

Public Perception of establishing Marine Protected Areas in Guimaras Province, Philippines using Contingent Valuation Method

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Abstract : Philippine fisheries code of 1998 (Republic Act 8550), which is enacted to achieve food security by managing, conserving and protecting fishery resources, obliges local governments to designate no less than 15% of jurisdictional municipal water as fisheries resource protection zone. Accordingly, Marine Protected Areas (MPAs) are the most extensively established as fisheries management and conservation tool and over 1,500 MPAs are reported in the Philippines. But there has been debate on the pros and cons of implementing MPAs because of the positive and negative impacts on local communities and fishermen. A dichotomous-choice contingent-valuation survey was conducted in the two municipalities of Guimaras, Philippines to investigate public opinion in debates over MPAs and to estimate willingness to pay (WTP) for MPAs to protect and conserve marine habitats for fishery resources. For the benefits and costs of MPAs, 43.6% of respondents thought the costs would be larger than the benefit, but 91% respondents voted in favor of increasing MPAs for fisheries resources as a protective measure. Finally, the estimated Turnbull lower-bound mean WTP (36.75ha) was php 493.6(US\$ 11.3) per household to establish the additional MPA (36.75ha) in their municipality waters.

Key words : Marine Protected Areas, Philippines, Contingent Valuation, Willingness-to-pay

Background

- Marine Protected Areas(MPA)
 - *International Union for Conservation of Nature(IUCN): A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values*
- General MPAs Value
 - Protecting commercial & recreational fisheries
 - Preserving Genetic and Biodiversity
 - Conserving ecosystems and maintaining ecological process
 - Nursery and Spawning places for fisheries
 - Replenishing Depleted Stocks
 - Education and research
 - Recreation and Tourism - scuba diving, etc.
- MPAs Management in Philippines
 - Fisheries Code in 1998 (Republic Act(RA) 8550): 15% of coastal municipal waters (within 15 km of the coastline) to be protected within no-take MPAs.
 - Philippines Marine Sanctuary Strategy: protect 10% of coral reef area in no-take MPAs by 2020.
 - MPA sites have been legally established since the 1970s in Philippines
 - Established MPAs, Ph: over 400 sites (2001), 525 sites (2007), and more than 1,000 sites (2012)


Background

- Objectives of MPAs in Philippines (Garces, 2013)
 - To Protect Critical habitat and biodiversity
 - To sustain or enhance fisheries by spawning stock collapse and providing recruitment of fished areas
- Challenges of MPAs Management, Ph
 - Most of these MPAs in Ph are weakly-functioning paper parks (Weeks, et al., 2010)
 - Thus, the majority of MPAs do not meet their management objectives (Garces, et al., 2013)
 - Only 9 % of MPAs achieve their Management Objectives (Hind, Hipolita and Gray, 2010).

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Motivation

- Guimaras Province
 - 3 Municipalities
 - Located at the center of coral triangle (the highest marine biodiversity in the world)
 - Well developed marine habitats – Seagrass and Mangroves
- But, Habitat degradation and Overfishing Problem
 - Seagrass areas in Guimaras (dark shading) = 981.19 ha (2013)
 - The mangroves of Guimaras cover ca. 620.32 ha (PGGP & PEMSEA 2012) or 577.06 ha (Long & Giri 2011).
 - In 1956 = 1,743.1 ha; in 1995 = only 395.6 ha. In 2012: mangroves & reforestation area = 1,096.11 ha (Fortes, 2013)



Municipalities	San Lorenzo			Sibunag		
Year	1999	2009	2012	1999	2009	2012
No. of fishermen	589	679	593	623	410	1,521
No. of registered fishermen	545					
Non-motorized fishing boats	58	112	85	47	190	55
Motorized fishing boats	170	239	239	239	80	154
Total Fishing Boats	228	351	324	308	270	209
Registered Fishing Boats	257					
Production	40	2189		101		58879

Survey Method

- Face-to-Face Survey
- 40-question survey interviewed 600 San Lorenzo and Sibunag Municipalities' residents
 - San Lorenzo Interview Survey: Sept. 4th ~ Sept 11th, 2013
 - Sibunag Interview Survey: Sept. 12th ~ Sept 18th, 2013
- Respondents were asked questions on;
 - general awareness of marine fishery resource depleting problem in municipal waters
 - Perception of Marine Protected Areas (or Fishery Sanctuary)
 - Benefits and Costs of MPAs
 - Size, Activities and Use level of MPAs
 - Willingness-to-pay(WTP) for establishing MPAs in Guimaras to conserve more marine habitats for fishery resources
 - as well as individual demographic information

Motivation

- There are two existing Marine Protected Areas (Fishery Sanctuaries) in San Lorenzo and Sibunag.
- But there is no management Plans for them.
- Therefore, there are the designated MPAs, but are not well-managed.
- It is important to understand public perception that dictates people's supports on protecting MPAs for fish resources.

Survey Results: Sample Demographic

Variable	Obs	Mean	Min	Max
Age	599	43.7	15	83
# of household	600	4.8	0	14
# of income earner	599	1.9	0	9

Edu. And Income	Percent
Education (MS grad +)	39.2%
(HS grad +)	60.3%
(Bachelor's degree +)	20.0%
Annual Income (<PHP59,999)	53.2%
(PHP 60,000 – PHP119,999)	30.2%
(PHP120,000 – PHP179,999)	7.3%
(PHP180,000 – PHP239,999)	2.7%
(PHP240,000 – PHP359,999)	1.0%
(PHP360,000 – PHP479,999)	0.2%

Occupation	Freq.	Percent
Government employee	44	7.3%
Professional (e.g., doctor, lawyer etc.)	1	0.2%
Technical (e.g., engineers, computer/IT, etc.)	1	0.2%
Self-employed (e.g., business, etc.)	39	6.5%
Farmer	109	18.2%
Fisherfolk	598	45.0%
Laborer	15	2.5%
Transportation worker	15	2.5%
Others	11	1.8%
Total	600	100.0%

Research Objective

- Conducted a referendum-style contingent valuation survey to analyze;
 - the public perceptions of marine fishery resource depletion
 - whether Guimaras residents believe marine protected areas can preserve marine fishery resources
 - how likely and to what extent do they believe it
 - whether Guimaras residents are willing to support financially additional MPAs establishment to protect the depleting marine fishery resources

Survey Results: Fishery resource depletion Perception

Issues of Perception	Obs.	% of Perception
Importance of Fishery Resources for Community's Economy		
<i>Extremely important</i>	576	96.0%
<i>Somewhat important</i>	14	2.3%
<i>Moderately important</i>	8	1.3%
<i>Slightly important</i>	1	0.2%
<i>Not at all important</i>	1	0.2%
Awareness of Fishery Resource depletion problem		
<i>Yes</i>	586	97.7%
<i>No</i>	14	2.3%
Major Factors contributing to Fishery Resource Depletion		
<i>Encroachment of commercial fishing boats in municipal waters</i>	107	17.8%
<i>Dumping of waste in municipal waters (causing water pollution)</i>	30	5.0%
<i>Illegal dwellings near the shoreline</i>	7	1.2%
<i>Illegal fishing methods (e.g. Compressor fishing, hukhud, sahid, fine-meshed fishing nets, dynamite fishing etc.)</i>	267	44.5%
<i>Marine habitat degradation from illegal activities (e.g. illegal cutting of mangroves, sea grasses, and coral reefs; marine gravel and sand mining)</i>	44	7.3%
<i>Overfishing (too many fisher folks)</i>	135	22.5%
<i>Other</i>	10	1.7%

Survey Results: Public perceptions on Marine Protected Areas

Issues of Perception	Obs.	% of Perception
Awareness of MPAs		
Yes	410	68.3%
No	190	31.7%
Existence of MPAs in Guimaras		
Yes	351	58.5%
No	249	41.5%
Need of MPAs to protect marine habitats for fishery resources		
Strongly Agree	394	65.7%
Agree	191	31.5%
Neither Agree nor Disagree	9	1.5%
Disagree	3	0.5%
I am not sure	3	0.5%
I'd like to know that the part of our municipal waters is protected even though I never use it		
Strongly Agree	272	45.3%
Agree	301	50.2%
Neither Agree nor Disagree	13	2.2%
Disagree	9	1.5%
I am not sure	5	0.8%
MPAs will not be managed because the rules won't be strictly enforced		
Strongly Agree	292	48.7%
Agree	269	44.5%
Neither Agree nor Disagree	16	2.7%
Disagree	19	3.2%
I am not sure	4	0.7%

Survey Results: Public perceptions on MPA Establishment

Issues of Perception	Obs.	% of Perception
I am willing to accept the restricted use of ocean to protect marine habitats for fishery resources		
Strongly Agree	353	58.8%
Agree	223	37.2%
Neither Agree nor Disagree	7	1.2%
Disagree	9	1.5%
Strongly Disagree	0	0.0%
I am not sure	8	1.3%
The costs of MPAs most likely outweigh the potential benefits		
Strongly Agree	81	13.5%
Agree	192	32.0%
Neither Agree nor Disagree	49	8.2%
Disagree	221	36.8%
Strongly Disagree	41	6.8%
I am not sure	16	2.7%
MPAs should be increased to protect more marine habitats for fishery resources		
Strongly Agree	331	55.2%
Agree	217	36.2%
Neither Agree nor Disagree	20	3.3%
Disagree	24	4.0%
Strongly Disagree	1	0.2%
I am not sure	7	1.2%

WTP for Establishment of new MPAs : The CV Scenario

- Prior to the referendum question, the survey instrument provided current MPA and new proposed MAP in each municipality water.
- Subsequently, a willingness-to-pay (WTP) question asked respondents to vote on a proposed new MPA establishment project to conserve more marine habitats for fishery resources depicted in the map:
- The proposed additional MPA (or Fish Sanctuary) has 30 hectares core zone with no-take zone and 6.75 hectares small buffer zone, which extends 25 meters outside from the core zone in all directions.

WTP Question: A tax

Good management of the marine habitats and resources will ensure that the local communities can continue to enjoy benefits from MPA. But there are continuous economic and financial costs of MPA to construct, monitor, maintain, and enforce the MPA.

To support the economic and financial costs, each municipality of San Lorenzo and Sibunag will establish Fishery Resources Trust Fund for MPAs, which could only be used to improve and protect marine habitats for fishery resources by the law.

WTP Question: As direct and/or indirect users and beneficiaries of the goods and services being provided by the MPAs, would you be willing to pay a one-time additional tax of PHP 93.00 on your income tax return in 2014 to the Fishery Resources Trust Fund for additional MPA?

- 1 - Yes
2 - No

WTP Estimation with Lower Bound Turnbull Non-parametric Estimator

A.WTP estimation for one ha of MPA

Mean	95% CI	
PHP 493.6	PHP 463.83	PHP 523.40
US\$11.3	US\$10.6	US\$12.0

B.Aggregate WTP estimation for MPA

2010 data	No. of Households	WTP/ha (php)	WTP/ha(\$)	Avg. MPA area(ha)	WTP for total one MPAs
San Lorenzo & Sibunag	9,544	128,192	\$ 2,928.1	357.5	\$1,046,791

Summary of Results

- Widespread awareness and concern about Fishery Resources Depletion Problem.
 - The primary factor perceived to affect Fishery Resources was *illegal fishing methods*.
 - To recover Fishery Resources, *more enforcement and patrolling of the municipal waters were requested*.
- Not Strong awareness of existing MPAs in Municipal Waters and Public concerned with potential costs of MPAs perceived a slightly greater likelihood of the potential benefits.
- But relatively strong perception of needs of more MPAs for conserve marine habitats for fishery resources.
- More preference on Small or Large core zone + Large buffer zone MPAs with no-take and very restricted activities in core zone.
- Finally, we found that 64% of respondents supported establishment of new MPAs regardless of their perceived likelihood of costs of MPAs.
- These results suggest that **there appears to be strong public support for more MPAs establishment.**