS. Penemuan ini membuktikan keadaan eksploitasi sumber yang berlebihan di kawasan kajian.

Semua parameter yang dianggarkan di dalam model permintaan memberikan tandaan yang konsisten dengan teori kecuali variabel harga ikan untuk jangka masa lepas. Keputusan kajian juga menunjukkan semua angkali parameter adalah lebih besar daripada setengah sisihan piawainya kecuali bagi intersep dan kuantiti permintaan di masa lepas untuk masa sebelum IBMS. Sementara itu, harga barangan pengganti dan pendapatan merupakan penentu utama bagi kuantiti ikan yang diminta. Keanjalan harga permintaan ikan didapati lebih besar (-0.676) pada masa selepas IBMS berbanding dengan sebelum IBMS (-0.295). Walau bagaimanapun, keanjalan pendapatan permintaan ikan didapati lebih anjal pada sebelum (0.740) berbanding dengan selepas (0.580) IBMS.

Analisis kebajikan menunjukkan program IBMS adalah tidak efektif. Kesan keseluruhan menunjukkan kerugian kebajikan ke atas masyarakat adalah 142.86 peratus daripada keadaan asal. Kerugian paling besar (iaitu dua pertiga) adalah ditanggung oleh pengguna manakala selebihnya oleh pengeluar.

## CHAPTER I

### INTRODUCTION

Agriculture plays an important role in the Indonesian economy. It contributed 24.09 percent to Gross Domestic Product (GDP) and 55.80 percent to employment in 1988 (BPS, 1989). Among the agricultural sub-sectors, the fishery contributed 1.70 percent of the total GDP. Nonetheless the number of people involved in the fisheries sector reached 1.3 million people excluding those engaged in the processing plant in 1986 (Martosubroto, 1987).

Fish is the primary source of animal protein. It provides 67 percent of animal protein of the total Indonesian diet, whereas meat, milk and egg contribute 21, 7, and 5 percent respectively (Naamin, 1987). Moreover, it is relatively cheaper compared to other source of animal protein. In 1984 the annual fish consumption was estimated to be about 15 kg per capita per year but fell short of the national target of 18 Kg.

The Indonesian archipelagic and territorial sea covers an area of about 3.1 million sq km, excluding 2.7 million sq km area of marine water which is under the Exclusive Economic Zone (EEZ) (Anon, 1983). Therefore, Indonesia is considered as having a high potential in water resources with various stock



of fish and other marine animals (Costa, 1988). The geographical location of Indonesia is shown in Figure 1.

### **The Role of Marine Fisheries in Indonesia**

Like many other developing countries, Indonesia also has National Development Plans, embodied under REPELITA. The first of these plans known as the First Five Year Development Plan (FYDP I), covered the period between 1969 to 1973. This was then followed by FYDP II (1974-1978), FYDP III (1979-1983), FYDP IV (1984-1988), and to the present FYDP V (1989-1993). These plans consist of development programmes and projects which include infrastructural and non-infrastructural developments.

In addition, the objectives of fishery development strategy underlined in FYDP V are as follows :

- (1) To increase production in terms of quantity and quality in order to fulfill the food, nutrition, raw material and or export requirements,
- (2) To increase the productivity of fisheries and value added activities and fishermen income,
- (3) To extend the productive employment opportunity in the fisheries and to support the regional development, and
- (4) To promote resource management and achieve better control of resource utilization throughout the country.

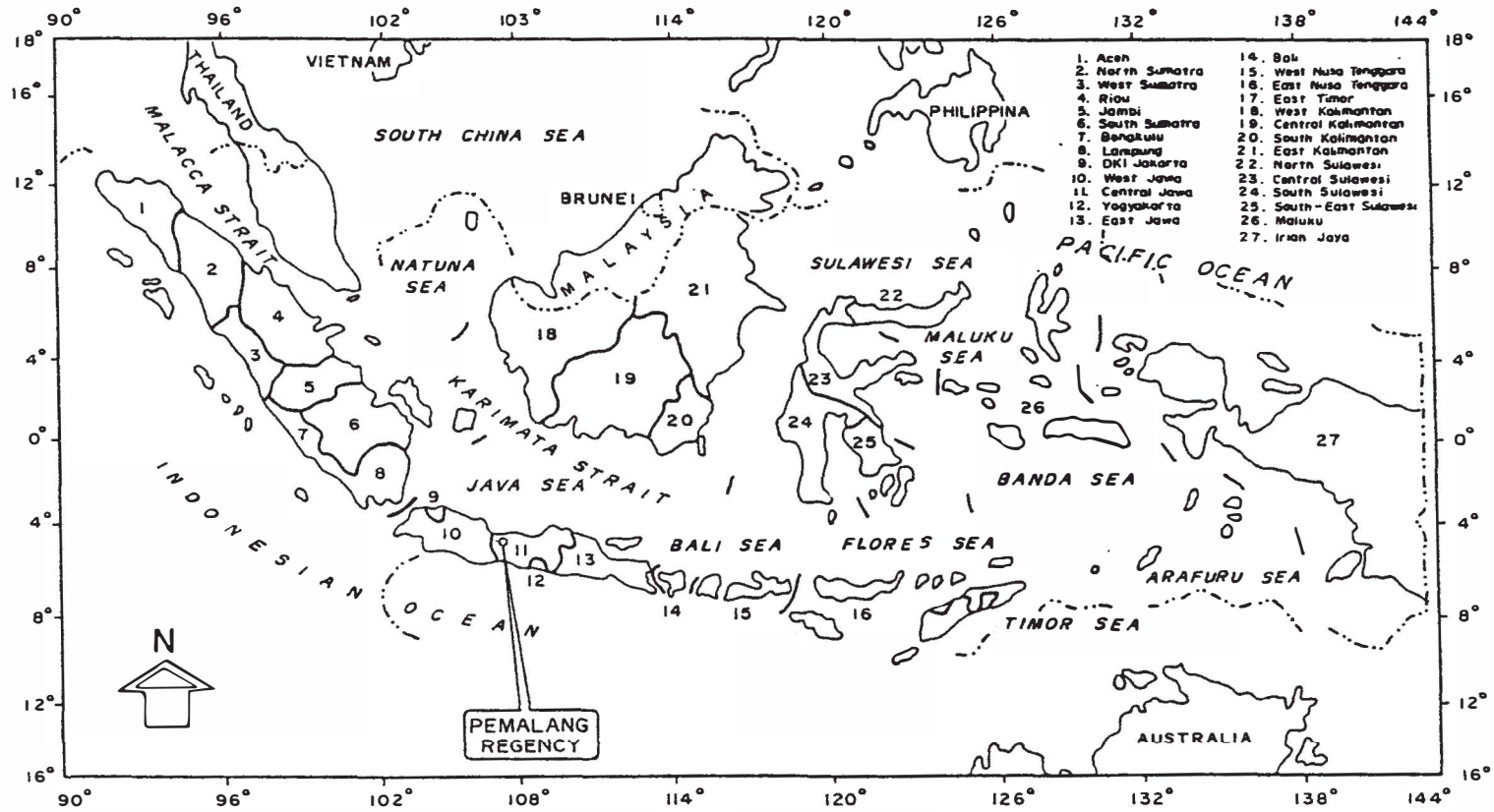


Figure 1: Map of Indonesia by Province Showing the Location of Pemalang Regency

Realizing the National importance of this sector, the government has set a target in REPELITA V (1989-1993)<sup>1</sup> to increase fisheries production by 5.78 percent per annum (from 3,007.9 thousand ton in 1989 to 3,765.7 thousand ton in 1993). The highest estimated growth rate however is assumed to be recorded by culture fisheries at a rate of 17.12 percent per annum, while the lowest is to be achieved by inland fishery at 2 percent per annum.

In addition, the objectives aboved are considered to be the goals of the long-term planning strategy. To fulfil these objectives, a range of government policies and programmes have been implemented with the aim at providing enough nutrition to the society as well as increasing income and employment opportunities to the small-scale fishermen. Improved Boat Modernisation Schemes (IBMS) have been part of this programmes, which among others, have been launched to benefit the small-scale fishermen who have been playing a significant role in enhancing fishery production.

Since the second REPELITA (1974-1979) the government has provided additional fishery infrastructures such as landing site, fishing and processing facilities. To date, the government has built 24 fishing ports and 149 landing sites which are scattered along the coastal areas, especially those

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<sup>1</sup> Bina Program issues, Directorate General of Fishery. 1988

in the vicinity of potential fishing grounds around Java, Sumatra, Kalimantan and Sulawesi. During this period, the government has also established six fishing companies, two of which dealt with shrimp fishing and four other with tuna fishing. Besides undertaking fishing business, they also serve as development agencies to help small-scale fishermen to market their catch. All of these efforts are basically aimed at uplifting the economic well being of the fishermen community.

Table 1 shows the trend in fisheries production in Indonesia from 1970-1987. In 1987, total fish production was about 2.67 million mt, with the largest production coming from North Coast Java (0.76 million mt) and Malacca Straits (0.47 million mt). In terms of share of production by sector, the marine and inland fisheries contributed 2.02 million mt (75.54 percent) and 0.65 million mt (24.46 percent), respectively. This clearly indicates the predominance of the marine sub-sector in Indonesian fisheries.

The estimated potential production of marine fishery in Indonesian territory is about 4.5 million ton per year. (with excluding the EEZ amounting to 2.1 million ton per year) Nonetheless, this potential seems to be primarily dominated by small-scale operations, which are typical of Indonesian fisheries, which are dictated by low technical input as well as productivity and income. However, the potential contribution of small-scale fisheries to the National fish



Table 1  
Fish Production in Indonesia, 1970-1987

Year	Production (million mt)	Index (1970 = 100)
1970	1.23	100
1971	1.24	100.8
1972	1.27	103.3
1973	1.28	104.1
1974	1.34	108.9
1975	1.39	113.0
1976	1.48	120.3
1977	1.57	127.6
1978	1.65	134.1
1979	1.75	142.3
1980	1.85	150.4
1981	1.91	155.3
1982	2.00	162.6
1983	2.21	179.7
1984	2.26	183.7
1985	2.40	195.1
1986	2.53	205.7
1987	2.67	217.1

Source : Fishery Statistics of Indonesia 1987,  
Ministry of Agriculture, 1989.

production is substantial. Inevitably, the marine fishery occupies a very important place in Indonesian economy. At the same time, Martosubroto (1987) estimates, more than 60 percent of fishermen live below the National poverty threshold, which has originally been pegged at 320-480 kg of rice equivalent. Accordingly, the fishery sector has also a great role to play in improving the economy of the fishermen as well as the welfare of the society as a whole.