Perceptions driving local support for marine conservation

A comparison of three case studies in the Philippines

Local fisher preparing to fish directly on the edge of a Marine Protected Area, Philippines (the MPA is delineated by the imaginary line through the two buoys visible on the left)

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Acronyms and glossary

BFAR	Bureau of Fisheries and Aquatic Resources (Department of Agriculture)
CCC	Coral Cay Conservation
DENR	Department of the Environment and Natural Resources
FGD	Focus Group Discussion
GBP	Pound sterling
HDI	Human Development Index
IUCN	International Union for the Conservation of Nature
KII	Key Informant Interview
LGU	Local Government Unit
MPA	Marine Protected Area
PHP	Philippine peso (exchange rate: 100PHP=GBP1.40392 (5/8/2010, xe.com)
PO	People's Organisation

bantay dagat	sea patrol: civilian voluntary fisheries patrol force
Barangay	smallest LGU
fish sanctuary	local terminology for no-take MPA

Abstract

Widely employed to combat coral reef and fish stock declines, Marine Protected Areas (MPAs) are mostly considered ineffective and are likely inadequate when pressures persist outside them. Building community support has become central to creating scope for marine conservation and increasing effectiveness. Although conflicts and controversy are to be expected by surrounding MPA implementation, much less is known about community perspectives of MPA impacts than about the biological dimension.

We compare three case studies, two with existing MPAs and one currently implementing an MPA, in which we identify the main perceptions held by local people and their interactions. We analyse how these perceptions determine levels of support for existing MPAs and for additional conservation interventions.

The two main factors determining levels of support for existing MPAs were perceived fish catch increase or decline, and income from tourism access fees. Both factors were able to sustain support for an MPA when the other was compromised. Catch increase sustained support for one MPA despite outrage about widely perceived corruption of income streams. Income, even when believed to be corrupted, sustained support where perceptions of catch impacts were not favourable.

Support for existing MPAs did not translate directly to support for additional conservation interventions. At the study site with the most favourable perceptions of the MPA's effects, low perceived influence on management of the MPA and of the village both acted as a barrier to support for further interventions. Despite this effect, low levels of involvement did not appear to affect levels of support for existing MPAs.

This study supports the notion that local involvement can be important to ensuring support for conservation, but suggests that a distinction in allocation of effort may be made. To consolidate support for an MPA, ensuring that increased catch and / or income are perceived as benefits can be sufficient even when involvement is lacking. But in cases where additional conservation interventions are considered necessary, additional investment in involvement may be required.

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1 Introduction

Coral reefs worldwide are increasingly under threat from human pressures, jeopardising safety as well as resource and livelihood security of human populations dependent on coral reefs and fishing (Worm et al., 2006, Wilkinson, 2008). Fish stocks globally have a long history of overexploitation (Jackson et al., 2001), at industrial as well as local or artisanal scales (Worm et al., 2009). Exacerbating impacts caused by the amount of fish extracted is the application – potentially associated with poverty in a "poverty trap" (Cinner, 2009) – of fishing methods that can damage coral reef ecosystems (Mcmanus, 1997). In the Philippines in the centre of marine biodiversity (Carpenter & Springer, 2005) in a context of coastal ecosystem deterioration (Courtney et al., 1999) and a rapidly growing population (NSO, 2008), catch per unit effort has declined substantially (BFAR , 1997, White et al., 2002, BFAR , 2009).

MPAs, in the context of this study taken to mean zones where fishing is prohibited ("no-take zones"), have been proposed as an instrument to protect coral reefs and reverse fish stock declines by controlling resource use (Gell & Roberts, 2003). Increasingly implemented (Spalding et al., 2008), there is increasing evidence for their potential to be effective inside (Lester et al., 2009) and outside their borders (Halpern et al., 2010). This appears to be particularly so at local scales (Halpern et al., 2010), the focus of this study.

However, in practice MPAs are still predominantly ineffective (Mora et al., 2006). In the Philippines too, many MPAs were established using small-scale community-based approaches leading some to positive assessments (Alcala & Russ, 2006), while others note that they are insufficient for biodiversity conservation (Weeks et al., 2009) and that only 20% are reaching their formulated goals (Lowry et al., 2009). There is also increasingly a view that even if they were effective, small MPAs within degraded surroundings are not large enough or sufficient to preserve ecosystem processes (Bellwood et al., 2004, Graham et al., 2008), particularly in the face of continued pressures outside them (Christie et al., 2002).

To address the issues, MPA networks are being formed (e.g. Lowry et al., 2009). As well, additional measures are implemented (i.e. other than fully no-take zones) because of

their potential to produce complementary conservation benefits (Allison et al., 1998, McClanahan et al., 2008) and because increasing no-take MPA area coverage may become unfeasible considering the impact that closing a large proportion of the sea to fisheries could have on local populations dependent on fishing for their livelihoods (Cinner et al., 2009).

A consensus has emerged that installing and maintaining a local-scale MPA requires local support to be successful (White et al., 2002, Francis et al., 2002, Christie et al., 2003, Mascia et al., 2003, Thomas & Middleton, 2003, White & Green, 2003, Ferse et al., 2010 and references therein). Subsequent efforts to up-scale conservation to include greater MPA area coverage or additional measures would require continued or potentially increased support. “Conflict and controversy” are to be expected in MPA implementation and need to be taken into account (Christie et al., 2009), but the social dimension of conservation is often less well-known than the biological (Mascia et al., 2003).

For local communities to support conservation interventions, local people must perceive the benefits of doing so to outweigh the costs. In the case of no-take MPAs, lost fishing ground represents an opportunity cost and various incentives are invoked to balance it. Directly addressing the perception of loss, explicit incorporation of increased catch as an objective could align fishers’ interests with the MPA, enhancing compliance and effectiveness (McClanahan et al., 2006). Indirect incentives include alternative livelihood opportunities (UP-MSI et al., 2002, IUCN-WCPA, 2008), and tourism income (IUCN, 2003, White et al., 2006). Furthermore, secondary factors such as an intrinsic conservation ethic (Bohnsack, 2003) or levels of ownership and involvement (Bunce et al., 2000) have been suggested to be able to influence attitudes and may be addressed by conservation managers.

1.1 Aims and objectives

This study responds to calls (e.g. Christie et al., 2003, Ferse et al., 2010) for a better understanding of impacts and design shortcomings of MPAs from a community perspective. Specifically, this study aims to improve understanding of the way in which local perceptions can interact to drive or reduce levels of support for existing MPAs and for additional conservation interventions. Recommendations will be derived in terms of critical factors to be addressed in MPA implementation in order to maximise community support.

1.1.1 Setting

The study is set in the context of communities developing or already having a local MPA, where additional conservation interventions are likely desirable. Three communities in the Philippines were selected as case study sites; two where an MPA has been in place for approximately 15 years, plus one where an MPA is currently being installed. The case study approach trades off generalisability for depth of investigation. The two communities with an existing MPA were selected to study commonalities and differences in perceptions between them, and the community currently installing an MPA was included to investigate ways in which perceptions and expectations can develop over time. Although many MPAs in the area are closed to diving, dive tourism in the area is increasing and case study sites that receive income from dive tourism were selected so that effects of this increasingly used MPA model can be analysed.

1.1.2 Objectives

1. Identify local perceptions influencing levels of support for:
    a) current local-scale MPAs, and
    b) additional conservation measures
2. Quantify the distribution of and associations between perceptions and explanatory variables
3. Qualitatively investigate cause-and-effect relationships
4. Derive recommendations for consolidating support for existing MPAs and building support for additional measures, in the case study sites and in general

1.1.3 Hypotheses

Exploration and hypothesis-testing approaches were combined. Hypotheses to be tested, developed in the initial (qualitative) phase of the study, were:

1. Levels of support for the MPA and for additional conservation interventions are associated
2. Levels of support for current and additional conservation interventions are predicted by (sign in brackets):
    a) education level (+)
    b) perceived fish stock trends (-)
    c) perceived MPA effectiveness (+)
    d) ownership of and involvement with the MPA (+):
        i) seminar attendance
        ii) personal underwater experience
        iii) influence on MPA or community management
3. Members of households that fish prefer gear restriction over a no-take zone

1.2 Thesis structure

The background section describes the case study sites. The methods section is structured around the three modes of information collection: scoping and exploration, a questionnaire, and triangulation. The results are presented thematically, starting with respondent backgrounds and subsequently establishing context in terms of local ecological understanding and perceptions of conservation issues. Thirdly, views on MPAs including involvement, levels of support, effectiveness, costs and benefits and their distribution, and any desired changes. Fourth, determinants of support for additional conservation interventions are explored. Finally results for each case study site are briefly summarised to provide a clearer picture of the relationships between findings. The discussion section considers limitations and potential sources of bias, and discusses the main factors found to influence levels of support as well as their interactions. This is followed by recommendations for local-scale marine conservation in general, for each of the study sites, and for further research.

2 Background

This chapter describes the background of the three case study sites, which were *Barangays*, the smallest unit of government in the Philippines. Table 2.1 summarises the characteristics of the case study sites and their MPAs. Each case study site had or was currently establishing one MPA.

Table 2.1 Characteristics of the case study Barangays and their MPAs

Barangay	Popu-lation *	split village ?	village layout	access to main road	munici-pality	MPA establish-ment	MPA size / buffer zone size	position of MPA	MPA type
Napantao	598	no	spread out	long dirt track	San Fransisco	approx. 1995	5 ha / 50m	downhill from town proper, not visible	no-take
Son-ok II	439	Son-ok I	compact	directly adjacent	Pintuyan	approx. 1995	5 ha / 0.9 ha	directly in front of town proper	no-take
Sta Paz Sur	406	Sta Paz Norte	compact	short con-crete road	San Fransisco	currently	6.4 / 100m	one edge visible from town proper, stretching out of sight	no-take

*source: (NSO, 2008)

2.1 Geography and topography

Three case study sites were selected on Panaon island, Southern Leyte province (figure 2.1) in the Eastern Visayas region of the Philippines: Napantao, Son-ok II, and Sta Paz Sur (in full: *Santa* Paz Sur). The primary connection to the main island is via a concrete road which runs the full extent of the south-western shore across Panaon island. Ferries run regular services to Mindanao to the south from several ports. Accessibility and village layout are summarised in table 2.1. The villages of Son-ok and Sta Paz both consist of two Barangays of which only one was studied: Son-ok II (counterpart Son-ok I) and Sta Paz Sur (counterpart Sta Paz Norte). Directly inland from and adjacent to Napantao, Caritas village was recently constructed and settled to shelter those displaced by 2003 landslides. Terrain is mountainous with often steep drops into the sea, and level stretches settled or used in agriculture. Slopes continue into Sogod Bay which is thought

to be approximately 1400 m deep with a minimal coastal shelf (van Bochove & Raines, 2009).

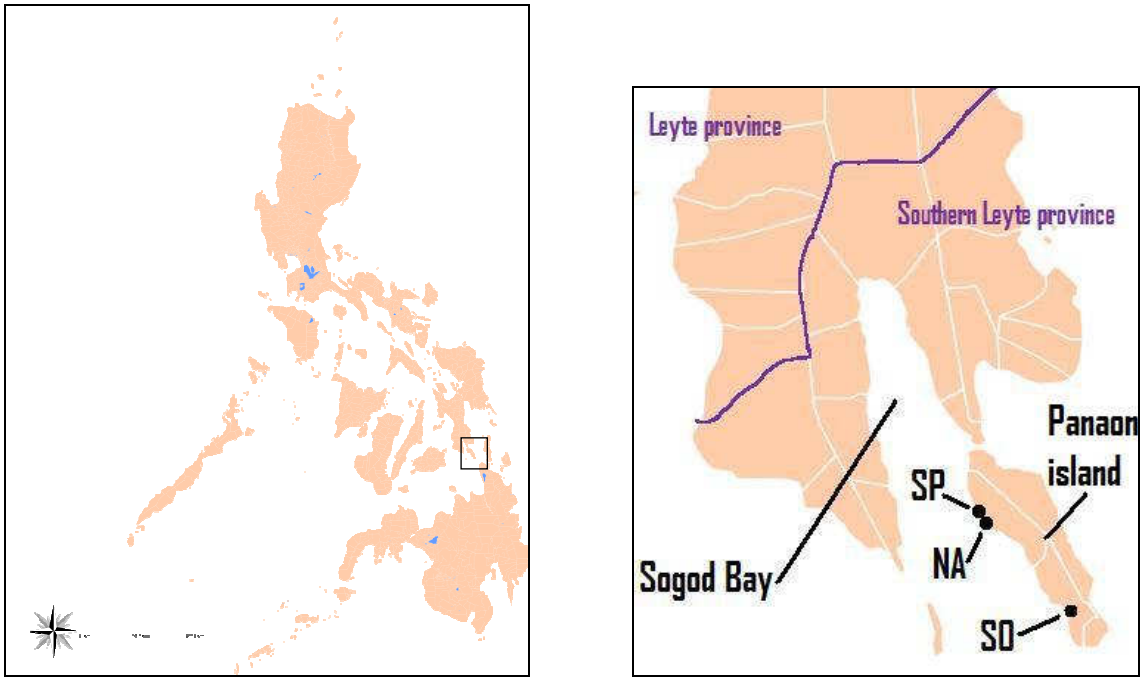

Figure 2.1 Map of the Philippines (left), with the study area enlarged on the right; Southern Leyte province is shown entirely, with part of Leyte province visible in the north. Case study site locations: SP: Sta Paz Sur; NA: Napantao; SO: Son-ok II, on Sogod Bay. Land mass in pink, with white lines denoting municipality boundaries. Sta Paz Sur and Napantao are in San Fransisco municipality, and Son-ok II is in Pintuyan. (modified from Felipe Aira)

2.2 Ecology

Coral reefs in Southern Leyte are among the least disturbed in the country despite a history of dynamite and other destructive fishing, and the area is frequented by whale sharks, dolphins and other megafauna (van Bochove & Raines, 2009). The area is quickly gaining popularity among dive tourists, with the main base Padre Burgos on the West side of the bay directly across from Napantao.

2.3 Demography

Population size of the case study sites is summarised in table 2.1. The annual growth rate in Southern Leyte is lower than national average (2.04%), having decreased from 2.73% (1995-2000) to 1.13% (2000-2007). Table 2.2 shows the main Human Development Index (HDI) indicators for the municipalities.

Table 2.2 Main Human Development Index (HDI) indicators for the municipalities where the study sites were located and the Southern Leyte average. Source: Provincial Government of Southern Leyte in (Heuër et al., 2008)**.**

Municipality (CASE STUDY SITE)	Malnourished children 7-10 yrs (%)	Infant mortality rate (per 1000 live births)	Elementary school enrolment (%)	Elementary school completion (%)	Illiteracy (%)	Households with access to potable water (%)	Households with access to sanitary toilet (%)
Pintuyan (SON-OK II)	***15.7***	***5.2***	95.5	78.3	9.5	***89.8***	90
San Fransisco (NAPANTAO, STA PAZ SUR)	18.6	0*	97.4	81.6	16	99.8	***89.2***
Southern Leyte Province average	15.1	7.8	91.8	78.1	9.1	89.6	87.5

*=not known whether this is actual figure or lack of data **bold italics**=situation has deteriorated since 2004 census

2.4 Socioeconomic characteristics and marine resource use

The only income data obtained were from Heuër et al (2008) and only for Napantao, showing an average monthly income per household of 5193PHP (approx. GBP73).

Local fishers frequently use small paddle or motorised (around 6HP) outrigger boats that carry one or several people (figure 2.2).

Figure 2.2 Typical outrigger fishing vessel on the water (above), and parked on land looking out over part of the Napantao MPA (right; picture courtesy Isabel Nicholson)

Fishing is mostly for subsistence, with surplus traded opportunistically. Many fishers also or primarily work in rice or copra (dried coconut meat, figure 2.3) farming, either as landowner or as hired labour.

Figure 2.3 Woman preparing copra at a smoking pit (left) on the beach in Napantao. On the right are empty coconut husks. (picture courtesy Isabel Nicholson)

2.5 Marine conservation and tourism

MPAs in the Philippines have mostly involved no-take zones (Alcala & Russ, 2006), often with buffer zones in which only non-destructive fishing methods are allowed (White et al., 2006, Balgos, 2005). This is also the case at the study sites.

Characteristics of the MPAs and tourism arrangements are summarised in table 2.3. Management arrangements of the Son-ok MPA have a complex history due to rival claims of Son-ok I and Son-ok II to management authority and MPA proceeds and disagreement over cost distribution. The municipality of Pintuyan subsequently assumed control over the MPA. Currently an ordinance aiming to devolve authority back to the community level, implicitly in the form of the People's Fisheries Organisation KASAKA, is awaiting Provincial Government approval. The Sta Paz Sur MPA is currently in the final stages of preparation, with the ordinance awaiting approval from the Provincial Government.

Two distinct income streams are associated with the MPA: directly from access fees, and indirectly from secondary tourist spending. This second stream produces only marginal income in the case study sites with tourists mostly staying elsewhere or visiting on liveaboard ships, but appears relatively to be captured best in Son-ok II. Its municipality is also developing an eco-tourism resort. Revenues in Napantao totalled 80,000PHP (GBP1,120) over 2009, with a multiple increase expected for 2010 (Tourism Office, San Fransisco municipality). The fee in Son-ok II has risen in response to the arrival of whale sharks in recent years and associated development of whale shark watching and covers all marine recreation activities. Proceeds over 2009 totalled 134,000PHP (GBP1881). Whale shark watching does not occur in the other two sites due to the absence of whale sharks there.

Table 2.3 Recreation arrangements of the case study MPAs

Barangay	Recre-ation allowed ?	tourist access fees: diving / snorkelling (PHP(GBP))	local resident access fees	sharing of proceeds
Napantao	yes	100(1.40) / 50(0.70)	free	20% bantay dagat honorariums + 40% each to Barangay and to municipality (in both cases split evenly between MPA maintenance and community development)
Son-ok II	in specific zone	250(3.51) per day all-in-one, incl. whale shark interaction	same as tourist fees	10% as honorarium for the People's Fisheries Organisation staff, with the remaining 90% divided into 60% for the LGU and the remaining 40% further divided into 70% to the People's Fisheries Organisation, 20% MPA management council, and 5% each to Son-ok I and II
Sta Paz Sur	yes	100(1.40) / 50(0.70)	free	20% bantay dagat honorariums + 40% each to Barangay and to municipality (in both cases split evenly between MPA maintenance and community development)

2.5.1 Coral Cay Conservation

Coral Cay Conservation (CCC), a UK-based conservation charity running several volunteer projects worldwide, hosted the field stay for this project at their base located in Napantao. CCC was not involved in the establishment of both existing MPAs. The Philippines project in cooperation with the Provincial Government of Southern Leyte centres on Sogod Bay involves three strategies: conservation education, capacity building, and resource appraisal.

2.6 MPA governance and enforcement

An important factor stimulating the creation of MPAs in the Philippines in the past two decades has been the move to devolve authority from national to local governments (White et al., 2002). Governing bodies concerned with MPA establishment and management are: the local Government Unit (LGU), Department of Environment and Natural Resources (DENR) and the Bureau of Fisheries and Aquatic Resources (BFAR) (White et al., 2006). In practice in the study area, the Provincial Government approves relevant ordinances, which are created and implemented by the municipality and the Barangay in concert. In addition, civil society is organised to a relatively high degree in the form of special interest People's Organisations (POs). Relevant to this study is the People's Fisherfolks' Organisation that exists in many communities. Enforcement is carried out by a civil guard: "*bantay dagat*". They often receive an honorarium, but are not allowed to carry firearms.

3 Methods

3.1 Data collection

A three-tiered approach was followed, starting with broad and open-ended group and individual discussions to scope the study and generate a preliminary understanding of the issue. Secondly, a questionnaire survey was implemented based on qualitative findings to investigate the distribution of perceptions and links between them. Thirdly, findings were triangulated with individuals and groups on a semi-continuous basis, as they emerged. As well, documented sources of information such as MPA ordinances were consulted.

Guidelines given by Bernard (, 2006) and field manuals (Bunce et al., 2000, Kapila & Lyon, 2006) were followed where appropriate in terms of design and analysis of questionnaires, preparation, conduction and analysis of qualitative techniques such as Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs), and in the integration of qualitative and quantitative investigation. Limitations and potential sources of bias are discussed in paragraph 5.1.

Interpretation was mainly done by Coral Cay's liaison officer and an interpreter from the Pintuyan municipal office, but many others have contributed. They and all respondents received no payment for their assistance.

Data collection activities performed under tiers 1 and 2 are shown in table 3.1, while triangulation (tier 3) was opportunistic and continuous. During all activities, people were encouraged to give additional information.

Table 3.1. Overview of successful planned data collection activities. Informal triangulation is excluded because of its opportunistic and semi-continuous character.

	Participants	Barangay		
		Napantao	Son-ok II	Sta Paz Sur
Courtesy call	Barangay captain	v	v	v
Focus Group Discussions	Fishers < 40	v	combined	combined
	Fishers > 40	v		
	Teenagers	v	v	-
	Water users association*	NA	NA	v
	Women	v	v	v
Key Informant Interviews	Municipal Tourism office	-	v	-
	Municipal Agriculture & Fisheries office	v	v	v
	Bantay Dagat	v	NA	v
	Captain & Barangay officials	v	v	v
	President fisherfolk organisation	v	v	NA
Additional Key Informants		interpreter A; Coral Cay	interpreter A; Barangay Captain	interpreter B; Barangay Captain
Questionnaires (number of participants)		30	29	30
Additional verification		Coral Cay's Philippine counterparts; Coral Cay local and international staff; local contacts such as motorcycle taxi drivers		

* With teenagers unavailable for interview in Sta Paz Sur, members of the Water Users' Association were interviewed instead

1. Scoping and preliminary investigation

The primary instruments in this phase were FGDs and KIIs (Bernard, 2006). First formal contact in each Barangay was a courtesy call with the Captain. FGD and KII participants were recruited by the main interpreters and Barangay Captains to specifications (table 3.1) and to reflect the range of attitudes among the population.

2. Questionnaire survey

A total of 89 questionnaires was performed (table 3.1) with only 2 refusals to cooperate (98% response rate; table 3.2). For each Barangay 60 adults (18 and up) were randomly selected: the first 30 were the original target list and the remainder were an ordered reserve list so that reserve participants had been selected with the same likelihood as the original. Table 3.2 shows reasons encountered for replacing a selected respondent with the next reserve candidate. Population lists were obtained from the public health nurse (Napantao), Barangay administration (Son-ok II) or voters' list from the May 2010 national elections (Sta Paz Sur). The Napantao list was most accurate and up-to-date

(table 3.2), so that a bias toward longer-term residents may have been introduced in Son-ok II and Sta Paz Sur.

Table 3.2. Number of respondents from original random selection not interviewed and reasons. Note: the number of replacements can theoretically exceed the number of questionnaires in a village because people from the reserve list may also be unavailable.

		Napantao	Son-ok II	Sta Paz Sur	total	%
reasons for not interviewing	moved elsewhere / deceased	4	13	16	**33**	**37%**
	refused / afraid	0	0	2	**2**	**2%**
	strategic reasons*	2	0	0	**2**	**2%**
	absent during all visits	0	1	0	**1**	**1%**
	too old / handicapped	0	0	1	**1**	**1%**
replacements	**total**	6	14	19	**39**	
	%	20%	48%	63%	**44%**	

*here, replacements for unavailable people on the selection list meant that an already interviewed household would have to be revisited to interview other members, where the interpreter considered it socially unfeasible to do so

A pilot version was used to test for issues related to translation and the phrasing of questions. Final questionnaires were reproduced in vernacular (locally called "Visayan"), with the interpreter in nearly all cases filling out the forms while conducting the interview orally. The author was present at 78% of interviews, verifying that interviews were conducted as intended and asking follow-up questions.

Questionnaires for Napantao and Son-ok II were identical (English: appendix A; vernacular: appendix B). The Sta Paz version (not included in appendix) was in principle identical, except being rephrased to accommodate for the fact that the MPA was still being implemented and so questions addressed *expected* effects. As well, a question was added regarding seminar attendance (p.19).

Of 21 respondents at least one response was discounted because the respondent indicated or made the impression not to understand the question. In 16 of these cases the issue were the questions about the distribution of costs and benefits (questions 20 and 21). Occasionally a respondent indicated to not be well aware of issues relating to the MPA and to prefer to let other people make decisions about it. But where they were able to give an answer with any level of confidence this was treated equal to other respondents' answers to best represent the distribution of opinions in the community. Only when no answer was forthcoming at all was the particular question left

unanswered. Although a pilot had been performed, questions 13 and 22 were not analysed because it emerged during the survey that alternative interpretations of the phrasing could lead to different answers. For a few other questions interpretation issues in the translated questionnaire were observed in the first few interviews. Interviewers were made aware of these and worked around them.

3. Triangulation

Verification of findings and temporary hypotheses was performed continuously and opportunistically with nearly all of the same individuals and groups, plus with others encountered. Key informants such as interpreters, CCC "counterparts" (Filipino training programme participants), CCC personnel and Barangay captains were important contributors to triangulation efforts.

3.2 Data analysis

Quantitative results were analysed statistically in R using tests as noted for each result in chapter 4; most often used was Pearson's chi-square test. Where applicable, the distribution of the test statistic was estimated from the data using 100,000 simulations. In the case of Likert-scale variables (e.g. agree-neutral-disagree) Kruskal-Wallis rank sum tests were applied in addition to take advantage of the ordinal character of the data. Where results comparing more than two levels of an independent variable (for example: comparing three Barangays) were accepted, chi-square residuals were consulted to determine the main difference (in the same example: Napantao might show a higher value than Son-ok II).

Because of the large number (>100) of statistical tests performed on the limited dataset, results were interpreted with caution. Where confidence was higher because qualitative results confirmed a result, an alpha level of 0.05 was accepted. However, where qualitative results were not clear an alpha level of 0.01 was required.

Qualitative results not confirmed by quantitative tests were only considered valid when fully triangulated, i.e. at least three different sources agreed.

4 Results

This chapter starts with a description of the background of respondents. The main body of results then follows a thematic structure starting with perceptions of ecological trends and problems, then perceptions of the local MPA and its impacts as related to levels of support, and finally considering support for additional or alternative conservation measures.

4.1 Background of questionnaire respondents

In total 89 questionnaire respondents were interviewed (% female in brackets): 30 (53%) in Napantao, 29 (69%) in Son-ok II and 30 (41%) in Sta Paz Sur. There were no significant differences between Barangays apart from a minor variation in age structure (figure 4.1). Three age categories were created for analysis, with the most equal number of respondents in each: 18-40; 41-53; 54+. College-level education was relatively rare (figure 4.2). Wealth was not recorded.

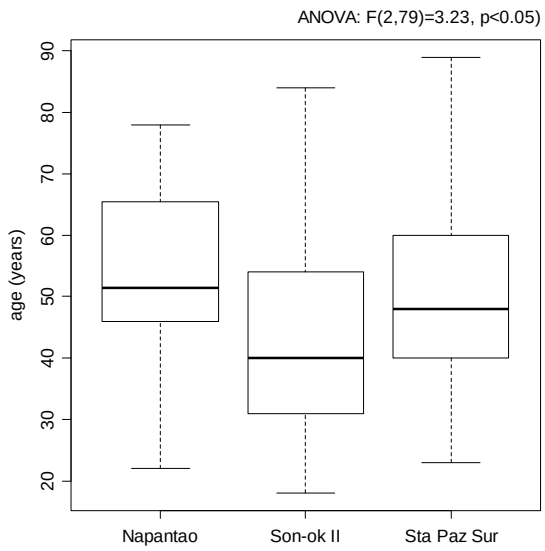

Figure 4.1. Age distribution of questionnaire respondents, measured in years

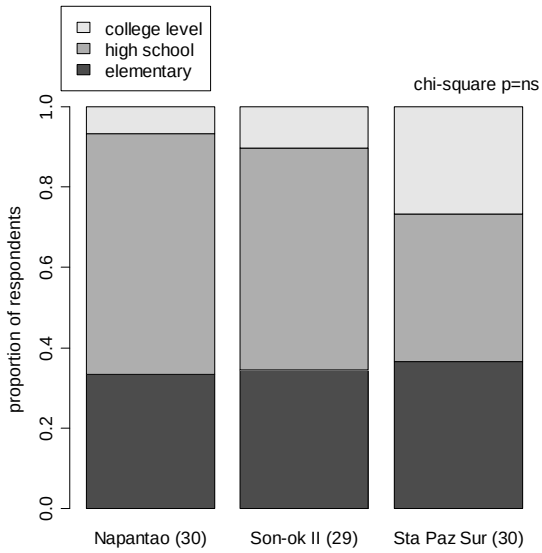

Figure 4.2. Education level of questionnaire respondents. Categories were assigned regardless of graduation or the number of years completed. Numbers in brackets on the x-axis represent the total number of answers selected per Barangay.

Just over half of all households included a person who fished (56%). To enable testing for association of fishing gear type with attitudes to a hook-and-line zone (paragraph 4.3.6),

respondents were categorised as either using hook-and-line as one of their methods (overall 72%) or as using exclusively other gear types.

4.2 Ecological and marine resource trends

4.2.1 Level of ecological understanding

A basic ecological understanding was observed with the majority of people who were asked about the MPA's function in a follow-up question during interview mentioned protection of the reproductive cycle of fish. During FGDs, children expressed the greatest awareness of modern conservation concepts. This observation was confirmed by key informants including 9 school teachers, who ascribed this that environmental are now being an integral part of the curriculum. At the other end of the spectrum were some older fishers in Napantao who believed that the entire seafloor of Sogod Bay is occupied by coral reefs similar to the near-shore reefs, providing the near-shore reefs with a virtually limitless source of fish. Folklore may play a role in some cases. Some in Napantao believe that "refrigerator-sized" grouper and monster octopus residing in the MPA (various foreign divers confirmed that exceptionally large grouper are occasionally spotted) can swallow a person whole and are guarding a treasure of black pearls and Spanish gold. Some do not dare swim in the area for fear of being attacked.

4.2.2 Fisheries trends and problems

In Napantao and Sta Paz Sur, fish stocks were considered to be in decline (figure 4.3; categories "much more" and "more", and "much less" and "less" combined), with some indicating decreased variety and size of fish as well as increased prices. In these Barangays the majority expected the next generation to be worse off.

In contrast, in Son-ok II many more people considered fish stocks to have increased (chi-square residual $p < 0.005$) and another proportion perceived no change ($p < 0.05$). Also, here the next generation was expected to be much better off ($p < 0.05$).

Expectations for the next generation depended on education level (Kruskal-Wallis $p < 0.005$), with college-level showing more negative expectations. Men had more negative expectations than women (categories not combined, Kruskal-Wallis $p < 0.05$), and fishers more negative than non-fishers (categories not combined, chi-square $p < 0.05$). Seminar

attendance showed no significant effect but low response numbers prevent a firm conclusion – seminar attendance was only scored in Sta Paz Sur.

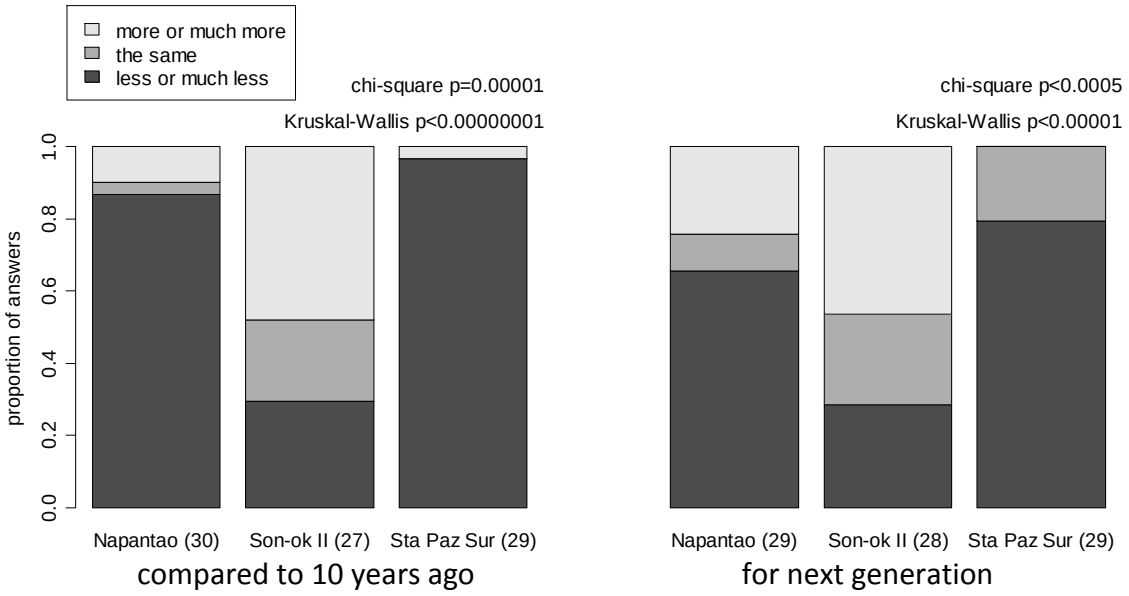

Figure 4.3. Perceived present fish abundance compared to 10 years ago (left), and expected fish availability for the next generation (right). Categories "more" and "much more", and "less" and "much less" were combined. In brackets: number of responses.

Overfishing and overpopulation were the most frequently mentioned factors considered responsible for fish stock declines. Illegal (damaging) fishing methods were also mentioned regularly, but were considered to have declined as a result of national bans. Commercial fishers from other areas were mainly blamed. Methods mentioned included poison fishing, coral-bashing, compressor fishing, double or mosquito netting, dynamite, and muro-ami. Also mentioned regularly were novel technologies such as advanced lighting in squid lures, or cheap rechargeable batteries enabling spear fishing at night. Less frequently mentioned were pollution and "disturbance" in general – including by air bubbles from scuba divers. Key informants noted that fishers have noticed that seasonal patterns of weather and fish abundance have changed. Only apparently knowledgeable key informants mentioned a tendency to think and operate predominantly on short time scales as a driver of decline.

There was disagreement during FGDs whether small-scale legal fishing of the type practiced locally could have any impact on fish stocks or whether variations should be attributed to interannual variability. Some believed that the fact that there were still fish left after a history of intensive dynamite fishing proved stocks' resilience, pointing out

that fish stocks are no longer at risk because some of the most damaging methods have already been banned.

When asked why there had been little conservation effort in the past, lack of awareness of issues and potential solutions was often mentioned. In terms of potential solutions there was a range of views. Improving enforcement of illegal (damaging) fishing methods was often mentioned. Others mentioned Fish Aggregating Devices (FADs), floats underneath which fish gather and can be caught without disturbing the coral reef. These have been tried locally, usually with a group of fishers installing one for their exclusive use, but were discontinued because of recurring monsoon damage. Alternative livelihoods were mentioned as a way of reducing reliance on fish although a proportion regards it as a supplemental opportunity to fishing rather than as a replacement. Seaweed farming has been tried in Sta Paz Sur, but monsoon damage and lack of buyers were considered too problematic.

4.2.3 Necessity of coral reef and fisheries management

Despite the large difference in perceived fish stock trends between Son-ok II and the other Barangays, the scope for conservation was very large in all three Barangays: coral reef management was overwhelmingly considered a necessity at 97% in each Barangay.

4.3 The local MPA

This section thematically presents local perceptions of the MPAs starting with levels of involvement, then considering levels of support, effectiveness and compliance, costs and benefits and their distribution, and any changes favoured. Finally, local views of ways in which perceptions can be changed over time through deliberate efforts are considered.

4.3.1 Involvement

Involvement with the local MPA was explored in terms of the extent to which people were reached in education efforts around the time of installation, relations with those promoting conservation, personal access to and experience of the underwater environment in the MPA, and perceived influence on management.

Involvement during introduction phase

Attendance to information and educational seminars that are regularly held around the time of introduction of a new MPA was only queried in the questionnaire in Sta Paz Sur, where 48% said they had attended. But the other Barangays might be similar, because during discussions many fishers in Napantao said they did not attend, and in Son-ok II part of the population held that there had been no hearing at all. The actual facts could not be established but these statements suggest a limited level of involvement around the time of installation.

Relations

Perceptions of CCC and other organisations promoting or implementing conservation were investigated qualitatively to consider whether they could potentially impact on levels of support. Issues related to the distribution of income from dive tourism and the implicated organisations are discussed in paragraph 4.3.4; leaving CCC to be considered here.

Mixed sentiments were expressed toward CCC, ranging from very positive (e.g. “very glad they are here”) to very negative (e.g. “foreigners are capturing our resources”). CCC’s base and the MPA were physically close together, and set apart from the Napantao Barangay proper. According to some, there exists a similar social gap. Several factors were observed that might contribute. Firstly, a belief was expressed by several people in Napantao that foreign divers were searching for Spanish gold or are illegally removing and exporting coral. Some key informants attributed this to the observation that local people initially, being familiar only with compressed air diving as a method to collect resources, did not understand the concept of diving for pleasure. They would have assumed that resource collection must be involved and this view would persist with a handful of people. Secondly, some local fishers complained that Coral Cay sometimes dived in their prime fishing ground when they were fishing, disturbing the catch. Thirdly, the only “no entry” sign the author observed in any of the local communities was placed at the entrance of CCC’s base in Napantao, directly between the Barangay proper and the MPA. Fourth, the MPA notice board does not state goals, regulations, or local people’s rights (figure 4.4). Key informants said that a previous sign

had borne such information, but it had collapsed some years before and not been replaced. Fifth and finally, a group of fishers wanted CCC to make a symbolic gift to the community (e.g. a health centre), which can arguably be interpreted to be in return for perceived enjoyment of benefits from the MPA instead of CCC being perceived to bring benefits to the community *by means of* the MPA. Indeed, foreigners were seen to benefit from the MPA without bearing costs; this is discussed in paragraph 4.3.4. There is also evidence of a conservation-related divide among the local community, where people opposing the MPA were frequently called “hard-headed” by those in favour.

Figure 4.4 Notice board on main access road to the Napantao MPA (locally called a "fish sanctuary"). The main picture shows CCC’s current base taken from the northern edge of the MPA. On the left the board displays some pictures of survey and recreational activities. On the right are “basic information” and five prohibited activities.

Personal underwater experience of the MPA

Underwater experience of the MPA can be acquired in two ways: through resource collection activities (legally before the MPA’s establishment or illegally after) or by snorkelling recreationally. Of the people who indicated no personal experience some expressed disinterest in the underwater environment, but others indicated a desire to see the MPA for themselves but that they had not done so because they perceived it to be prohibited or too expensive (see next heading), or lacked access to snorkelling gear.

Overall, a fair proportion (48%) of people had seen their MPA under water. In Napantao this proportion was lower than in the other Barangays (Napantao: 20%, Son-ok II: 55%; Sta Paz Sur: 69%; chi-square $p < 0.0005$). More men than women had seen the MPA under water (63% versus 36%, chi-square $p < 0.05$) which is potentially related to the higher prevalence of fishing among men, but education, age, whether people fished and seminar attendance played no role.

Recreational access for local people

Like tourists, local residents were allowed to snorkel in the MPAs or in the designated zone in the case of Son-ok II. Formally, local residents of Napantao and Sta Paz Sur were exempted from having to pay recreation fees while in Son-ok II they were not (table 2.3). However, regulations appeared to be relatively poorly known by residents (figure 4.5).

In all Barangays a substantial proportion incorrectly believed that access was prohibited. In Napantao many were unaware of the exemption, believing instead that they would need to pay a fee. In Sta Paz Sur the fee exemption appeared to be better known than in Napantao: many correctly believed that access would be free and fewer thought that they would need to pay. In Son-ok II, where people did formally have to pay a fee, regulations were reflected to an extent in answers with a fair proportion being aware of having to pay and only very few incorrectly thinking that access was free.

An explanation for particularly poor knowledge of the exemption in Napantao may lie allegations of preferential treatment in and unclear communication about fee collection.

Overall more college-level educated people thought that access was free ($p < 0.005$), showing superior knowledge. Gender, age, whether people fished and seminar attendance showed no effect.

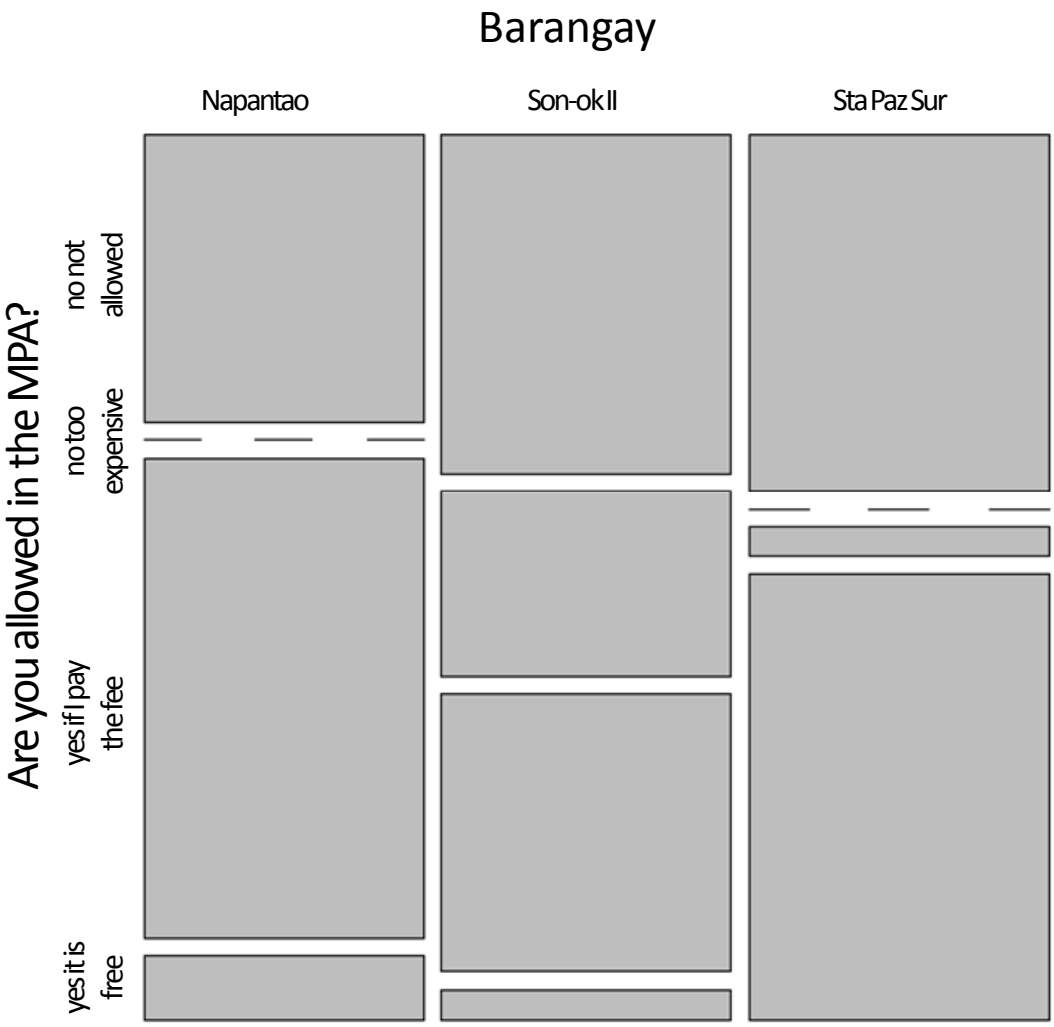

Figure 4.5. Local residents' perceptions of their recreational access rights. People were asked whether they had access to the MPA, for example if they would want to go snorkelling. Mosaic plot shows the distribution of perceptions (box areas; divided first along the x-axis and secondly along the y-axis to produce a mosaic).

Influence on management

Levels of perceived personal influence on management of the MPA and of the Barangay itself were much lower in Son-ok II than in the other Barangays (figure 4.6). Respondents and key informants linked this to a high level of discontent with the handling by the municipality and of the People's Fisheries Organisation KASAKA of MPA affairs, particularly with respect to tourism income, and a desire for control to be returned to the Barangay. Allegations of corruption related to the distribution of tourism income were widespread; this is discussed in paragraph 4.3.4.

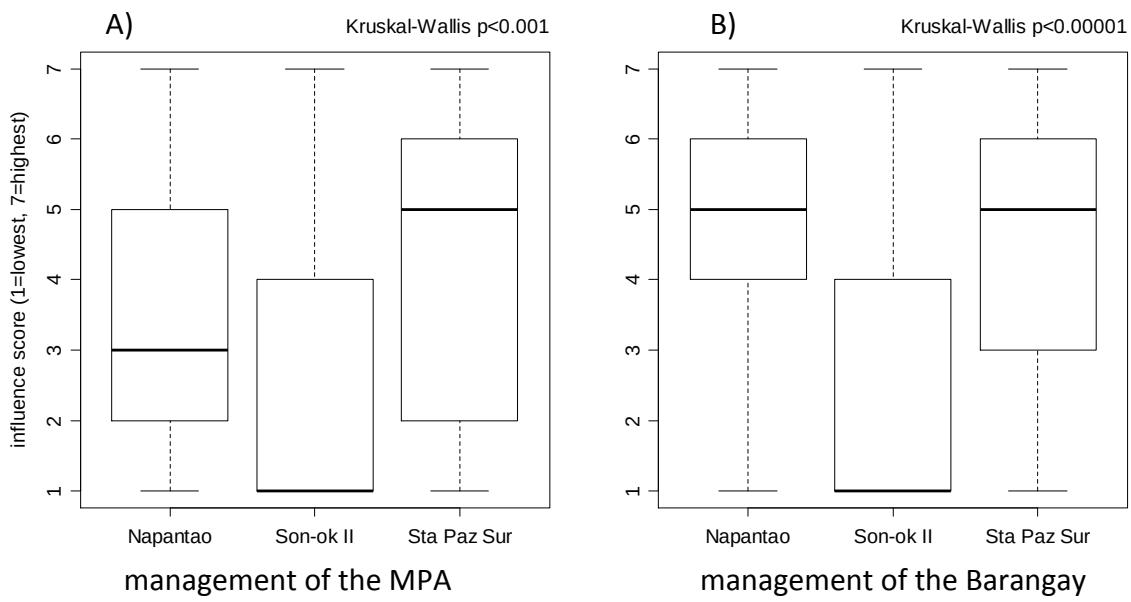

Figure 4.6. Perceived level of influence on management of the MPA (left), and management of the Barangay (right). Respondents were asked to score influence on an equidistant discrete 1-7 scale.

Summary – involvement

In summary, levels of involvement and ownership appeared to be below their potential with limited seminar attendance, mixed sentiments toward CCC, a proportion perceiving lack of opportunity to experience the MPA under water, a proportion incorrectly believing access to be prohibited or unaware of their fee exemption and low influence on management in Son-ok II.

4.3.2 Support

Very high levels of support for the MPAs were expressed in all three Barangays (table 4.1), with Son-ok II even at 100%. Those opposed in Napantao indicated that they considered the MPA unnecessary for the maintenance of fish stocks and it only served to

reduce their fishing ground (paragraph 4.3.4). A small number in Son-ok II indicated that they supported the MPA simply because they considered it impossible to remove it, given the high levels of support from others.

Respondents were asked to indicate their attitude toward the MPA during three stages in the MPA's existence: at the time of installation, during operation, and with respect to the future. Only marginal differences were found between the three phases (table 4.1). Note that in the case of the existing MPAs (Napantao and Son-ok II), the question about the time of installation necessarily relied on recall, possibly introducing inaccuracy.

Table 4.1. Attitudes toward the MPA over time. A) at the time of installation; B) around 15 years later (at present); C) preferred course of action for the future. Attitudes in Sta Paz Sur are included in A) rather than B) because its MPA is currently being installed. Respondents younger than 15 at the time of installation were not asked this question (Napantao and Son-ok II).

A) AT INSTALLATION

	in favour	against	no opinion
Napantao (15 years ago)	21	1	3
Son-ok II (15 years ago)	24	0	0
Sta Paz Sur (present)	25	2	2
total	70	3	5

B) DURING OPERATION

	in favour	against	no opinion
Napantao (present)	25	3	1
Son-ok II (present)	29	0	0
total	54	3	1

C) FUTURE

	maintain	remove	no opinion
Napantao	21	2	6
Son-ok II	29	0	0
Sta Paz Sur	27	1	2
total	77	3	8

Intentions surrounding MPA installation were generally considered benign: there was much agreement that the MPA was intended to benefit local people when it was installed (table 4.2).

Table 4.2. Agreement with the statement "the MPA was originally set up for the benefit of the people of the Barangay". The category "no opinion" was deleted.

	agree	disagree
Napantao	20	3
Son-ok II	22	1
Sta Paz Sur	26	2

4.3.3 Perceived overall effectiveness and enforcement

Perceived levels of overall effectiveness of the MPA will be considered in this paragraph, as well as issues related to enforcement. Effectiveness was deliberately not defined in this question in order to measure general sentiments. Costs and benefits – elements of effectiveness – are considered in detail in paragraph 4.3.4.

MPAs were considered to be effective by a majority in all three Barangays, with Son-ok II at 100% (figure 4.7). Perceived effectiveness did not depend on education, gender, age, whether people fished, or seminar attendance.

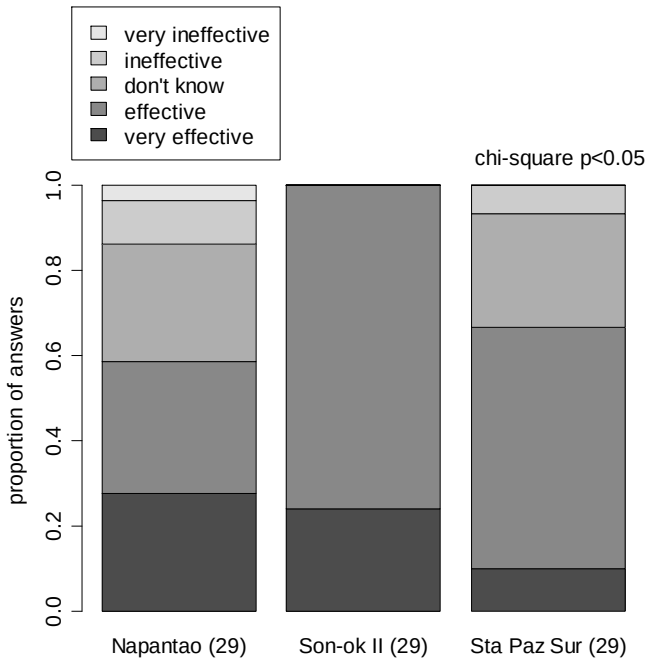

Figure 4.7. Perceived effectiveness of the Barangay MPA

Although widely acknowledged to occur inside the existing (Napantao and Son-ok II) MPAs, the majority evidently did not consider illegal fishing to negate effectiveness. The true extent of the problem is unknown. According to Napantao bantay dagat 10 people were apprehended over 2 years and during the fieldwork period two apprehensions were made, but discussion groups suggested that many more offences may occur. Outsiders are chiefly accused but some mention local spear fishers. Indeed some spear fishers themselves joked about fishing in the MPA, appearing to insinuate that they offend while others outright admitted to spending prison time for repeat-offending. Practical issues such as a lack of financial means (i.e. manpower and materials such as torches and boats), difficulties with observation, and a lack of commitment from bantay

dagat were mentioned by different people as causal factors for limited enforcement success in Napantao and Son-ok II. In contrast, Sta Paz Sur residents including village guards expressed very positive expectations regarding the practical side of enforcement.

Municipal officials as well as local residents emphasised the importance of the ordinance as an instrument enabling the application of penalties to offenders. Some officials argue that penalties should be higher to increase the deterrent function, but there was widespread support for the system of progressively tougher penalties with repeat offences.

4.3.4 Perceived costs and benefits

A combination of approaches was used to investigate perceptions of costs and benefits. First the relative perceived importance of impacts was investigated and the results categorised to produce the dominant factors. The dominant emerging factors were investigated and are described below in more detail. Finally, perceptions regarding the distribution of costs and benefits are analysed.

Main impacts

Through initial qualitative work a list of positive and negative impacts considered by local people to be serious positive or negative impacts on communities and households was composed. Impacts were all related to three factors: access, income, and fish catch (legend of figure 4.8). Key informants confirmed the dominant status of the first two factors in particular; these are considered in detail below. Access implications were considered by key informants to be of secondary importance. They are considered above in paragraph 4.3.1.

To quantify the relative importance of effects, questionnaire respondents were then asked to select from this list those impacts that they considered important. They did this both for their expectations at the time of installation of the MPA, and for their present experiences. When categorised into the three factors as above, no major differences were apparent between Barangays (lines connecting bars in figure 4.8). Interestingly, the positive effects of fame were mentioned by all respondents in Son-ok II.

Only 29% of people who answered both questions indicated any difference between their past expectations and present perceptions. Note that this question relies on recall, and modification of expressed past perceptions by presently held views could not be ruled out.

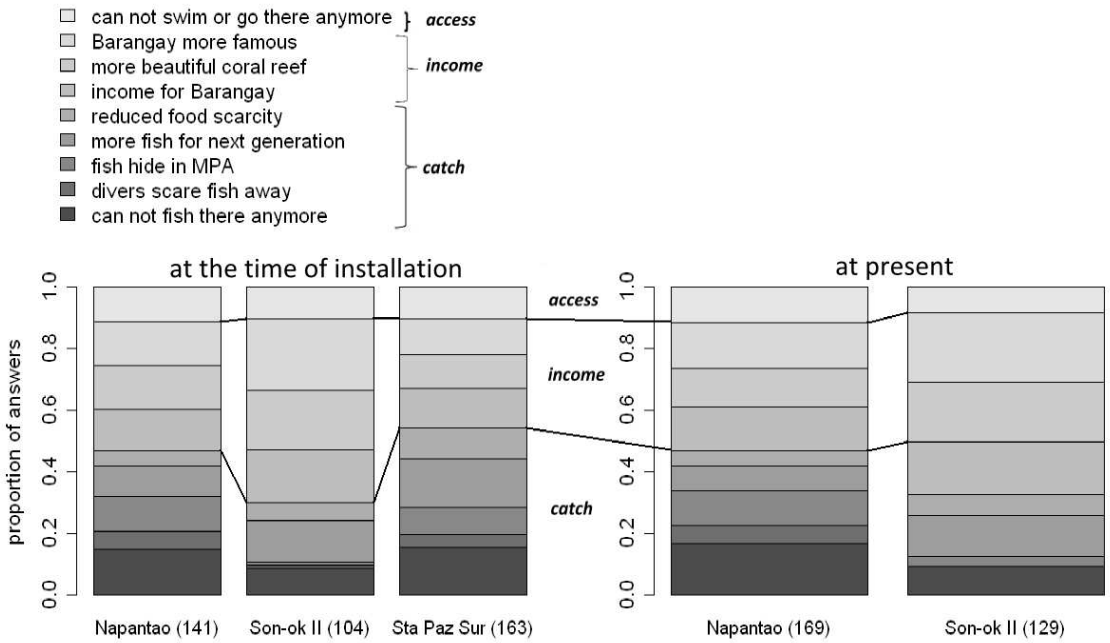

Figure 4.8. Positive and negative effects of the MPA, expected at the time of installation (left) and experienced at present (right). Sta Paz Sur is included in the analysis of expectations at the time of installation. Respondent numbers (in brackets) can exceed the number of respondents because respondents could select multiple answers. Lines connecting bars divide data into categories "access", "income", and "catch".

Net effect on fish catch

One of the two dominant factors, levels to which fish catch was on balance perceived to have increased as a result of the MPA (figure 4.9) were high, but comparatively lower in Napantao (chi-squared residual $p < 0.05$).

The obvious factor that can be perceived to lead to a net negative fish catch trend is the opportunity cost from lost fishing ground, which was considered of prime quality in Napantao and Son-ok II. However, this ultimately appeared to be considered less problematic in Son-ok II than in the other Barangays (figure 4.8). In Napantao, key informants considered that fishers' views were too negative, because many did not account for the increased fishing pressure due to the settlement of Caritas village in their assessment of the net effect of the MPA. Many fishers did explicitly note the

increased impact from Caritas, but the key informants' views could not be verified. Furthermore, fishers from other Barangays who fished near the Napantao MPA (among whom were fishers from Sta Paz Sur) consistently claimed that it does produce higher fish catches.

In terms of positive contributions to fish catches, there was a general view that fish stocks inside the MPAs had become (or will become; Sta Paz Sur) abundant. Overall 96% agreed that "fish reproduce in the sanctuary, and they swim out where we can catch them" ("spillover"). Indeed in Napantao fishing precisely as close to the MPA as permitted was observed on a daily basis (front cover picture). In Son-ok II, respondents indicated that personally observing increased size and abundance of target and non-target marine species was the decisive factor convincing them that the MPA had a positive net effect. In Sta Paz Sur, the MPA was expected to produce increased fish catches within a short space of time, with views similar to Son-ok II (figure 4.9).

Some respondents were opportunistically asked whether they thought the MPA was sufficient to solve the current ecological and fisheries problems, and in Son-ok II all answered affirmative. Agreement was not quantified due to time restrictions.

Education level, gender, age, whether people fished and seminar attendance showed no effects.

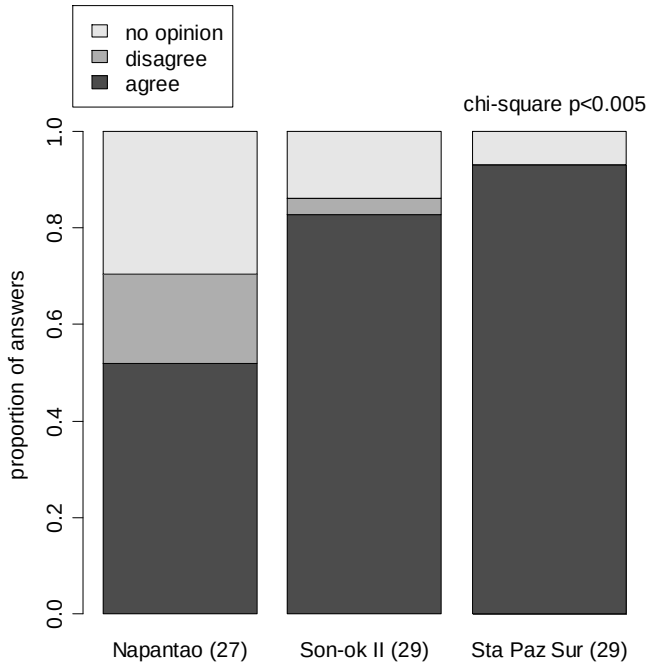

Figure 4.9. Agreement with the statement "because of the MPA, there is now more fish to catch" (changed for Sta Paz Sur to: "... there *will be* more fish to catch"). Removing the category "no opinion" reduced overall significance (p=0.003650).

Tourism income

The other of the two dominant factors, the potential of income to generate support for the MPA was confirmed by local residents in response to an occasionally opportunistically asked question (not quantified). When asked to consider a situation where there would be no direct monetary income from the MPA at all, there was agreement in Son-ok II that the MPA would still be beneficial due to its effects on fish catch. However, in Napantao many indicated that they would withdraw their support since they perceived a net catch decline (see above) and the income was the only benefit perceived. This indicates that income can drive support even against a background of less favourable perceptions of fish catch impacts.

Mentioned by a majority in Son-ok II and many in Napantao, and apparently eliciting strong feelings, were allegations of corruption and of income not benefiting the people. The main allegation in Napantao was that income was not spent on projects benefiting the people. In Son-ok II, the issue is too complex to describe in detail here. In short, the People's Fishers Organisation KASAKA was widely accused of pocketing tourist MPA access fees, abuse of power for personal privileges, and leveraging more tourism income for personal gain. To a lesser extent, the municipality was also implicated. In Sta Paz Sur, nobody mentioned corruption as a likely problem.

Distribution of costs and benefits

To investigate perceptions of the distribution of costs and benefits, respondents were asked to score benefits accruing to (figure 4.10) and costs borne by (figure 4.11) eight groups of people. Noteworthy observations are discussed in this paragraph.

A key group in FGDs when discussing costs and benefits were the fishers. Particularly in Napantao they were considered to be disadvantaged (supporting conclusions drawn above from figure 4.9), enjoying low benefits compared to the costs. In contrast, in Son-ok II fishers were considered to bear relatively low costs compared to the benefits they enjoyed. The general population's views of fishers' situations appeared to be well aligned with fishers' own perceptions. There was no difference between perceptions of costs borne (Kruskal-Wallis $p > 0.5$) or benefits enjoyed by fishers between fishers' and non-fishers' households ($p < 0.1$).

In contrast to fishers, divers and tourists were seen to benefit very much from the MPA but bear practically no costs.

Respondents' own households were perceived in Napantao to benefit less than they were in the other Barangays, but bear similar costs (figure 4.10 and figure 4.11).

The bantay dagat were perceived to benefit from the MPA. Group discussions suggested that this was in terms of employment and honorariums (e.g. a percentage of fines, as in Napantao). In Napantao they were considered to bear lower costs. Discussions suggest that the danger from violence perceived in all Barangays is seen to be offset here by the income gained.

Barangay and municipal officials were considered to benefit substantially from the MPA. Discussions suggest that this is because of their position of power and (legal or illegal) control over and accrual of income. Only in Sta Paz Sur were they also seen to sustain a cost, in the form of the workload surrounding installation of the MPA.

The next generation was perceived to benefit strongly, but relatively less so in Napantao. It was seen to bear practically no costs. The Philippines as a nation was perceived to benefit strongly and bear almost no costs.

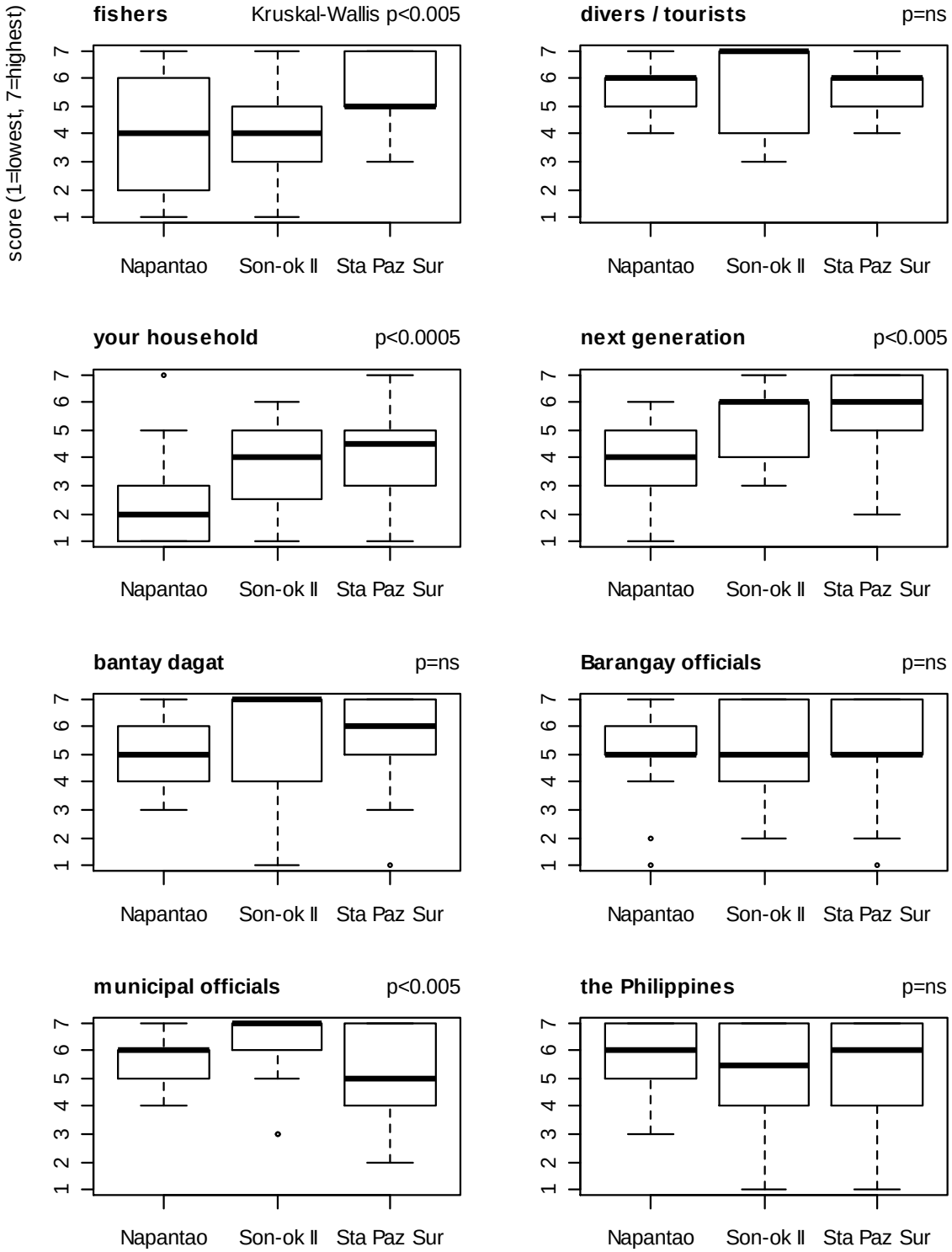

Figure 4.10. Level of benefit perceived to accrue to various groups of people as a result of the MPA. Scores were assigned on an equidistant discrete 1 - 7 scale (box-and-whisker plots).

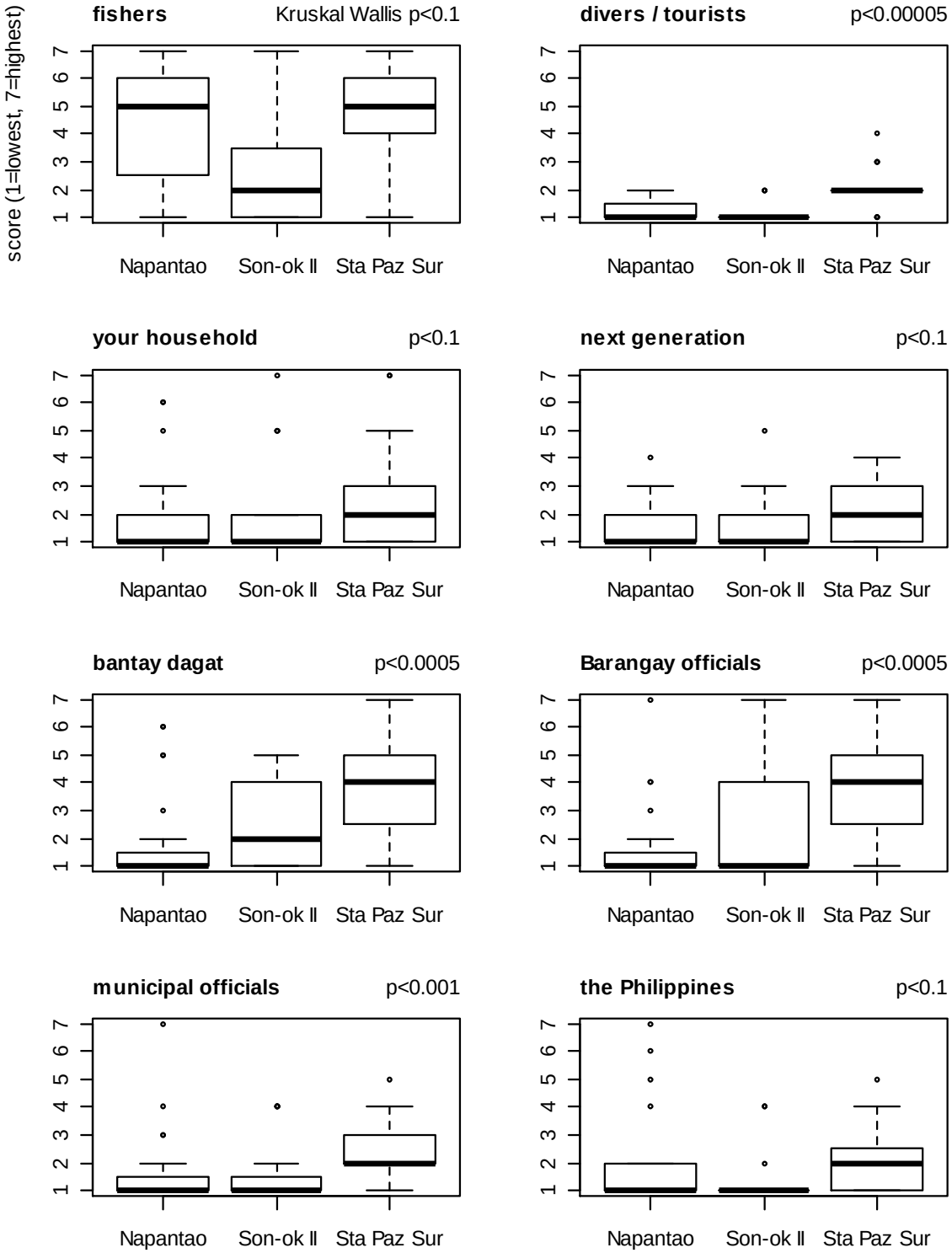

Figure 4.11. Level of costs perceived to be borne by various groups of people as a result of the MPA. Scores were assigned on an equidistant discrete 1 - 7 scale (box-and-whisker plots).

Summary – costs and benefits

In summary, the net effect on fish catch, and income emerged as the main drivers of support. In Napantao, perceptions of net fish catch effects are comparatively negative, but tourism income is maintaining support despite allegations of corruption. In contrast, in Son-ok II fish catch is considered to have improved so much that potentially no additional conservation is considered necessary. Here too, corruption is a problem but it does not reduce support for the MPA. In Sta Paz Sur, expectations were comparatively optimistic.

4.3.5 Changing the MPA?

In Son-ok II, a much larger proportion of people wanted to make changes to the MPA than in the other Barangays (figure 4.12). Questionnaire respondents readily volunteered an explanation: they wanted to change MPA management and return control of the MPA from municipal to Barangay level.

In Napantao, a much larger proportion wanted to make the MPA smaller than in the other Barangays (figure 4.13). However, views are divided because this proportion was still smaller than the proportion who wanted to make it bigger. Strikingly, despite many here incorrectly believing that they would have to pay a fee to snorkel in the MPA (paragraph 4.3.1) there was comparatively little drive to change the fees for local people.

Age showed a strong association with support for change, but only when split into two categories (categories <36 (90% support), >36 (47%); chi-square $p < 0.001$) instead of the three created originally. Posterior creation of age categories could lead to spurious results, but because of the highly significant p-value we accept the result. Furthermore, although younger people could also be overrepresented because they appeared more likely to respond to the particular type of question involved (and therefore be tallied), this effect did not seem to be large enough to explain the result.

Education, gender, whether people fished, and seminar attendance showed no effect.

An interesting sentiment occasionally encountered in all Barangays was that the fish sanctuary (local terminology for MPA) should be a “true sanctuary”: off-limits to divers because they too disturb fish. However, when confronted with the consequence of foregoing tourism income, most changed their minds and favoured maintaining the MPA.

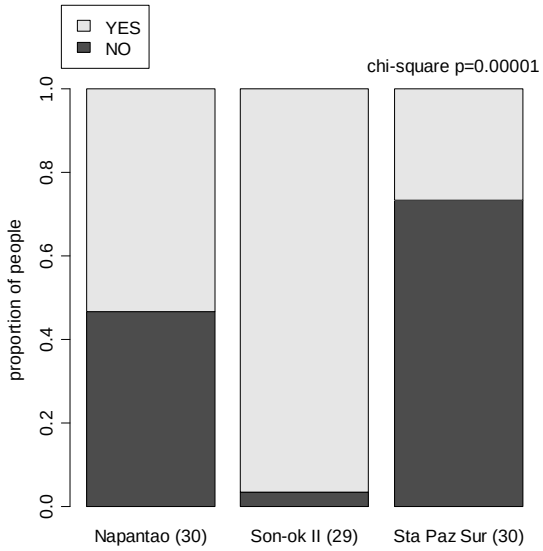

Figure 4.12. Overall level of support for changing the MPA. Data were aggregated by tallying those who indicated they wanted to make any changes to the MPA at all (figure 4.13) versus those who did not.

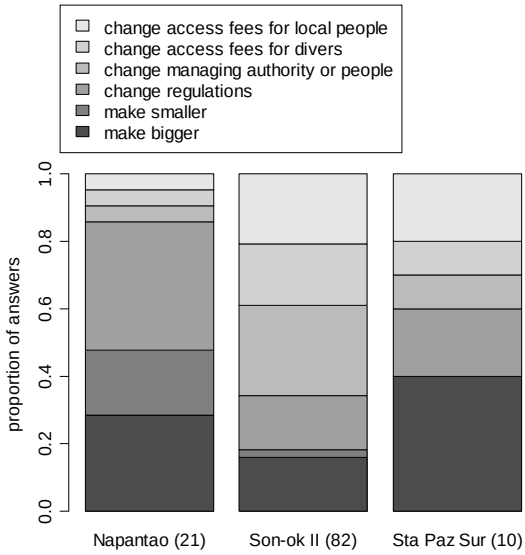

Figure 4.13. Preferred changes to the MPA. Respondent numbers (in brackets) can exceed can exceed the number of respondents because respondents could select multiple answers.

4.3.6 Convincing people and changing opinions

Despite stated views on costs and benefits showing little difference between the time of installation and the present (paragraph 4.3.4), officials in the case study Barangays and their municipalities claimed that educational campaigns were able to reduce initial apprehension and overcome opposition to such an extent that the majority of people vote in favour of installation of an MPA at a public hearing. This was supported by the observed association of education level with perceived fish stock trends and with knowledge of regulations.

Discussion groups and key informants confirmed the view of initial apprehension and opposition being overcome over several years. But examples were encountered of opinions changing in both directions. These confirmed the view of catch increase and tourism income being the dominant factors determining support.

As another explanation for becoming opposed to the MPA over time, apparently unrealistic or false promises made when the MPA was installed were mentioned in Napantao. For example, that food scarcity would be eliminated within 3-5 years, or that the MPA would be re-opened to fishing after several years.

In Napantao, key informants claim that an influential core of older fishers continues to try to persuade others to oppose the MPA.

4.3.7 Summary – attitudes to the local MPA

Despite high levels of support for coral reef management in general and the MPAs specifically, factors shaping this support are not addressed optimally in the case study sites. One dominant factor driving support, net effect on catch, is perceived to be lacking in Napantao and the other dominant factor, income, is tainted by corruption in Napantao and in Son-ok II. Furthermore, levels of involvement and ownership fail to meet their potential.

4.4 Attitudes toward additional or alternative measures

This section explores the extent to which perceptions of the existing MPAs, given the high levels of support for the MPA despite their suboptimal state, are also able to generate support for additional conservation measures.

To investigate support for additional measures, a hypothetical "gear restriction" conservation measure was presented in the form of a zone where only hook-and-line fishing (being less damaging than methods such as netting) would be allowed. Firstly, respondents were asked for their views on such a measure in addition to the existing MPA. Secondly, respondents were given the choice between either an MPA or a hook-and-line zone.

4.4.1 Support for a hypothetical additional hook-and-line zone

The main differences between Barangays in the level of support for a hook-and-line zone addition (figure 4.14) were the very low opposition to the idea in Sta Paz Sur (residual chi-square $p < 0.01$), and potentially the high opposition in Son-ok II ($p < 0.05$).

A concern raised occasionally by fishers was that a hook-and-line zone might disadvantage fishers who use other types of gear. For example in Sta Paz Sur many fishers use cages and don't use hook-and-line. Some agreed with the principle but not the specific method; these are not included in figure 4.14.

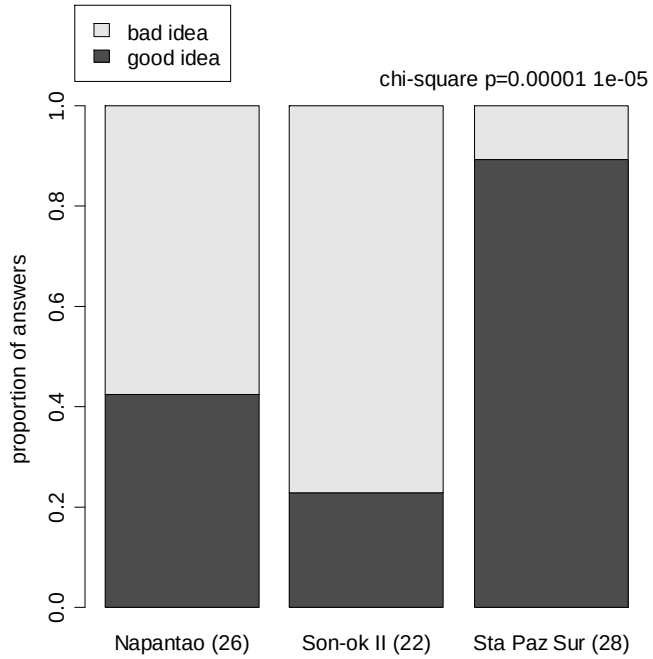

Figure 4.14. Attitudes to the hypothetical installation of a hook-and-line zone in the Barangay in addition to the present MPA. The category "no opinion" was deleted.

The pattern is not explained by only invoking net effect on catch, and income. It follows that additional or other factors are involved.

Perceived levels of influence on management of the Barangay (chi-square $p < 0.005$) and the MPA ($p < 0.005$) were both strongly positively associated with the level of support for the concept. In both cases this was potentially (limited significance) mainly explained by 83% of those who perceived the lowest influence being opposed to the idea (chi-square residual $p < 0.05$); they were all Son-ok II residents. This strongly suggests that disenfranchisement in Son-ok II from management is a critical factor counteracting support for additional conservation measures.

Another factor related to involvement and ownership, perceptions of access regulations for local people, was associated with the level of support for the concept (chi-square $p < 0.005$). The variation was potentially mainly explained by the low proportion of those who think access is free for local people being opposed (chi-square residual $p < 0.05$).

This supports the notion of disenfranchisement breeding opposition: those not disenfranchised do not oppose.

College-level education was associated with much higher support for the concept than elementary and high school combined (90% versus 48%; $p < 0.05$); this was supported by impressions during discussions.

Contrary to expectations, views on fish stock trends did not show straightforward associations. Perceived fish stock trends over the past 10 years showed a bimodal association with support for the concept (figure 4.15); this pattern remained unexplained. Also, expected future fish stock decline appeared to be associated with support for the idea (figure 4.15). A Kruskal-Wallis rank sum test (categories “more” and “much more”, and “less” and “much less” combined), performed because of the low chi-square significance, produced a similar statistic ($p < 0.05$).

Many of the other variables measured in the questionnaire were also tested but no other associations were established.

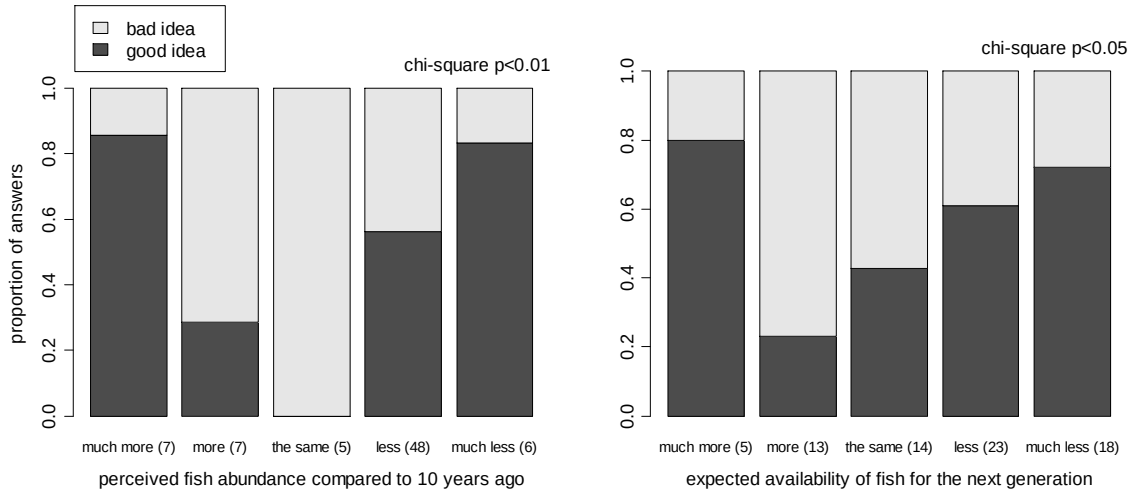

Figure 4.15. Attitudes to the idea of adding a hook-and-line zone as a function of: perceived abundance of fish compared to 10 years ago (left); expected availability of fish for the next generation compared to the present (right)

4.4.2 Preferences: the existing MPA versus a hook-and-line zone

Compared to the other Barangays, where the distribution was near even, more people in Son-ok II preferred the MPA (chi-square residual $p < 0.05$) (figure 4.16).

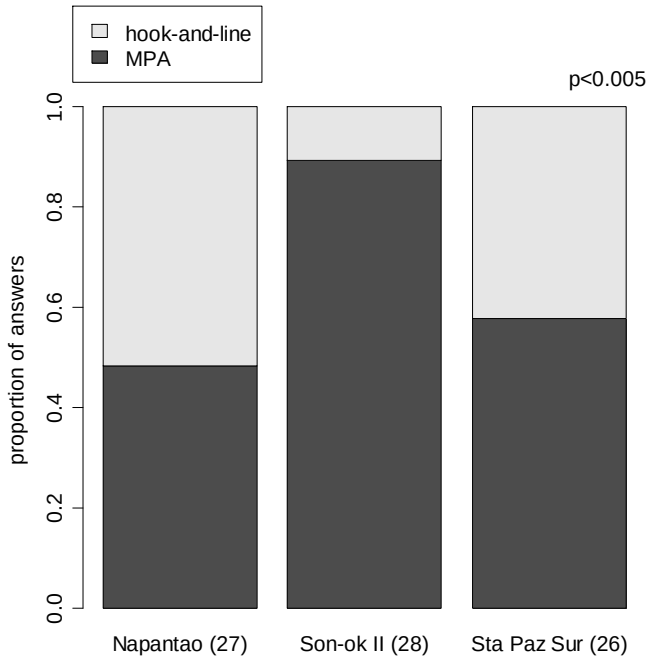

Figure 4.16. Preferences when respondents were asked to choose between the two. The category "no opinion" was deleted.

Preference for the MPA was associated with expectation of increasing fish stocks in the future (categories "more" and "much more", and "less" and "much less" combined; Kruskal-Wallis rank sum test $p < 0.005$). This likely reflects preference for the MPA by those who consider it to result in increased fish catch. Disagreement with increasing catch levels as a result of the MPA was associated with preference for a hook-and-line zone (chi-square $p = 0.01$).

4.5 The hypotheses

Table 4.3 summarises results for the hypotheses proposed in paragraph 1.1.3.

Table 4.3 Summary of conclusions to the hypotheses

#	Hypothesis	Result
1.	Levels of support for the MPA and for additional conservation interventions are associated	*
2.	Levels of support for current and additional conservation interventions are predicted by (sign in brackets):	
a)	education level (+)	p<0.05 (college-level versus other types combined
b)	perceived fish stock trends (-)	• past trends: inconclusive, apparently bimodal pattern • expected future trends: expected association was observed, but should be interpreted with caution because of the low significance
c)	perceived MPA effectiveness (+)	ns
d)	ownership and involvement with the MPA (+):	
i)	seminar attendance	ns
ii)	personal underwater experience	ns
iii)	influence on MPA or community management	p<0.005
3	Members of households that fish prefer gear restriction over a no-take zone	ns

* This could not be tested because support for the MPA was universally very high. In hypothesis 2, only levels of support for additional measures are therefore considered.

4.6 Summary of main results per case study site

This section briefly reviews the most important findings for each case study site to provide a more integrated picture of their interrelationships.

4.6.1 Napantao: income driving support, and the influence of other factors

Despite the stage for conservation appearing to be set with perceived fish stock declines, coral reef management a necessity, a majority view that the MPA is effective, and near unanimous support for its maintenance perceptions regarding effects on fish catch and the balance of benefits for households and the next generation were less positive than in the other study sites. This was not attributable to lack of spillover – which was nearly unanimously perceived to occur. But income drove support despite mixed perceptions of fish catch impacts. Key informants' and external fishers' assertions that the MPA does increase catches suggests that secondary factors may be negatively impacting on views within the Barangay.

4.6.2 Son-ok II: increased catches, and the MPA as an adequate solution?

Whereas in Napantao and Sta Paz Sur ecological declines were a current view, in Son-ok II the MPA was considered to be effective and to have resulted in fish stocks having started to increase again. Personal observation of increasing catch played a decisive role. This site demonstrates the potential for perceived increased fish catch to generate support on its own, even in the face of severe dissatisfaction with and lack of influence on management. Support for additional measures was strikingly lower here, which was explained by lack of influence on management. As a potential additional effect there were indications that the Son-ok II MPA might be considered adequate to deal with the problems by a proportion of the population, so that they would consider additional measures unnecessary.

4.6.3 Sta Paz Sur: high hopes

In general, perceptions and levels of support in Sta Paz Sur, including for additional measures, were most positive and highest of the three sites. Catch increases were expected to occur within several years, as they were perceived in Son-ok II to have done, but not in Napantao. Enforcement was expected to be comparatively straightforward. Sta Paz Sur scored the highest for expected catch increase and for benefits accruing to fishers in general.

5 Discussion

After a discussion of limitations, results will be discussed thematically starting with an interpretation of local ecological understanding, then a discussion of the main factors found to drive (catch increase, income) or block (involvement) support for conservation. Subsequently, drawing on qualitative findings secondary factors modifying perceptions are considered. Then, trajectories by which support can change over time are analysed. Finally, recommendations in terms of conservation management and further research are given.

5.1 Limitations

The main logistical constraint on data collection was the availability of and issues introduced by interpretation. This limited the number of case study sites to the three presented here.

5.1.1 Potential sources of bias

Triangulation was a continuous process. One recommendation (e.g. Kapila & Lyon, 2006) that could not be followed was for an interdisciplinary scientific team because the author was the only scientist involved. However, the purpose of this recommendation – to interpret the issue from a variety of viewpoints – was served in part by eliciting views on the issues under study from interpreters and others closely involved. This increased the likelihood of elite bias (Kapila & Lyon, 2006) occurring, which was mitigated by opportunistically triangulating during interviews with questionnaire respondents, who had been randomly selected.

Because FGD participants were generally gathered through personal networks of key informants, representativeness could not be guaranteed, but efforts were made to gather a variety of people for discussions, and findings were triangulated during questionnaire interviews.

Although the possibility cannot be ruled out that respondents gave socially desirable answers there were no indications to suggest that this would be the case. Respondents were generally forthcoming, cooperative, willing to be audio-recorded, and openly

expressed negative views or alluded to fishing illegally in the MPA. Triangulation of findings did not expose discrepancies in responses.

A temporal bias could not be ruled out due to the limited duration of the fieldwork. The fieldwork coincided with copra harvesting season; the resulting cash flow may temporarily improve households' income, which could conceivably influence perceptions of livelihood security. This may also be the case for the imminent southwest monsoon season, during which fishing is largely suspended. The main mitigation strategy was discussion with key informants.

Compared with likely outcomes of community debates, quantitative results may present a bias toward less vocal community members, because they were included in analysis whereas they would be likely not to get involved in actual debates.

5.2 Setting the stage: perceived urgency

Ecological and fisheries problems were in essence perceived similarly in the three case study sites: many pressures causing declining fish stocks. Theoretically, this paves the way for conservation (e.g. Johannes (2002) describes how perceived sea turtle declines likely made local communities in Oceania receptive to efforts promoting their conservation); particularly when declines are perceived to reach crisis level does action tend to precipitate (Ferse et al., 2010 and references therein). Indeed there was near full agreement with coral reef management being necessary.

However, there were indications that in Son-ok II the MPA was considered to be adequate to combat ecological declines. This could be due in part to shifting baseline syndrome, where past abundance is remembered to more closely resemble present abundance than in actual fact it did (Pauly, 1995, Bunce et al., 2008, Papworth et al., 2009). Its occurrence could be problematic because small MPAs such as in this case study cannot be expected to be adequate in biological terms (Bellwood et al., 2004, Graham et al., 2008, Christie et al., 2002). This underlines the importance of continuing to ensure an accurate perception of the issues among the local population.

As an aside, in contrast to shifting baseline syndrome there exists the notion that MPAs are able to revive support for conservation by providing a window to past abundance

(Bohnsack, 2003). However, this did not appear to be the case here considering the large discrepancy between levels of support for adding a hook-and-line zone and levels of support for maintaining the MPA.

5.3 Main factors determining support

This section contains the main conclusions of this study. It describes the two main factors found to determine support for the MPAs, catch increase and income, as well as the main additional factor found to block support for additional measures: involvement.

5.3.1 Catch increase

As one of the two main driving factors, and coupled with the positive effects of support on effectiveness (White et al., 2002, Francis et al., 2002, Christie et al., 2003, Mascia et al., 2003, Thomas & Middleton, 2003, White & Green, 2003, Ferse et al., 2010 and references therein) and the potential for greater effectiveness of management regimes that specifically address community goals (McClanahan et al., 2006, Klein et al., 2008), the observed potential of catch increase to generate support argues in favour of incorporation of catch increase as an explicit goal of MPAs. However, this does not mean that MPAs should necessarily permit fishing within their borders, as evidenced by the preference for the MPA in Son-ok II due to its perceived positive catch effects.

A distinction that should be made is between *perceived* and *actual* catch increase. A study by Yasué et al (2010) highlighted the discrepancy between perceptions of increased catch outside the MPA by local people and fish censuses showing less pronounced effects. Their study suggests that post MPA installation, it is important to ensure that any actual increases do not go unnoticed; even modest actual gains may produce substantial optimism (Yasué et al., 2010). Monitoring with full involvement of the local community has been suggested as a useful instrument (e.g. Pomeroy & Carlos, 1997, ICRI, 2003, Danielsen et al., 2005), and was identified by Pollnac (2004) as an important predictor of MPA success in the Visayas where this study took place.

5.3.2 Income

The other of the two main driving factors of support, income, had positive as well as negative effects on support. Negative effects were observed in the form of discontent

with corruption: in Son-ok II corruption was the primary and in Napantao it was one of the main sources of discontent related to the MPA. An analogy can be drawn to the potentially dual effects of tourism development itself, which can help fund conservation (Thur, 2010) or alternative livelihoods (White et al., 2006), but also increase environmental pressures and cause tensions with fisheries (Lucas & Kirit, 2009).

In Napantao the positive effect dominated, and in Sta Paz Sur MPA income appears to be a secondary concern and negative effects were not foreseen by the community (which is no guarantee that they will not occur). In contrast, in Son-ok II corruption was an integral component of negative sentiment toward management and may thus have contributed to the lack of support for additional conservation interventions. Being difficult to control (Kaufmann, 1997), the potential for corruption makes income as part of MPA design a risk factor, but given the potential rewards it cannot be ignored. Indeed, CCC attempts to give income potential a low profile when preparing new MPAs (van Bochove, 2010). This highlights a need for development of practicable mitigation strategies to deal with corruption and negative impacts on community perceptions.

In the future, the balance could be changed if access fees for tourists are increased following indications that many MPAs are currently valued below their potential (Wielgus et al., 2010). The added income could increase support, but could also reduce it as a result of the increased incentive for corruption. The long-term stability of the current balance in case circumstances remain the same could not be investigated further due to practical constraints. Given the level of dissatisfaction it is conceivable that support could start to fail in the future if management is not changed, but also that dissatisfaction could remain without drastic consequences for the MPA.

5.3.3 Involvement

Involvement, a crucial barrier to support for additional measures in Son-ok II, is widely promoted (e.g. UP-MSI et al., 2002, IUCN-WCPA, 2008, White et al., 2006). MPAs have the potential to empower (Maliao et al., 2009) but also to disempower (Stoffle & Minnis, 2007) local people. In Son-ok II, a perception of disempowerment was highly prevalent. This had no serious consequences for levels of support for the existing MPA, but blocked support for additional measures. This finding suggests that calls for efforts to enhance

involvement and empowerment of local people during MPA design and implementation may be nuanced. Our findings suggest that, at least from a perspective of support generation, investment in community involvement may not be strictly required in cases where additional conservation measures are not considered necessary. Of course, this does not refute the validity of investment in participation for other purposes (see for example Lundquist & Granek, 2005). Moreover, our findings also suggest that in cases where additional measures *are* considered necessary, investment in involvement may be crucial for building support.

This presents the question of the extent to which involvement was promoted in the case study sites. Low penetration of educational seminars in Sta Paz Sur and potentially also in the other sites suggests that the level of involvement was limited.

In Sta Paz Sur perceptions related to involvement are currently favourable with influence on MPA and Barangay management scoring well, access regulations better known than in Napantao, and spontaneous offers of help in terms of guarding the MPA. Lessons learned in the other two sites could be used here to maintain positive views.

5.4 Other factors influencing levels of support

Having discussed the dominant factors determining support for conservation, the author considers that two indirect factors warrant consideration here because of their potential to change perceptions on the dominant factors. They are: other people's views, and optimistic expectations prior to MPA establishment, and potential future trends.

5.4.1 Other people's views

An obvious case of people influencing other people's opinions was the opposing group of older fishers in Napantao. But there is another way in which people's views are able to influence other people's opinions, in the cases where people with little personal awareness of the MPA indicated a preference for others to determine the best course of action. These people did not perceive such costs from the MPA that they felt it necessary to oppose it, but at the same time did not perceive such benefits that they were actively in favour. This neutral attitude might be receptive to convincing explanation of MPA benefits. These people, who often lived away from the sea, could be

included in education and outreach efforts in order to broaden the overall support base in the community without having to overcome much resistance.

5.4.2 Optimistic prior expectations

Although a very real practical issue, illegal fishing inside the MPA did not appear to be an important factor depressing perceived effectiveness of MPAs. Enforcement was considered to be constrained primarily by resources, suggesting that this is unlikely to improve in the near future.

Considering the low success rate of MPAs generally (Mora et al., 2006) and in the Philippines (Lowry et al., 2009), and considering the somewhat less positive perceptions in the other Barangays, expectations in Sta Paz Sur may be unrealistically positive. Expectations of catch increases (within several years) may actually be fulfilled as in Son-ok II, or might not as in Napantao. But expectations regarding the ease of enforcement appear likely to be unrealistic, contrasting with views on persistent practical difficulties of enforcement and compliance in the other Barangays. Enforcement might be less than straightforward in Sta Paz Sur, given that the MPA is not visible from the town proper as in neighbouring Napantao where illegal fishing is known to occur and considering the widespread nature of the problem in the Philippines (Christie et al., 2002, Maliao et al., 2009) and globally (Mora et al., 2006). Considering that Sta Paz Sur and Napantao are in the same municipality, it seems unlikely to receive more or better equipment. Furthermore, corruption did not feature in expectations at all, but appears difficult to control.

If catch increases turn out to be perceived small or absent, enforcement issues, corruption, or other unforeseen factors could lead to disenchantment here.

5.4.3 Some notes on the future

As today's children grow up and come to determine society's views, there is a possibility that something of their present-day views will persist. Awareness will increase, attitudes may become more positive toward conservation and there may be an increased sense of urgency, in part because of the school curriculum which now features ecology and sustainability issues. Furthermore, a generation is growing up who do not remember a time when there was no MPA. At the same time older fishers who feel strongly about

losing traditional fishing ground are replaced. However, other factors may counteract this scenario. MPAs may be overpowered by external pressures (Bellwood et al., 2004, Graham et al., 2008, Christie et al., 2002) exacerbated by a growing population (NSO, 2008). If the result is a declining fish catch and food security, pressures to open MPAs to fishing could increase and the outcome is far from certain.

6 Recommendations

6.1.1 General

- Ensuring community perception of catch increase should be a primary focus of MPA management to build support
- Tourism income can be employed as a powerful driver of support, but the risk of corruption blocking further support must be taken into account
- When distributing limited capacity to invest in generating involvement, priority should be considered to be given to communities where additional conservation interventions are required the most
- If current conservation efforts are not sufficient to address ecological problems, it should be ensured that the local population are aware of this

6.1.2 For the case study sites

Napantao

- Address the lack of perceived fisheries benefits
- Install a sign explaining the goals and purpose of the MPA, the rules and regulations and the access rights of local people
- Address the factors potentially contributing to a social divide
- Prior to diving in the fishing area, consult with local fishers

Son-ok II

- Engage with management personnel to address the lack of perceived influence, and (if at all feasible) the alleged corruption
- If additional conservation is deemed necessary, establish awareness of the necessity with the community

Sta Paz Sur

- Starting from a favourable position, ensure that the pitfalls identified in the other two Barangays are avoided

6.1.3 Further research

- As a logical next step, findings from this case study approach should be quantified. A focussed study across a substantial number of communities quantifying support for existing MPAs and additional measures as a function of presence or absence of tourism income and of perceived catch increase would clarify the generalisability of the framework described here.
- Similarly, comparison of a larger sample of existing and newly forming MPAs could clarify whether high expectations at the time of establishment are a general pattern. This could lead to understanding of the most effective time of intervention for efforts to build support for conservation.

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Appendix A – Questionnaire Napantao & Son-ok II (English)

[*Nearly all interviews were conducted by the interviewer asking questions and filling out the form. There were several mistakes on the form, which were skipped by the interviewers. These have been removed from this version for clarity.*]

INTRODUCTION

[*An introductory text was specified, but most interviewers did not follow it. It was removed here. Instead, interviewers were asked to explain the subject and purpose of the study, and stress that it was important for the respondent to give their opinions, not what they thought the interviewer wanted to hear.*]

BACKGROUND

Gender
- ☐ male
- ☐ female

Age _____

Marital status
- ☐ unmarried
- ☐ married
- ☐ widower / widow

Education level
- ☐ elementary school
- ☐ high school
- ☐ college level
- ☐ no education

Occupation

YOU CAN SELECT MORE THAN ONE
- ☐ fishing
- ☐ farming
- ☐ carpenting
- other:
- ☐ _____
- ☐ _____

Do you have a boat intended for fising?
- ☐ yes
- ☐ no

What gear do you use?

YOU CAN SELECT MORE THAN ONE
- ☐ spear fishing
- ☐ hook-and-line
- ☐ fish net
- ☐ fish cage
- ☐ _____
- ☐ _____
- ☐ _____

QUESTIONS

CORAL REEF / FISHERIES MANAGEMENT

1. How much fish is there in the Barangay compared to 10 years ago?
   - ☐ much more
   - ☐ more
   - ☐ the same
   - ☐ less
   - ☐ much less

   Why? _____

   _____

   _____

2. How much fish do you think there will be for the next generation?
   - ☐ much more
   - ☐ more
   - ☐ the same
   - ☐ less
   - ☐ much less

   Why? _____

   _____

   _____

3. What is your opinion about the necessity of coral reef and ocean management in the Barangay?
   - ☐ necessary
   - ☐ no opinion
   - ☐ not necessary

COSTS AND BENEFITS OF FISH SANCTUARY – WHEN IT WAS FIRST INSTALLED

Please think back to the time when the fish sanctuary was first installed (about 14 years ago). I will ask a few questions about what you expected from the fish sanctuary then. Please focus on the time when the sanctuary was first installed.

4. When the plans were first announced, were you in favour or against the fish sanctuary in your Barangay?

- ☐ in favour
- ☐ didn't have opinion at the time
- ☐ against

Why? _____

_____

_____

5. Then, when it was first installed, were you in favour or against the fish sanctuary in your Barangay?

- ☐ in favour
- ☐ didn't have opinion at the time
- ☐ against

Why? _____

_____

_____

[IF THE ANSWERS TO QUESTION 4 AND 5 ARE DIFFERENT:]

Why did you change your mind?

_____

_____

_____

6. When it was first installed 14 years ago, what serious negative and positive effects did you expect the fish sanctuary to have for your household? Please tell me all the effects that you can think of.

NEGATIVE	POSITIVE
☐ A. Can't fish there anymore	☐ F. Income for Barangay from divers
☐ B. Can't go there (for example to swim)	☐ G. Reduces food scarcity
☐ C. Fish hide there, so can't catch them	☐ H. Barangay is more widely known
☐ D. Divers scare fish	☐ I. More fish for next generation
☐ E. Other:	☐ J. More beautiful coral reef
	☐ K. Other: .....

7. Please could you rank the effects that you mentioned from most important to least important?

Negative effects and positive effects all in the same list:

1. _____
2. _____
3. _____

8. When the MPA was first installed, the intention was that it would benefit the people of our Barangay.

- ☐ agree
- ☐ no opinion
- ☐ disagree

PERCEPTIONS OF FISH SANCTUARY – TODAY

Now let's talk about the present. I will ask the same questions that I asked about the past, but this time about the present. I would like to understand how your opinion about the fish sanctuary has developed since it was installed.

9. Are you now in favour or against the fish sanctuary in your Barangay?
   - ☐ in favour
   - ☐ no opinion
   - ☐ against

   If your opinion changed between 14 years ago and today, please explain why

   _____
   _____
   _____
   _____
   _____

10. What serious negative and what positive effects does the fish sanctuary have for your household this year?

NEGATIVE	POSITIVE
☐ A. Can't fish there anymore	☐ F. Income for Barangay from divers
☐ B. Can't go there (for example to swim)	☐ G. Reduces food scarcity
☐ C. Fish hide there, so can't catch them	☐ H. Barangay is more widely known
☐ D. Divers scare fish	☐ I. More fish for next generation
☐ E. Other:	☐ J. More beautiful coral reef
	☐ K. Other: .....

11. Please could you rank the effects that you mentioned from most important to least important?

    Negative effects and positive effects all in the same list

    1. _____
    2. _____
    3. _____

12. Because of the sanctuary, there is now more fish to catch.
    - ☐ agree
    - ☐ no opinion
    - ☐ disagree

13. If you fish: how much fish you can catch now, compared to if there would be no sanctuary?
    - ☐ more
    - ☐ the same
    - ☐ less
    - ☐ don't know

14. Fish reproduce in the sanctuary, and they swim out to where we can catch them.
    - ☐ agree
    - ☐ no opinion
    - ☐ disagree

15. When we approach the fish outside the sanctuary, they hide inside the sanctuary so that we can't catch them.
    - ☐ agree
    - ☐ no opinion
    - ☐ disagree

INVOLVEMENT

16. Have you ever seen the MPA under water (for example snorkelling)?
    - ☐ yes
    - ☐ no

17. Can you go into the sanctuary (for example snorkelling)?
    - ☐ no I'm not allowed
    - ☐ no it's too expensive
    - ☐ yes if I pay the access fee
    - ☐ yes, it is free

18. How much influence do you have on management of the fish sanctuary?

    1 2 3 4 5 6 7
    no influence |------|------|------|------|------|------|------| *very much*

19. How much influence do you have in running the Barangay?

    1 2 3 4 5 6 7
    no influence |------|------|------|------|------|------|------| *very much*

DISTRIBUTION OF COSTS AND BENEFITS

20. How much do the following groups benefit from the fish sanctuary?

not at all *very much*

	1	2	3	4	5	6	7
fishers	|------	|------	|------	|------	|------	|------	|------|
divers / tourists	|------	|------	|------	|------	|------	|------	|------|
your own household	|------	|------	|------	|------	|------	|------	|------|
next generation	|------	|------	|------	|------	|------	|------	|------|
bantay dagat	|------	|------	|------	|------	|------	|------	|------|
Barangay officials	|------	|------	|------	|------	|------	|------	|------|
Municipality officials	|------	|------	|------	|------	|------	|------	|------|
the Philippines	|------	|------	|------	|------	|------	|------	|------|

21. How much do the following groups bear any ill effects from the fish sanctuary?

not at all *very much*

	1	2	3	4	5	6	7
fishers	|------	|------	|------	|------	|------	|------	|------|
divers / tourists	|------	|------	|------	|------	|------	|------	|------|
your own household	|------	|------	|------	|------	|------	|------	|------|
next generation	|------	|------	|------	|------	|------	|------	|------|
bantay dagat	|------	|------	|------	|------	|------	|------	|------|
Barangay officials	|------	|------	|------	|------	|------	|------	|------|
Municipality officials	|------	|------	|------	|------	|------	|------	|------|
the Philippines	|------	|------	|------	|------	|------	|------	|------|

22. What is your opinion about that distribution?
    - ☐ fair
    - ☐ don't mind
    - ☐ unfair

23. What would you like to change about that distribution of positive and negative effects, if you could?

    _____
    _____
    _____
    _____

FUTURE

24. Should the MPA in your Barangay stay or not?
    - ☐ stay
    - ☐ remove
    - ☐ no opinion
    - ☐ other:

      _____
      _____
      _____

25. In your opinion, should anything be changed? (**you can select more than one**)
    - ☐ make bigger
    - ☐ make smaller
    - ☐ change regulations
    - ☐ change access fees for divers
    - ☐ change access fees for local people
    - ☐ change management (people)
    - ☐ other:

      _____
      _____
      _____

    Please explain why and how:

    _____
    _____
    _____

26. What other coral reef and ocean management measures should be implemented in the Barangay?

    _____
    _____
    _____

27. Please rank them from most important to least important:

1. _____
2. _____
3. _____
_____
_____
_____

GEAR RESTRICTION

One way of combining protection with fishing is when you install an area where only hook-and-line fishing is allowed. All other gear is prohibited there.

[*Interviewers explained in some more detail to those respondents who did not seem to understand.*]

28. Would you like to have such an area in your Barangay, in addition to the fish sanctuary?
- ☐ good idea
- ☐ no opinion
- ☐ bad idea

29. And what if you had to choose between a fish sanctuary OR a hook-and-line area?
- ☐ hook-and-line
- ☐ fish sanctuary
- ☐ no opinion

[If you chose hook-and-line:]

Compared to the MPA, what size should it be?
- ☐ smaller than the MPA
- ☐ the same size as the MPA
- ☐ bigger than the MPA

EFFECTIVENESS OF THE MPA

30. How effective is the MPA?

- ☐ very ineffective
- ☐ not effective
- ☐ effective
- ☐ very effective
- ☐ don't know

31. What is needed to make the MPA more effective?

- ☐ more equipment for bantay dagat (for example boat, search lights)
- ☐ more bantay dagat
- ☐ more marker buoys
- ☐ other: ...

WRAPPING UP

Is there anything else you would like to add?

_____
_____
_____
_____

Is there anything you would like to ask us?

_____
_____
_____
_____

Thank you very much for your time!

Appendix B – Questionnaire Napantao & Son-ok II (Visayan)

PAGPA-ILA

[*See English version for comment on this section: Introduction*]

PAGHULAGWAY

Kasarian	☐	lalaki
	☐	babaye
Pano-igun		_____
Estado	☐	Ulitawo/Dalaga
	☐	Minyo
	☐	Byudo/Byuda
Edukasyon	☐	elementarya (grade: ____)
	☐	high school (year: _____)
	☐	kolehiyo (college level)
	☐	wala maka-eskwela
		PILI-A ANG PANGITA NGA PWEDE NIMO
Pangita	☐	pagpanagat
	☐	pananum sa bukid
	☐	panday
		laing pangita:
	☐	_____
	☐	_____
Aduna ka ba'y kaugalingon nga pumpboat nga imong paga-gamiton para sa panagat?	☐	aduna
	☐	wala
		PILI-A ANG TANAN NGA PWEDE NIMO
Unsa nga mga gamit pang-dagat ang imong paga-gamiton kung ikaw managat na	☐	pana
	☐	pasol
	☐	pukot
	☐	bo' - bo'
	☐	_____
	☐	_____
	☐	_____

PANGUTANA

TANG-GAPAHAN / PAGDUMALA SA MGA ISDA

1. E kumpara ang kadaghanun sa isda sa inyong barangay karon ngadto sa kadaghanun sa isda kaniadtong mga 10 na katuig nga mi-agi?
   - ☐ mas daghan
   - ☐ daghan
   - ☐ parehas ra
   - ☐ minos
   - ☐ mas ni-minos

   Nganu man? _____

   _____

   _____

2. Sa imong tan-aw, pila na lang kadaghana ang isda sa sunod nga henerasyon?
   - ☐ mas daghan
   - ☐ daghan
   - ☐ parehas ra
   - ☐ minos
   - ☐ mas ni-minos

   Nganu man? _____

   _____

   _____

3. Sa imong opinyon, kinahanglan ba nga paga-dumalahon ang mga tang-gapahan ug ang dagat sa inyong barangay?
   - ☐ kinahanglan
   - ☐ walay opinyon
   - ☐ dili kinahanglan

KAHASOL UG BENTAHE KUNG ADUNA'Y SANGTUARYO PARA SA MGA ISDA

Palihug balika sa inyong panumduman kadtong panahon nga mao pa gi-mugna sa unang higayon (mga 14 ka-tuig na nga milabay) sangtuaryo para sa mga isda dinhi sa inyong barangay. Aduna ako'y mga pangutana mahitungod sa inyong gila-oman sa maong sangtuaryo para sa mga isda. Palihug e-tumong ang inyong hunahuna ngadto sa panahon nga mao pa kini gi-mugna ang maong sangtuaryo o lugar dalangpanan sa mga isda dinhi sa inyong barangay.

4. Mi-oyon ka ba o misupak sa dihang mga 14 katuig nga miagi GIPAHIBALO na kamo nga aduna'y pagahimuon nga sangtuaryo o lugar dalangpanan sa mga isda dinhi sa inyong barangay?

   ☐ mi-oyon
   ☐ walay ko'y opinyon adtong panahuna
   ☐ misupak

   Nganu man? _____

   _____

   _____

5. Mi-oyon ka ba o misupak sa dihang NAMUGNA O NAHIMO na ang maong sangtuaryo o lugar dalangpanan sa mga isda dinhi sa inyong barangay mga 14 na katuig nga niagi?

   ☐ mi-oyon
   ☐ walay ko'y opinyon adtong panahuna
   ☐ misupak

   Nganu man? _____

   _____

   _____

   (KUNG NAMAGLAHI ANG IYANG TUBAG SA PANGUTANA)

   Nganu nga nausob man ang imong hunahuna?

   _____

   _____

   _____

6. Mga 14 na katuig nga miagi, sa dihang kini unang gi-tukog, unsa'y mga negatibo ug positibo nga epekto sa inyong panimalay nga imong gila-oman gikan sa sangtuaryo sa mga isda. Palihug sultihe ko sa imong mahuna-hunaan.

NEGATIBO	POSITIBO
☐ A - dili na makapangisda	☐ F - aduna'y kita para sa barangay gikan sa mga divers (mudayib)
☐ B - dili na maka-adto o maka-langoy langoy sa lugar diin nahimutang ang sangtuaryo	☐ G - nakapa-minos sa kawad-on sa pagkaon
☐ C - ang mga isda adto mutago, ug tungod niini dili na makakuha ug isda	☐ H - mas na-ilhan o nisikat sa ang barangay
	☐ I - mas midaghan na nga nindot nga tang-gapahan
☐ D - ang mga isda mahadlok/kuyawan sa mga divers (daybirs)	☐ J - mas daghang isda para sa sunod nga henerasyon
☐ E - uban pa: _____ _____ _____	☐ K - uban pa: _____ _____ _____

7. Palihug ug imo ma sunod-sunod gikan sa pinaka-importante hangtud ngadto sa minos ug importansya ang epekto nga imong nahisgutan?

Negatibo ug positibo nga epekto, ilista sa usa ra ka listahan

1. _____
2. _____
3. _____

8. Sa dihang kini unang gimugna o gitukod, gina-ingon nga kini para sa kaayohan sa mga katawhan sa barangay?

☐ mi-oyon
☐ walay opinyon
☐ misupak

PAGLANTAW SA SANGTUARYO SA MGA ISDA – KARON

Niabot na kita sa KARON. Ako epangutana ang samang mga pangutana apan sa karon na nga sitwasyon. Buot nako masabtan ang kaugmaran sa inyong opinyon mahitungod sa pagmugna ning maong sangtuaryo o lugar dalangpanan sa mga isda dinhi sa inyong barangay.

9. Sa pagka-karon, oyon ka ba o supak nianing sangtuaryo o lugar dalangpanan sa mga isda dinhi sa inyong barangay.

   ☐ mi-oyon
   ☐ walay opinyon
   ☐ misupak

   Kung ang imong opinyon niadtong 14 katuig nga nilabay NAU-SOB na o lahi na sa imong opinyon karon, nganu man?

   _____
   _____
   _____
   _____
   _____

10. Palihug pili-a ang tanan epekto sa sangtuaryo nga nia sa inyong barangay nganha sa inyong panimalay karong tuiga nga imong gika-oyonan, ma negatibo man o positibo,ug kung duna pa man gani ka nga ika-dugang nga epekto, palihug ug esulti usab.

NEGATIBO	POSITIBO
☐ - dili na makapangisda	☐ - aduna'y kita para sa barangay gikan sa mga divers (mudayib)
☐ - dili na maka-adto o maka-langoy langoy sa lugar diin nahimutang ang sangtuaryo	☐ - nakapa-minos sa kawad-on sa pagkaon
☐ - ang mga isda adto mutago, ug tungod niini dili na makakuha ug isda	☐ - mas na-ilhan o nisikat sa ang barangay
☐ - ang mga isda mahadlok/kuyawan sa mga divers (daybirs)	☐ - mas midaghan na nga nindot nga tang-gapahan
	☐ - mas daghang isda para sa sunod nga henerasyon
☐ - uban pa: _____ _____ _____	☐ - uban pa: _____ _____ _____

11. Palihug ug imo ma sunod-sunod gikan sa pinaka-importante hangtud ngadto sa minos ug importansya ang epekto nga imong nahisgutan?

    Negatibo ug positibo nga epekto, ilista sa usa ra ka listahan.

    1. _____
    2. _____
    3. _____

12. Ug tungod ba sa sangtuaryo, daghan nang isda makuha karon?

    ☐ oyon ka
    ☐ walay opinyon
    ☐ supak ka

13. Kung ikaw managat, pila na kadaghana ang imong makuha nga isda KARON, kumpara sa una nga wala pa'y sangtuaryo o lugar dalangpanan sa mga isda dinhi sa inyong barangay?

- ☐ daghan
- ☐ parehas ra
- ☐ ni-minos
- ☐ wala ko kabalo

14. Ang mga isda gi-ingon nga magpasanay ngadto sa sangtuaryo ug diin sa higayon nga kini mulangoy pagawas sa maong sangtuaryo, dinha kamo maka-higayon ug pangisda sa maong mga isda?

- ☐ oyon ka
- ☐ walay opinyon
- ☐ supak ka

15. Oyon ka ba o supak nga kung kamo moduol sa mga isda nga naa sa gawas sa sangtuaryo kining maong mga isda mutago o musulod sa sangtuaryo, ug tungod niini, dili na kamo makakuha sa maong mga isda?

- ☐ oyon ka
- ☐ walay opinyon
- ☐ supak ka

PAGPAKIGLAMBIT

16. Nakakita na ba ka sa talan-awon o hitsura elawon sa dagat diha sa sangtuaryo ginamit ang usa ka antipara?

- ☐ oo
- ☐ wala pa

17. Maka-adto ba ka sa sangtuaryo para maglangoy-langoy o magtan-aw tan-aw sa elawon sa dagat ginamit ang antipara?

- ☐ wala, kay bawal
- ☐ wala, kay mahal ang bayad
- ☐ oo, basta duna'y ikabayad
- ☐ oo, kay libre ra man

18. Unsa kalapad ang imong impluwensya o gahom sa pagdumala sa sangtuaryo sa inyong barangay?

walay impluwensya	1	2	3	4	5	6	7	*halapad ug impluwensya*

19. Unsa kalapad ang imong impluwesya o gahom sa pagpadagan sa inyong barangay?

walay impluwensya	1	2	3	4	5	6	7	*halapad ug impluwensya*

PAGBAHIN-BAHIN SA DILI MAAYO UG SA BENEPISYO

20. Unsa kadak-a ang benepisyo gikan sa sangtuaryo ang nakuha sa musunod nga mga grupo?

	wala						*daghan kaayo*
	1	2	3	4	5	6	7
mananagat	|------|	|------|	|------|	|------|	|------|	|------|	|------|
daibir / turista	|------|	|------|	|------|	|------|	|------|	|------|	|------|
sa inyong panimalay	|------|	|------|	|------|	|------|	|------|	|------|	|------|
sunod nga henerasyon	|------|	|------|	|------|	|------|	|------|	|------|	|------|
bantay dagat	|------|	|------|	|------|	|------|	|------|	|------|	|------|
Barangay officials	|------|	|------|	|------|	|------|	|------|	|------|	|------|
LGU officials	|------|	|------|	|------|	|------|	|------|	|------|	|------|
the Philippines	|------|	|------|	|------|	|------|	|------|	|------|	|------|

21. Unsa kadak-a ang nahi-agumang dili maayong epekto gikan sa sangtuaryo sa mga musunod nga mga grupo?

	wala						*daghan kaayo*
	1	2	3	4	5	6	7
mananagat	|------|	|------|	|------|	|------|	|------|	|------|	|------|
daibir / turista	|------|	|------|	|------|	|------|	|------|	|------|	|------|
sa inyong panimalay	|------|	|------|	|------|	|------|	|------|	|------|	|------|
sunod nga henerasyon	|------|	|------|	|------|	|------|	|------|	|------|	|------|
bantay dagat	|------|	|------|	|------|	|------|	|------|	|------|	|------|
Barangay officials	|------|	|------|	|------|	|------|	|------|	|------|	|------|
LGU officials	|------|	|------|	|------|	|------|	|------|	|------|	|------|
the Philippines	|------|	|------|	|------|	|------|	|------|	|------|	|------|

22. Unsa man ang imong opinyon sa maong pagkabahin-bahin sa negatibo ug positibo nga mga epekto?

- ☐ patas
- ☐ wala ko'y paki-alam
- ☐ dili patas

23. Kung tagaan ka ug higayon, naa ba kay gusto usbon mahitungod ana nga pagkabahin-bahin?

_____
_____
_____
_____

ANG KAUG-MAON

24. Ato pa ba ipabilin o kinahanglan na pahawaon o undangon ang sangtuaryo sa inyong barangay?

- ☐ ipabilin
- ☐ wagtangon na
- ☐ wala'y opinyon
- ☐ uban pa nga ikasulti:

_____
_____
_____

25. Sa imong opinyon, naa ba'y kinahanglan nga usbon o bag-ohon, pwede ka makapili sa tanan nimong nagustohan nga tubag?

- ☐ palapdan
- ☐ pa-gamyan
- ☐ usbon ang ubang balaod
- ☐ usbon ang balayrana para sa mga daybirs
- ☐ usbon ang balayrana para sa mga lumulupyo sa lugar (locals)
- ☐ usbon ang tig-dumala/bag-o nga tig-dumala
- ☐ uban pa nga ikasulti:

_____
_____
_____

Palihug esulti unsa-un ug nganu?

_____
_____
_____

26. Unsa pa man laing pama-agi sa pagprotektar sa tang-gapahan ug sa kadagatan nga gusto nimo buhaton nganhi sa inyo barangay?

_____
_____
_____

27. Palihug ug imo ma sunod-sunod gikan sa pinaka-importante hangtud ngadto sa minos ug importansya ang epekto nga imong nahisgutan?

1. _____
2. _____
3. _____
_____
_____
_____

NILIMITAHANG MGA GAMIT

Usa ka pa-agi sa pag-usa sa pagprotektar o pagpanalipod sa mga isda mao ang pagtukod ug usa ka lugar diin pwede maka-pamasol. Samtang ang uban nga paagi sa pagpangisda dili pwede sa maong lugar.

28. Gusto ba ka nga gawas nga aduna na kamo'y sangtuaryo anaa pa gayud kamo usa pa ka lugar nga sama niini?
- ☐ maayo nga ideya
- ☐ walay ko'y opinyon adtong panahuna
- ☐ dili maayo nga ideya

29. Kung kintaha'y papilion ka, unsa man ang imong pilion, sangtuaryo para sa mga isda o lugar pasolanan?
- ☐ lugar pasolanan (hook-and-line)
- ☐ sangtuaryo para sa mga isda
- ☐ wala'y opinyon

[Kung ang gipili, lugar pasolanan:]

Unsa kadak-a ang imong ikasugyot nga kadak-on sa lugar pasolanan?
- ☐ gamay pa sa sangtuaryo
- ☐ parehas kadak-a sa sangtuaryo
- ☐ mas daku pa sa sangtuaryo

ANG KA-EPEKTIBO SA SANGTUARYO

30. Unsa ka epektibo ang sangtuaryo?
- ☐ arang ka wala'y ayo
- ☐ dili epektibo
- ☐ epektibo
- ☐ arang ka epektibo
- ☐ wala kabalo

31. Unsa'y kinahanglang buhaton para mahimong mas epektibo ang sangtuaryo?
- ☐ mas daghang gamit para sa taga bantay dagat (for example boat, search lights)
- ☐ mas daghang bantay dagat
- ☐ mas daghang tima-elhan sa dagat (marker buoys)
- ☐ mas klarong plastada sa mga tima-elhan sa dagat (marker buoys)
- ☐ _____
- ☐ _____
- ☐ _____

HINAPOS NGA BAHIN

Aduna pa ba ka'y dugang ikasulti?

_____
_____
_____
_____

Aduna pa ba ka'y mga pangutana?

_____
_____
_____
_____

Daghang salamat sa oras nga imong gigahin para niini!!!