

Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.

Marine Protected Area: A Case Study in North-Eastern Iloilo, Philippines

A thesis presented in partial fulfilment of the
requirements for the degree of

**Master of Management
in
Economics**

Massey University
Palmerston North, New Zealand

**Cheryl Joy Jardiolin Fernandez
2010**

ABSTRACT

Marine Protected Area (MPA), as a fisheries management tool has been promoted by both national and local conservationists and has provided de facto illustrations of integrated coastal management (ICM) in the Philippines. However, conflict is inevitable in the implementation of public policy such as the MPA because of contrasting objectives and expectations from various stakeholders. Coupled with non-human (e.g. MPA size) and human (e.g. mismanagement) threats, conflict becomes a hindrance to MPA effectivity. In the Philippines alone, only 10-20% of the 500 MPAs are attaining their objectives. This study presents an overview of MPA management and examines the interaction between the civil society and market forces of institutional arrangements in the case of North-Eastern Iloilo (NI) in the Philippines. It discusses overall scenarios that resemble conflict between various national, local and international sectors, assessing MPA success factors and the expected implications from such implementation.

Results from key informant, focus-group discussion and social survey show that there are problems on MPA management in the region. Using data and strategic analyses, it presents that minimisation of conflicts amongst actors should be the primary goal of the NI municipalities. In addition, MPA size and membership to organisations are also significant factors of success. Moreover, the analysis from a simple correlation to complex Principal Component Analysis (PCA) and Canonical Correlation Analysis (CCA) conclude that information on MPA regulation does not directly contribute to the improvement in MPA management. It implies that a focus on informing stakeholders about the benefits of having an MPA and its regulations is ineffective. The focus should be on the reduction of conflict between economic actors - for free riding problems are currently occurring, thus minimising conflict by conflict resolution and

proper incentives. However, there are still remaining challenges on MPA management, for not all factors are incorporated on this study. The challenge now is on how to identify the remaining factors and integrate them into policies and implementations to improve the overall condition of coastal communities.

DEDICATION and ACKNOWLEDGMENT

I dedicate this piece of work to my family: Mama, Papa, and Perry - for whom I owe my achievements.

My thanks and appreciation to *Dr. Kim Hang Pham Do and Prof. Anton Meister* for persevering with me as my advisors through out the time it took me to complete this study. Thank you for encouraging me to take further steps forward and for supporting me on whatever decision I made on my entire work. For that, I humbly thank you two for believing in me.

I am grateful to all the people who shared their expertise, time, and effort in providing necessary information, especially to the *people and government officials* of the municipalities of Ajuy, Balasan, Batad, Carles, Concepcion and Estancia. To the Bureau of Protected Areas of the Department of Environment and Natural Resources Regional Office VI (DENR-VI) and to the Iloilo Provincial Capitol, a big thank you for endlessly accommodating my inquiries and requests.

To *Dr. Pepito Fernandez Jr.* of the University of the Philippines Visayas (UP Visayas), I express my utmost respect and gratitude, for his valuable advices and insights on my study.

I am also thankful to the College of Management in UP Visayas, especially to *Dr. Joy C. Lizada* for her support on my professional development at the Department of Management.

I want to extend my gratitude to all my colleagues in the Department of Economics and Finance especially to *Nilesh Prakash and Zhongwei Xing*.

To members of the International Student Support at Massey University, especially to *Sylvia Hooker, Olive Pimentel, Sue Flynn and Dianne Riley*, who have given their full guidance and humble support on my welfare while studying, I give my appreciation.

I would also like to acknowledge my friends outside the department, especially to, *Kunsik Park, Iyah and Stephanie Pimentel, Andree Wallace, Bernadette Haru, Joshua Roldan, Ralph Kaule, Sunema Simati, Lala Komalawati, Jessica Tan, Yen Tesoro, Bandeth Ros, Deepika Naidu, and Reynald Castaneda*. I survived and enjoyed my stay in New Zealand, because of the exciting memories they have all shared. My special thank you goes to *Marissa Isidro-Sohoo*, for her unending friendship and statistical tutorials – I treasure our gaganess together.

I would like to express my thanks to my Asia-NZ Young Leaders Network family, especially to *Melanie Crawford, Muhammad Aman Allah, Agus Setwayan, Danaasuren Vandangombo, Nguyen Ba Cuong*, for the fun and relationships you all shared with me before and after the forum. To the *Asia-NZ Foundation* for giving me the opportunity to present my initial works to the International Institute for Fisheries Economics and Trade (IIFET) in Vietnam last July 2008.

My gratitude also goes to *Olive Pimentel and family, Jojo, Rey and Alyssa Roldan, Josephine and Bong Flores, Angel and Myrna Carambas, Gina, Dan and Danelle Corpuz, Marissa and Naldo Roldan* - for accepting me as a part of your family and for sharing your blessings – I will treasure your true friendships with me.

I also want to express my deep appreciation to my friends back in the Philippines namely, *Evelyn Jugado, Paul Erwen Parreño, Amour Mae Co, Jan Eilene Monteclaro, Luth Edmund Apresto, Christine Gavanoan, Michelle Tamonan, Marite Borres, Steven Tronco, and*

Ahyo. Thank you for your support during my ups and downs. Your constant communications made me feel less homesick!

My appreciation to a lady who made my stay in New Zealand and at Massey University, fun and exciting – *Mimi Dogimab*. For her unselfishness, advices support, and memories of friendship, I humbly thank her. She is the older sister, I never had.

My gratitude to the *New Zealand Development Agency (NZAID)* for giving me an opportunity to pursue my higher education as well as in fulfilling my dreams. It is indeed a privilege, on my part, to study and experience New Zealand at its best! 😊

TABLE of CONTENTS

ABSTRACT	III
DEDICATION AND ACKNOWLEDGMENT	V
TABLE OF CONTENTS	VIII
LIST OF FIGURES	XII
LIST OF NOTATIONS	XIII
CHAPTER ONE ~ INTRODUCTION	1
1.1 OBJECTIVES OF THE STUDY	3
1.2 OUTLINE OF THE STUDY.....	8
CHAPTER TWO ~ FISHERIES MANAGEMENT AND THE CASE STUDY OF NORTH-EASTERN ILOILO, PHILIPPINES.....	9
2.1 THE PHILIPPINE MACROECONOMY, ENVIRONMENT AND NATURAL RESOURCES	9
2.1.1. <i>The Philippine macroeconomy.....</i>	<i>10</i>
2.1.2 <i>The Philippine environment and natural resources.....</i>	<i>14</i>
2.2 THE PHILIPPINE FISHERIES MANAGEMENT AND THE COMMUNITY RESOURCE MANAGEMENT PROGRAMME (CRMP)	19
2.3 THE CASE STUDY IN NORTH-EASTERN ILOILO (NI), PHILIPPINES....	28
2.4 CONCLUDING REMARKS.....	32
CHAPTER THREE ~ MARINE PROTECTED AREA: RELATED LITERATURES.....	33
3.1 MPAS INVOLVE HUMAN AND ECOLOGICAL DIMENSIONS	33
3.2 MPAS IN THE PHILIPPINES: ARE THEY ACHIEVING THEIR OBJECTIVES?.....	38
3.3 MPA AND THE ROLE OF ITS LOCATION	40
3.4 MPA AND THE ROLE OF SOCIAL FACTORS	41
3.5 CONFLICT AS A DISADVANTAGE OF MPA IMPLEMENTATION.....	46
3.6 SOCIAL SURVEY, STAKEHOLDERS' PERCEPTION, AND SUCCESS PROXIES	48
3.7 CONCLUDING REMARKS.....	49
CHAPTER FOUR ~ METHODOLOGY AND DATA COLLECTION	51
4.1 MPA AND HUMAN WELL-BEING	51
4.2 THEORETICAL AND EMPIRICAL ANALYSIS OF MPA.....	54
4.2.1 <i>Market failure and government intervention.....</i>	<i>54</i>
4.2.2 <i>Three MPA management regimes</i>	<i>57</i>
4.3 DATA COLLECTION	60
4.3.1 <i>Survey interview (SI) and social survey questionnaire.....</i>	<i>60</i>

4.3.2 <i>Key informant (KI) interview and focus-group discussion (FGD)</i>	64
4.4 DATA ANALYSIS	64
4.4.1 <i>Likert Scale and the evaluation criteria</i>	64
4.4.2 <i>Principal component analysis (PCA)</i>	67
4.4.3 <i>Logit regressions</i>	68
4.5 STRATEGIC ANALYSIS.....	71
4.6 CONCLUDING REMARKS.....	72
CHAPTER FIVE ~ RESULTS AND DISCUSSION	74
5.1 THE CURRENT MPA MANAGEMENT SCENARIO AND GENERAL EVALUATION CRITERIA	74
5.1.1 <i>MPA management regimes, income, knowledge and membership</i>	75
5.1.2 <i>The general evaluation criteria</i>	79
5.1.3 <i>The four principal components</i>	81
5.2 MPA SUCCESS AND CONFLICT IN NI, PHILIPPINES.....	89
5.2.1 <i>MPA conflicts between actors and regimes</i>	89
5.2.2 <i>Factors affecting implementation of Marine Protected Area (MPA)</i>	95
5.2.3 <i>Canonical correlation analysis results</i>	98
5.3 THE ROLES OF ECONOMIC ACTORS.....	100
5.4 MPA PERCEIVED BENEFITS AND COSTS FOR REGULATION COMPLIANCE	104
5.5 KEY FINDINGS AND POLICY IMPLICATIONS	107
5.6 CONCLUDING REMARKS.....	108
CHAPTER SIX ~ SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	110
6.1 SUMMARY AND CONCLUSIONS.....	110
6.2 RECOMMENDATIONS.....	113
APPENDICES.....	117
APPENDIX A: <i>CATEGORIES AND NUMBER ESTIMATES OF MPAs IN THE PHILIPPINES</i>	117
Appendix A.1: <i>A Summary of the total number of MPAs of different categories</i>	117
Appendix A.2: <i>A Summary of Philippine MPAs Recorded 1995, 1997 and 2000 (from Aliño et. al, 2000)</i>	118
APPENDIX B: <i>ENVIRONMENTAL LEGISLATIONS IN THE PHILIPPINES</i>	119
APPENDIX C: <i>KEY INFORMANT AND SOCIAL SURVEY QUESTIONNAIRES</i>	120
Appendix C.1: <i>Marine Protected Area (MPA) and Coastal Management Activities (Key Informant Questionnaire)</i>	120
Appendix C.2: <i>Social Survey Questionnaire</i>	121

APPENDIX D: COASTAL MAPS OF NORTH-EASTERN ILOILO
MUNICIPALITIES 127
Appendix D.1: Municipality of Carles, Iloilo, Philippines..... 127
Appendix D.2: Municipalities of Concepcion and San Dionisio,
..... 128
Iloilo, Philippines 128
Appendix D.3: Municipalities of Batad, Balasan and Estancia,
..... 129
Iloilo, Philippines 129
Appendix D.4: Municipality of Ajuy, Iloilo, Philippines 130

BIBLIOGRAPHY 131

LIST of TABLES

<i>Table 1: Percentage Distribution of Gross Domestic Product (GDP) of the Philippines.....</i>	<i>12</i>
<i>Table 2: Study Area: Demographic Profile (NI Municipalities, Philippines)</i>	<i>30</i>
<i>Table 3: Phases and activities for MPA establishment and management within local government jurisdiction.....</i>	<i>31</i>
<i>Table 4: Conflict in different Management Regimes in North-Eastern Iloilo, Philippines</i>	<i>62</i>
<i>Table 5: Summary and description of variables for LOGIT regression</i>	<i>63</i>
<i>Table 6: Correlation Matrix of Selected Variables</i>	<i>75</i>
<i>Table 7: Behaviour of Fishermen in NI, Philippines</i>	<i>78</i>
<i>Table 8: Descriptive statistics of selected variables (n=213).....</i>	<i>79</i>
<i>Table 9: Eigenvalues of Correlation Matrix</i>	<i>81</i>
<i>Table 10: Correlation (Structure) for Principal Components</i>	<i>82</i>
<i>Table 11: Principal Component Analysis (PCA) Summary Statistics</i>	<i>83</i>
<i>Table 12: Goodness of Fit Tests - General Logit for Conflict Variables</i>	<i>90</i>
<i>Table 13: Benefits for Fishermen and Public Sectors in NI, Philippines (PhP, per year)</i>	<i>94</i>
<i>Table 14: Logit model to determine factors associated with MPA SUCCESS1.....</i>	<i>96</i>
<i>Table 15: Logit model to determine factors associated to MPA SUCCESS2.....</i>	<i>97</i>
<i>Table 16: Multivariate tests of significance and approximates F-tests</i>	<i>98</i>
<i>Table 17: Eigenvalues and canonical correlations</i>	<i>99</i>
<i>Table 18: Canonical Likelihood Ratio and F Values.....</i>	<i>99</i>
<i>Table 19: Total-Sample Standardised Canonical Coefficients</i>	<i>100</i>
<i>Table 20: Frequencies of benefits and disbenefits of MPA when complying or not complying</i>	<i>105</i>

LIST of FIGURES

Figure 1: Map of North-Eastern Iloilo, Philippines	7
Figure 2: Per capita income from 1960-2005 (US\$, constant)	11
Figure 3: Philippine Gross Domestic Product (GDP), 2003-2008 in Million PhP	15
Figure 4: Philippine Fish Production from 1996-2005, by Fishing Operations	16
Figure 5: Consumptive and Non-consumptive Values of Marine Resource	34
Figure 6: Relationships between marine protected areas, coral reef health and human well-being, Adapted from Gjertsen	52
Figure 7: Score Plots for Principal Component 1 (PC1) and Principal Component 2 (PC2)	86
Figure 8: Score Plots for Principal Component 1 (PC1) and Principal Component 3 (PC3)	87

LIST of NOTATIONS

BFAR – Bureau of Fisheries and Aquatic Resources
CDA – Canonical Discriminant Analysis
CCA – Canonical Correlation Analysis
CRMP – Coastal Resource Management Programme
DENR – Department of Environment and Natural Resources
DILG – Department of Interior and Local Government
FARMC – Fisheries and Aquatic Resources Management Council
FGD – Focus Group Discussion
GDP/GNP – Gross Domestic Product/Gross National Product
ICM – Integrated Coastal Management
IUCN – International Union for the Conservation of Nature
JICA – Japan International Cooperation Agency
KI Interview – Key Informant Interview
LCG 1991 – Local Government Code 1991
LGU – Local Government Unit
LOGIT function – logistic function
MAO – Municipal Agriculture Officer
MPA – Marine Protected Area
NEDA – National Economic and Development Authority
NSCB – National Statistics Coordination Board
NGO – Non-government Organisation
NI – North-Eastern Iloilo
NIACDEV - Northern Iloilo Alliance for Coastal Development
NIPAS Act 1992 – National Integrated Protected Areas Act 1992
NSO – National Statistics Office

NZD – New Zealand Dollar

PCA – Principal Component Analysis

PCG – Philippine Coast Guard

PHP – Philippine Peso

PNP – Philippine National Police

PO – People’s Organisation

PAMB – Protected Area Management Board