

Socio-Economic Conditions and Perceptions on the Conservation of Tubbataha Reefs and Vicinity: A Households Survey in Cagayancillo, Palawan

Rodelio F. Subade*¹ and Ana Liza A. Subade²

¹Associate Professor in Economics
Division of Social Sciences, College of Arts and Sciences,
University of the Philippines in the Visayas, Miag-ao, Iloilo 5023A
²Ph.D. Candidate and WWF-USA Russel E. Train Fellow
School of Environmental Science and Management
University of the Philippines Los Baños, Los Baños, Laguna
Date submitted: March 2, 2006; Date accepted: October 12, 2006

ABSTRACT

This paper presents the results of a socio-economic monitoring survey of 110 sampled respondents/ households across the 12 barangays of Cagayancillo, using a survey instrument through personal interviews. Findings show that on the average, the respondent was 48 years old, with 7 years of formal education, has lived in Cagayancillo for 31 years and belonged to a family/household with 6 members. Cagayanens had shifted to farming as the main source of their livelihood and income, while fishing was only second. Based on their income data, Cagayanens are living below poverty threshold level of income. Poverty incidence ranged from 67-79% of the Cagayanen households. The income data for 1999 and 2004 when compared, plus the respondents' perception that present aquatic resources are not in good condition, somehow allude to the possibility that the Cagayanens may just easily fall on the vicious cycle of poverty and environmental degradation.

The good news can be the increasing involvement of people in coastal resource management and conservation. By including the people in the main Cagayancillo islands as beneficiaries of and participants in the conservation efforts and projects, WWF-Philippines/ KKP has perhaps initiated a good momentum for a democratized and more sustainable stakeholders management of coastal resources in Cagayancillo. In order to sustain this momentum for continuous people's participation in coastal resource management and conservation, and eventually the alleviation of poverty in Cagayancillo, concerned policy makers and other entities need to consider some options, one of which is the continuation of conservation efforts started by WWF-Philippines for another 2-3 years.

Key words: Cagayancillo, Tubbataha Reefs, socio-economic, perceptions, conservation, WWF-Philippines

*Corresponding author

INTRODUCTION

Cagayancillo (or Cagayancillo islands) is an archipelagic town of the province of Palawan, consisting of 31 islands and islets. It lies approximately 320 kilometers east of Puerto Princesa and about 98 kilometers southwest of Panay island. It has 12 barangays and a population of 6,348 people or 947 households (2000 census of the National Census and Statistics Coordinating Board).

The islands of this municipality are part of an extensive coral atoll system, hence they are of coralline origin (Alcala, 1993 as cited by Arquiza and White, 1994). As the nearest town and closest human settlement to the Tubbataha reefs national marine park (TRNMP) and UNESCO world heritage site, Cagayancillo covers the said reefs under its political jurisdiction. As such, any conservation measure to protect and preserve the TRNMP will inevitably include and consider the role of and impacts on Cagayanen people.

Considering that Cagayancillo residents are major stakeholders in the conservation of TRNMP, the GEF-funded Tubbataha conservation project, which was implemented by WWF-Philippines (or the Kabang Kalikasan ng Pilipinas, i.e. KKP) included among others, sustainable resource management and livelihood. This component aimed at: (a) increased understanding of the resource use and socio-economic factors leading to resource depletion in TRNMP, Cagayancillo and Cavili; (b) implementation of community-based resource management, including management of local reserves; (c) and setting up of community-based livelihood projects that are linked to conservation management (WWF-Philippines, 1999).

As part of the end-of-project activities, WWF-Philippines funded this study in order to provide updated information on the socio-economic conditions of households in Cagayancillo, Palawan. Specifically, this study aims:

1. To assess the current socio-economic conditions in Cagayancillo.

2. To determine changes in the over-all socio-economic conditions in Cagayancillo, comparing the present conditions with those prior to the WWF-GEF-UNDP conservation project; and

3. To assess people's perception of conservation efforts in Cagayancillo, particularly during the WWF-GEF-UNDP five-year conservation project.

CONSERVATION EFFORTS IN CAGAYANCILLO

The emergence of coastal resource management in Cagayancillo can be traced from the evolution of multi-sector arrangements for the conservation of Tubbataha Reefs which is part of the municipality (Figure 1). It took the initiative of one person to ring the alarm bells for Tubbataha, and subsequently the various effort of stakeholders non-government organizations and government agencies, for these Reefs to become a national marine park. Eventually, these initiatives become the launch pad for coastal resource management in the whole municipality.

Arquiza and White (1994) discussed the evolution of multi-sector social response to the decline of marine environmental quality at Tubbataha Reefs mainly due to illegal fishing. In 1987, a native of Palawan, Ernesto Sta. Cruz, who was working with Task Force Pawikan wrote a request addressed to Vice Governor Ventura to declare Tubbataha as a marine park. In response, the Palawan provincial legislative board passed Resolution No. 244 on September 7, 1987, requesting the Department of Environment and Natural Resources (DENR) to declare Tubbataha as a marine park in order to protect its fisheries and aquatic resources. Responding to this request, President Aquino issued Proclamation 306, which declared Tubbataha as the first national marine park.

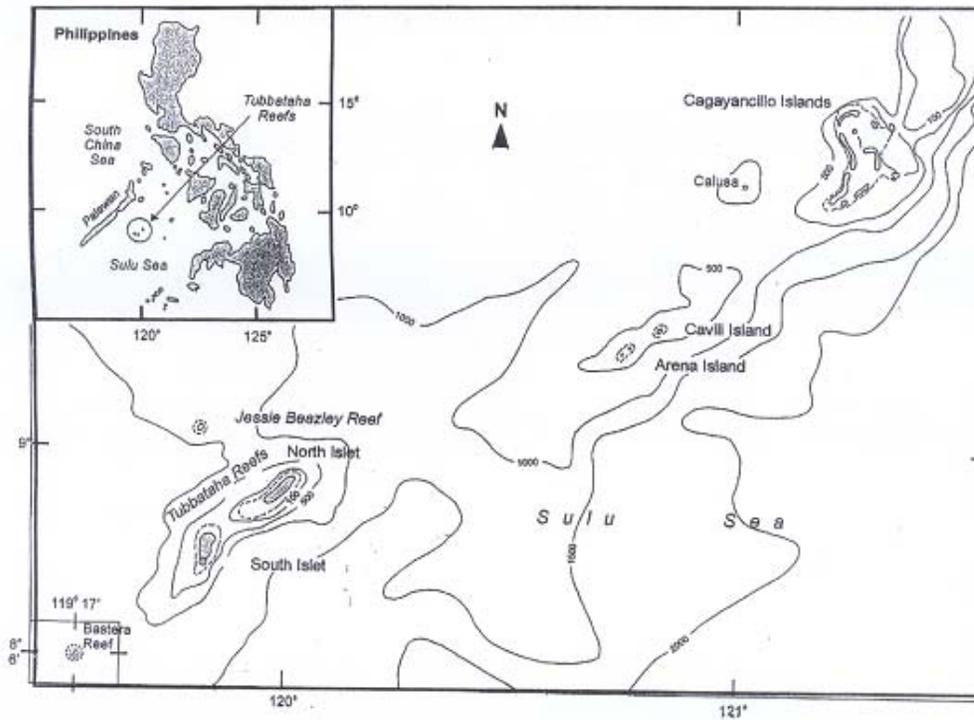
What followed was a protracted battle on the establishment of Shemberg's (a private company based in Cebu) seaweed farm in Tubbataha, the endorsement for which was marked with controversy and dirty politics. Eventually, the joint efforts of various stakeholders, initiated by Sta. Cruz whistle blow, led

to Shemberg's abandonment of the plan, the politicians backing off from the amendment to Proclamation 306 which was to allow the seaweed farm in Tubbataha, and the ejection of the seaweed farmers at the park per order by the DENR.

In the late 1980s, conservationists, scuba divers, dive boat owners and Manila-based scientists, organized the Tubbataha Foundation. This Foundation worked for the conservation and protection of Tubbataha, and was also instrumental in the discontinuation of the seaweed farm. The foundation was appointed eviction team leader. In 1990, DENR signed a Memorandum of Agreement with the Foundation for the protection of Tubbataha. From 1991-1993 the Foundation received funds for conservation efforts through the debt-for-nature swap. However, the Foundation was perceived as lacking in networking with other groups or stakeholders.

Recognizing the rich biodiversity in Tubbataha and its global value/importance, the UNESCO declared it as a World Heritage Site on December 11, 1993. On July

20, 1995, Presidential Fidel Ramos issued memorandum circular no. 128 which created the Presidential Task Force for Tubbataha jointly headed by the DENR Secretary and the chairman of the Palawan Council for Sustainable Development (PCSD). On November 7, 1996, the co-chairmanship of the task force was designated to the DENR Secretary, Secretary of National Defense and the Governor of Palawan, representing PCSD. In this year the management plan for Tubbataha was drafted and refined through the efforts of Coastal Resource Management Project (CRMP), Japan International Cooperation Agency (JICA), DENR, PCSD, WWF-Philippines and the stakeholders of Palawan and Cagayancillo. In June 1998, the Tubbataha Protected Area Management Board (TPAMB) was created through the memorandum of agreement between Governor Salvador Socrates and DENR Secretary Victor Ramos. In October 13, 1999 the TRNMP management plan was approved by the TPAMB, and in November 26, 1999, the PCSD also approved the plan. It is in this year that TRNMP was enlisted in the Ramsar List of Wetlands of International Importance,



Source: White, et. al (2003).

Figure 1. Cagayancillo islands with Tubbataha reefs.

and also when the GEF-supported conservation project administered by WWF-Philippines started.

It must be pointed out that most of the efforts for coastal/marine resource management have been focused on the conservation of Tubbataha, and less on the other Cagayancillo islands. Though the Tubbataha Foundation started some work on setting up cooperative in Cawili island in 1990, not so much were undertaken by any party for coastal resource management in the archipelagic municipality. It could have been ideal to do so, but perhaps society's focus at that time was glued more on the urgency to save Tubbataha. As part of the 5-year GEF grant through WWF-Philippines, community organization/development work was undertaken in Cagayancillo itself, in order to increase awareness and seek the municipality's long-term partnership in conserving Tubbataha and other marine resources of Cagayancillo.

METHODS

A perusal of available secondary materials - previous study of WWF-Philippines, municipal documents and other research studies, was done. For primary sources of data, a household survey was undertaken using a stratified random sampling of Cagayancillo households during the month of May 2004. Sample size was computed at 95, given a 95% level of confidence. To maximize interviewers fieldwork, a total of 102 households were surveyed, proportionately allocated across the 12 barangays of Cagayancillo. Initially, due to big waves and difficulty of reaching the islands by boat, the two sitios, Cavili and Calusa were not included in the sampling. However, due to better weather, a field survey was undertaken in the these island sitios of Bgy. Magsaysay. Eight (8) respondents were then sampled, thereby increasing total sample to 110.

Eleven field interviewers from Cagayancillo were trained on the use of the survey instrument, and were supervised on field while conducting personal interviews of respondents who were usually household heads or the spouse. The survey instrument comprised the following sections: (1) eight demographic questions; (2) a household composition matrix; (3) six questions on economic activities; (4) nine questions on economic conditions; (5) a appliance composition

matrix; (6) two matrixes consisting of a six-point Likert-type scale were used to evaluate residents perception on changes in over-all economic conditions (7) 13 questions on residents' perception on conservation programs; (8) a martrix on respondent's involvemen in conservation programs; (9) a problem-solution matrix in the management of coastal resources. To complement with survey data, key informant interviews were also conducted with the town mayor, municipal agricultural officer, some barangay captains, an old age resident who have lived in the village through the years and seaweed farmers. These were conducted to obtain background information and history of the study site and conservation programs implemented in Tubbataha and Cagayancillo. A focus group discussion with a group of fishermen was also undertaken to evaluate the status of coastal resources and to determine problems in the management of these resources.

RESULTS AND DISCUSSIONS

Socio-Economic Characteristics of Respondents

Results of the study showed that on the average, respondents interviewed were 47.6 years old. The biggest age group or cohort was the age group of 40-49 years old. Seventy six percent of the respondents were male while 24% were female. Average number of years of education was 7.45 years (Table 1). Almost all (97.3%) of the Cagayanens were Catholic while only 2.7% were Baptists. Main language spoken was the native Cagayanen, while many people can also speak and understand Tagalog, Cuyonin, Kinaray-a, Ilonggo and Cebuano. The Cagayanen household had an average number of 6 members.

Only 46.4% (or 51 of 110) of the respondents had lived there since birth. A significant 23.4% or 26 people had lived in the town for only 10 years or less, signifying that there have been many people who have moved into Cagayancillo for the past decade.

Socio-Economic Conditions of Respondents

Most household respondents owned their house and lot. Of the total respondents, 95% owned their house, while 86% owned their lots where their house stood.

Characteristics	Minimum	Maximum	Mean	Std. Dev.
Years of Education (n=109)	1	14	7.45	2.83
Household Size	1	14	6.13	2.50
Age	25	78	47.58	13.72
Years of Residence in Cagayancillo	1	73	31.27	20.99
Age Distribution:	Frequency	Percent		
Below 30	12	10.9%		
30-39	23	20.9%		
40-49	28	25.45%		
50-59	24	21.8%		
60-69	15	13.64%		
70-above	8	7.27%		
Sex	Frequency	Percent		
Male	84	76.36%		
Female	26	23.64%		
Total	110	100%		

Table 1. Socio-Economic Characteristics of Respondents

Majority (72%) of the used galvanized iron (G.I.) sheets for their house roofing, while 17% used nipa. For their house walling, 33% used sawali (bamboo slits), 22.7% used mixture of cement and wood, 18% used lawanit and wood and 17.3% used mainly cement. The above information may imply that Cagayanen households had limited capability in house construction expenditures. Eighty-eight percent of households (97 of 110) had their own toilets. Of these 97 households, 62 had water sealed toilets, 17 used open pit, and 14 used closed pit toilets. For water source, 60% were totally dependent on installed water tanks which gather/ store rain water, 19.1% relied mainly on open wells, and combination of the two.

The main fuel used for cooking was wood-based (wood or charcoal), which was cited by 69% of the sampled respondents. Seventeen percent (or 19 of 110) used a combination of LPG, and wood (& charcoal), while 10% used only LPG. About 3.6% used kerosene gas. Sources varied, but lighting were mainly sourced from kerosene gas (50% of households). Only few households depend on electricity (23%). This is attributed to the limited and insufficient electric supply, which lasts only for the daily period of 6:00 pm to

11:00pm among poblacion barangays. Generator, both owned and others'/neighbors constitute 10% as lighting source.

In terms of ownership of household appliance, majority (or 82%) owned at least one appliance, 23.6% owned two appliances, and only 12% owned three appliances. This indicates the simple or very modest living conditions of Cagayanen households. The most common appliance owned was the radio (65.6%).

Economic Activities and Livelihood

Income Sources and Livelihood Occupations/Jobs.

The distribution of jobs/ occupation of Cagayanens showed variability and less dependence on fishing as source of livelihood. Compared to the results of the 1999 socio-economic survey conducted by WWF-Philippines that showed fishing and seaweed farming as the major sources of livelihood. It is interesting to note that the leading occupation of the respondents was not fishing, but farming as evidenced by 27% who cited this as their first occupation (Table 2). This was followed by fishing, (24.5%). Other jobs were along

Type of Job/Occupation	Frequency as 1st Job	Frequency as 2nd Job
1 Fisherman	27 (24.5)	18 (16.4)
2 Seaweed Farmer	2 (1.8)	4 (3.6)
3 Farmer (crops)/farming	30 (27.27)	13 (11.8)
4 Teacher	3 (2.7)	---
5 Gov't Employee	1 (0.9)	---
6 construction workers	1 (0.9)	---
7 carpenters	6 (5.5)	3 (2.7)
8 home-based livelihood (poultry, livestock)	2 (1.8)	4 (3.6)
9 home-based livelihood (banig making)	4 (3.6)	3 (2.7)
12 Housewife/housekeeper	11 (10)	---
15 Businessman	3 (2.7)	1 (0.9)
17 Brgy. Officia/SK	10 (9.1)	---
18 Day Care Worker/ Brgy Health Worker	2 (1.8)	3 (2.7)
20 Retiree/pensioner	1 (0.9)	---
21 laborer/maid/janitor/ security/utility worker	3 (2.7)	1 (0.9)
0 No Job/occupation/ none	4 (3.64)	60 (54.5)
Total	110	110

Figures in parentheses are percentage of column totals

Table 2. Respondent's Occupation/ Job

construction and home-based livelihood. There were very few professionals. Very few cited seaweed farming as their occupation/source of income, and this may be attributed to the so-called "ice-ice" disease which has infested farmed seaweed for the past few years. The few former seaweed farmers admitted abandoning it as a source of livelihood due to the said seaweed disease, which resulted to severe losses.

To upgrade/ supplement household income, 45.5% (or 50 respondents) of the respondents had a concurrent second job/occupation. Fishing had become a second occupation (36%) followed by farming (26%). Others were into home-based livelihood, and seaweed farming (2%).

If the different main occupations/ livelihood sources of all working family members are considered and tabulated, farming remained the widest employer, attributed to 63 family members, compared to 53 for fishing, across the 110 households of respondents. Furthermore, farmers would outnumber fishers, 89 vs. 81, respectively, if we tabulate all main and concurrent second (and third) livelihood sources/ occupations of family members.

Per Capita and Family Income.

Based on the information on family members occupations/ sources of income, household or family income was computed. The average family (household) income for Cagayanens was P3418.48 per month or P41021.760 per year. However, this figure is good for the average household size of 6.13 members for Cagayancillo, as found in the same survey. On a per capita (per person) basis, Cagayanens earned P557.66 per month or P6691.97 per year. Translating such amount to a national standard of a five-member family/ household, monthly household income would have been P2788.32, while annual household income would be P33459.84.

The poverty threshold level of income for rural Palawan in year 2002, based on the National Census and Statistics Board, was a monthly income of P894.08 per capita per person or P4470.42 per month per family/ household of five members. Hence, a rural person of Palawan should then earn P10729 to be able to live at the poverty threshold, or P53645.00/year. It is evident that the 2004 level of income of Cagayanens is way below the 2002 poverty threshold level of income, and much less for 2004 since prices have gone up in 2004 compared to 2002 (Note: available poverty threshold level of income at NSCB is only for 2002). Based on the results of the study on the total family income earned by Cagayanens, the poverty incidence can range between 67% to 79% of the population.

Perceptions on changes in the over-all socio-economic conditions

To determine perceived changes in over-all economic conditions, respondents were asked to compare quality of life in 1999 with that of the present 2004 (Table 3).

Most of them (45.5%) mentioned that the economic condition did not change. Only 25.5% believed that 2004 quality of life is better than that of 1999, the rest believed other wise that 2004 was worse than 1999.

In terms of household income, 49.1% believed that their income decreased in 2004 compared to that of 1999 (Table 4). Around 24% on the other hand, said that although their income increased this year, they could only buy less goods, due to increasing prices. Similar to conservation programs in Belize (Alexander, 2000), residents perceived that their living conditions hardly improved with the establishment of the Community Baboon Sanctuary. Though many residents felt that neither their households nor themselves were benefiting, majority of them did not want the Sanctuary abolished and strongly supported maintaining its status.

Moreover, several questions on perceived changes in socio-economic conditions since 1999 were asked (Table 5). On the number of students studying in elementary and high school, 73% of the respondents thought they were increasing. Only 8% believed this indicator was decreasing, while 10% thought there were

	Frequency	Percent
Better	28	25.5
Worse	28	25.5
The same	50	45.5
Can't Tell	2	1.8
No Answer	2	1.8
Total	110	100.0

Table 3. Comparing quality of life since 1999 to present

	Frequency	Percent
Higher, but can buy less goods	26	23.6
Higher, and can buy more goods	7	6.4
Lower	54	49.1
Can't tell	12	10.9
No Answer	3	2.7
The same	8	7.3
Total	110	100.0

Table 4. Comparing income since 1999 to present

Compare Present Conditions to that of 1999	Higher/Increasing	Lower/Decreasing	No changes	Can't tell	No answers
Number of students studying in elementary and high school	80 (72.7)	9 (8.2)	11 (10.0)	10 (9.1)	--
Number of students in elementary and high school who dropped out	21 (19.1)	55 (50.0)	15 (13.6)	17 (15.5)	1 (0.9)
Number of families who can eat 3 times a day & has enough food to eat	49 (44.5)	10 (9.1)	42 (38.18)	7 (6.4)	2 (1.8)
Number of families who moved out to other places (n=109)	58 (52.7)	20 (18.2)	17 (15.5)	13 (11.8)	1 (0.9)
Number of people in Cagayancillo/ population	89 (80.9)	7 (6.4)	8 (7.3)	5 (4.5)	1 (0.9)
Number of transient fishers in Cagayancillo from other places (n=108)	12 (10.9)	48 (43.6)	14 (12.7)	21 (19.1)	13 (11.8)
Number of migrants who settled in Cagayancillo (n=107)	9 (8.2)	39 (35.5)	29 (26.36)	16 (14.5)	14 (12.7)
Level of health sources	33 (30.0)	8 (7.3)	61 (55.5)	6 (5.5)	2 (1.8)
Frequency/number of crimes	6 (5.5)	29 (26.4)	32 (29.1)	18 (16.4)	20 (18.2)
Amount of fish catch (n=108)	15 (13.6)	54 (49.1)	24 (21.8)	9 (8.2)	6 (5.5)

Table 5. Perceptions on changes in socio-economic conditions

no changes. On the other hand, 50% of the respondents also thought that the number of drop-out have decreased, while 19% thought they were increasing, and 13.6% said there was no change.

On another positive note, 44.5% believed that more families can eat three times a day and have enough food were as compared to that of 1999. Although 38% perceived that there is no change.

As regards people's mobility/ out-migration, 53% of the respondents thought that in 2004 higher number of people moved to other places compared with 1999. Moreover, despite such movements, 81% of the respondents believed that the municipality's population has increased.

Corollary to this, 36% believed that the number of migrants who decided to settle in Cagayancillo in 2004 has decreased, while 26% said there was no change on this indicator. Considering increased population, it is important that health services increased in its level of provision to the community. However, 56% believed that there is no change, or that the level of services remains the same compared to 1999, while 30% thought that level of health services increased for the same comparative periods.

As to peace and order, 29% believed that there is no change in the peaceful atmosphere of the town, while 26% even believed that there are even less crimes nowadays than before. Only 6% believed that crimes have increased.

Perhaps due to conservation/ enforcement efforts, 44% of the respondents believed that the transient fishers who come to Cagayancillo nowadays have decreased compared to 1999. However, a big 19% could not really tell if it was so, while 12% had no answer. For fish catch, 49% believed that it decreased in 2004 compared to 1999, 22% believed there is no change, while 14% thought it increased in 2004.

Perception on the condition of aquatic resources

With regards to the present condition of aquatic resources, about 46.4% of the respondents believed that these resources are not in good condition and only

30.0.% say otherwise. On the other hand, more respondents observed that aquatic resources in 1994 and in 1998 were in good condition (Figure 2).

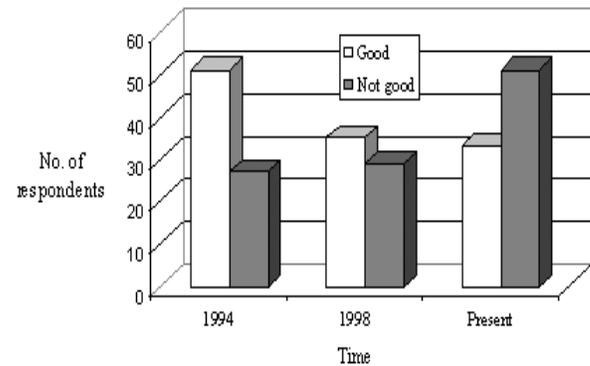


Figure 2. Perceived condition of aquatic resources through time

The primary reason for the deteriorating condition of aquatic resources is the effect of illegal/destructive fishing (17.2%). It was reported in one study that one blast of dynamite fishing could damage about 7.5 square meters of coral reef area (McManus et. al., 1992). Considering that corals have very slow growth rate which ranges from 2-20 cm. per year depending on the life form (Wells, 1984), it would indeed be difficult for the corals to recover for a span of 10 years, and much more difficult for just 5 years (1999-2004). In the study of Alcala and Gomez (1979) as cited in Uychiaoco et. al. (1995) it was reported that recovery of adult coral communities from blast fishing would take about 38 years, while Yap et. al. (1990) reported a slow rate of 1-3% coral cover per year in his study. Thus, despite the five-year conservation program in Tubbataha and Cagayancillo, and the recent fisheries law enforcement in Cagayancillo, the negative effects of destructive fishing are still evident, while the tangible effects of conservation still need to be felt by the Cagayanens. Other reasons for the deterioration were implementation of conservation programs were not implemented throughout the municipality (1.8%), due to bad weather or climate (1.8%), increasing number of fishers (1.8%), the aquatic resource is not taken cared of (0.9%) and the increasing number of population (0.9%).

On the other hand, the major reasons of those who perceived why the aquatic resources are in good

condition at present, are: the disappearance of illegal fishing (10%), existence of coast patrols and guards (7.3%), lessening of illegal activities (5.5%), and establishment of programs of local government unit (3.6%) and of Kabang Kalikasan ng Pilipinas (3.6%). Perception on and awareness of conservation programs Half (50%) of the respondents were members of various organizations. Only five respondents were officers and members at the same time. They were either chairman or vice-chairman of the organization. Among the different organizations mentioned, fisherfolk (26.4%), a fishermen's organization, was the most cited organization that the respondent was involved with. Even some of those who were no longer engaged in fishing were still members of the fisherfolk organization. Other organizations were barangay based, religious based and people's organizations. Respondents (30%) involvement in the different organizations were within the period of 2002-2003, which is within the period when conservation programs of KKP-WWF were on its implementation. For those who were not yet members, majority (81%) was willing to be a member of an organization.

Only a few respondents (12.7%) named organizations existing before KKP-WWF implemented programs in the area. The aims of these organizations are shown in Table 6. When asked of who started conservation programs in Tubbataha and Cagayancillo, the respondents (47.3%) cited KKP-WWF. This was

followed by government agency (e.g. DENR or DA) at 18.2%.

With regards to those persons or institutions that significantly contributed in the management and improvement of marine resources, 67.27% of the respondents cited KKP-WWF. The local government unit and government agency (e.g. DA and DENR) were also mentioned with 14.54% and 8.18% respectively. The contributions of the abovementioned institutions are shown in Tables 7 and 8. Others mentioned are PNP/Tanod, Mayor Joel Carcelar, fisherfolk, Bantay Dagat, BFARMC and individuals who in one way or another helped in various activities or programs.

The major contribution of KKP-WWF is in the management and protection of marine resources. Other major contributions are provision of training and seminars and assistance in addressing illegal fishing. These were also mandates of LGU and government agencies. It could be observed that the management and improvement of marine resources covers wider tasks and needs support of different individuals and institutions for its implementation.

While many of the respondents (45.5%) were not aware of any conservation project/program to protect marine resources of Cagayancillo and Tubbataha, it could be noted that 40% were aware of these programs. Some of these programs mentioned were the KKP-WWF

Name of Organization	Aim	Frequency	Percent
Fisherfolk	1. For the good of fishermen and seaweed farmers/growers	2	16.67
	2. As guards of the sea.3. For livelihood program	1	8.33
	3. For livelihood program	1	8.33
Samaka	None		
Marine Reserve	1. As guards of the sea.	1	8.33
BFARMC	1. For the good of fishermen and seaweed farmers/growers	1	8.33
	2. To help people.	1	8.33
	3. For livelihood programs	4	33.33
Cooperative	1. For the good of fishermen and seaweed farmers/growers	1	8.33
TOTAL		12	100.00

Table 6. Organizations with its aims before WWF conservation programs

conservation project (32.56%), coastal resource management e.g. establishment of marine reserves (20.93%), programs of the fisherfolks (16.28%), creation of BFARMC (9.3%), and creation of Bantay Dagat (4.65%). The activities cited by the respondents involved in the different programs are shown in Table 9.

Contributions	Frequency	Percent
Spearheaded the conservation program	2	2.90
Helped so many and without them all the corals are destroyed	2	2.90
Provided projects	2	2.90
Provided seaweeds	1	1.45
Helped in prohibiting illegal fishing	9	13.04
Manage & protect marine resources	33	47.83
Patrol	1	1.45
Established reserve areas	2	2.90
Helped in the right way of fishing	3	4.35
Provided training & seminar to obtain information	14	20.29
Total	69	100

Table 7. Contributions of KKP-WWF in the management and improvement of marine resources.

Contributions	Frequency	Percent
Helped in prohibiting illegal fishing	8	57.14
Manage and protect marine resources	1	7.14
Helped in the right way of fishing	1	7.14
Provided training and seminar to obtain information	3	21.43
Patrol	1	7.14
Total	14	100

Table 8. Contributions of LGU in the management and improvement of marine resources.

Among these activities, only 29.1% of the respondents participated in these projects and programs. The level of participation of the residents is quite higher than in other areas in the country. Uychiaoco and Aliño (1995) estimated that only a small proportion of the population (less than 10% of fishers in a given area) participate in a community-based coastal resource management programs in the Philippines. Among those who participate, their contributions to these programs are shown in Table 10.

Activities	Frequency	Percent
1. Enforcement of fisheries laws	6	25
2. Information dissemination of management and protection of marine resources	3	12.50
3. Implementation of reserve areas per barangay	3	12.50
4. Prohibition of illegal fishing methods	3	12.50
5. Patrol of coastal waters	3	12.50
6. Planting of seaweeds or mangroves	2	8.33
7. Implementation of protected areas to enhance fish growth.	2	8.33
8. Alternative livelihood.	1	4.17
9. Prohibition of dumping of waste in the coastal waters	1	4.17
TOTAL	24	100.00

Table 9. Projects/Programs to protect marine resources of Cagayancillo and Tubbataha

Activities involved	Frequency	Percent
As part of the enforcement of fishery laws through bantay dagat and patrolling	10	38.46
Informing the community to avoid illegal activities	3	11.54
Prohibiting of illegal fishing	2	7.69
Mangrove planting	2	7.69
Seaweeds cultivating	1	3.85
Reporting illegal activities	2	7.69
Participation in what ever activities	2	7.69
Assisting in monitoring of coastal resources	1	3.85
Paying due fees e.g. fishing license	1	3.85
Attending trainings and seminars	2	7.69
TOTAL	26	100.0

Table 10. Residents' contribution to conservation program.

With regards to whether the conservation programs benefited the Cagayancillo community, majority of the respondents who were aware of or involved in these programs (93.18%) answered yes. A number of them (61.70%) also believed that the mechanisms on how these conservation programs were implemented were not contradictory to their indigenous culture and tradition. Table 11 shows how the conservation programs benefited the Cagayancillo community. The perceived benefits from conservation programs were interrelated, e.g. the lessening of illegal fishing activities (17.%) could be due to the presence of

Benefits	Frequency	Percent
Alternative livelihood	1	2.5
Informal education	3	7.5
Illegal activities were lessen	7	17.5
Able to catch fish	1	2.5
Increased fish growth	4	10
Presence of Bantay Dagat and patrols	3	7.5
Conservation of the marine resources	6	15
Implementation of reserve areas	1	2.5
People source of income	4	10
KKP gives fry and fingerlings/capital to the community	2	5
Increase knowledge/information about the conservation of marine resource	3	7.5
Helping the poor	3	7.5
The mangroves planted became the spawning grounds of fishes	1	2.5
Gives satisfaction to the people	1	2.5
TOTAL	40	100.0

Table 11. Perceived Benefits of the Cagayancillo community from conservation program

Bantay Dagat and patrols (7.5%). This in turn could have resulted to increased fish growth (10%) and thus could be one of the people sources of income (10%). Another benefit is the increase in people awareness and information regarding marine resources. This benefit could be due to the information and education campaign activities of the WWF.

There were only two reasons cited by those who perceived that the community did not benefit from conservation programs. First, programs were not realized and second people were not able to benefit from the programs of KKP-WWF. It would be politically naïve to conclude that all forms of participation are always beneficial to the participants. In most cases, it would take some time for the community to enjoy the benefits of conservation programs considering that it would take years for the natural resources to recover. Nevertheless, the community's contribution in the programs through the provision of their peoples' labor is worth noting. The enlistment of members of the community, often on a voluntary basis, is a good form of participation. Later, some may act as catalysts for other community development effort.

Most (98%) of those involved in conservation programs agreed that these should be continued for a number of reasons (Table 12).

Perceived problems in the management of coastal resources

The use of illegal fishing methods seems to be a major problem in Cagayancillo. This is further exacerbated by the lack of patrol in area and intrusion of outsiders using illegal fishing. Solutions given were to increase patrol and to report and arrest illegal fishers. According to Fiscal Julius Conception, the problem with illegal fishing is the lack of witnesses to testify against those illegal fishers. In most cases, the illegal fishers were acquitted due to lack of witnesses (Table 13).

To address problems on illegal fishing in Tubbataha, the Tubbataha Management Office had encouraged its support groups and stakeholders to help in the enforcement of laws. In particular, the Navy and the Coast Guard have been mobilized to enforce park rules in Tubbataha, in addition to the TMO's hired park rangers and logistical inputs. In addition, the local government of Cagayancillo and the Provincial Government have deputized the Kilusan Sagip Kalikasan (KSK) to help in the enforcement of local

Reasons	Frequency	Percent
For the good and development of the community in Cagayancillo.	22	50.00
The program is now operating/ has started.	1	2.27
To encourage growth of fishes and the marine resources	4	9.09
To control illegal fishing	4	9.09
So that marine resources and spawning grounds will not be destroyed	3	6.82
To give the people of Cagayancillo enough income	3	6.82
Provided seaweeds for cultivation and materials needed.	3	6.82
To be able to help the poor like us	1	2.27
To inform and spread the programs of KKP to develop our locality	2	4.55
The intentions are good	1	2.27
TOTAL	44	100.0

Table 12. Reasons why conservation programs should be continued

Problems	Frequency	Solutions	Frequency
Lack of patrol	8	Police should patrol always	3
Poverty	3	Increase patrol	2
Use of illegal fishing	17	Go fishing	1
		Avoid use of illegal fishing	12
		Increase patrol	4
		Report and arrest illegal fishers	7
		Give due punishment to illegal fishers	4
To stop outsiders in using illegal fishing	3	Prohibit intrusion of outsiders to fish	3
Lack of access to Tubbataha	1	To make a resolution to allow fishing in Tubbataha	1
The sea is deteriorating	2		
Intrusion of outsiders	5	Authorities should make inspection	2
		Prohibit intrusion of outsiders to fish	3
Death of sea weeds	5	Ask help from the government	3
No means of transportation	1	Provide vehicle	1
Lack of funds for fishery, seaweeds and others	11	Help, assist, provide funds for livelihood/jobs	3
		Look for funding for seaweeds farming	1
Lack of fish net	2	Provide credit	1
Lack of nylon	1		
Lack of boat	2	To work hard in order to earn	
		Help, assist, provide funds for livelihood/jobs	11
Loss of octopus	1		
Insufficient/lack of products e.g. fish. sea weeds etc.	11	Guard the fish, seaweeds and other marine resources	2
Lack of patrol boats	6	Ask support from the NGO/government for a vehicle to patrol	5
Lack of weapons for patrol guards	1	Request weapons from the National Government	1
Lack of radio communication in patrolling	1	Provide radio communication	1
Lack of information	3	Information education through training and seminar	3
Lack of source of income/livelihood	2	To pray for the development of seaweed project	1
		Help, assist, provide funds for livelihood	1
Lack of fishing tools and equipment	2		
Lack of transportation vehicle	1	Provide rice that could be bought in Cagayancillo	1
Lack of sufficient fish to catch	1	Avoid destroying corals	1
Destroyed coral reefs	1	Avoid destroying corals	1
Lack of information regarding KKP	1	Information education through training and seminar	1

Table 13. Problems with solutions in the management of coastal resources

and national fishery laws in coordination with the local government and other agencies.

Another major problem is the lack of fund or financial support for fishery and other livelihood in the area. Funding is quite difficult to obtain considering that Cagayancillo is a fifth class municipality with no sufficient income to support government's projects. The islands are also isolated from mainland Palawan thus there are difficulty in the transportation of goods and services. Poor soil condition and lack of irrigated lands make it also difficult for rice production in the

area. In addition, despite being a pristine area, only upper level tourist can afford to travel and dive in Cagayancillo particularly in Tubbataha.

Changes in the over-all socio-economic conditions

Over the span of 5 years from 1999, i.e. when the WWF-Philippines Tubbataha Conservation Project started until 2004, the last year of the project, some changes on the socio-economic conditions in Cagayancillo could be stated.

1. More movement/ migration of people. The 1999 survey of WWF-Philippines showed that only 17% have resided in the municipality only for the last 10 years (decade). This study found that such constituent has grown to 23.4%, perhaps as a product of people's in-migration from mainland Palawan, and other provinces in the Visayas.

2. Slight increase in high school educational attainment. A small improvement in the educational attainment could be noted. From a 17%, those who completed high school was about 24% based in this survey for 2004. Assuming that the high school education was of good quality, Cagayancillo now have more trainable people for other livelihood activities other than fishing. Improved literacy of these families will have a higher chance of gainful employment, thus veering away from high dependence on fishing.

3. Decreased/Lower Income Level. At current prices, the 2004 level of family income is P3418.48, which is lower than the 1999 level of P3812 pesos. Computing the real value of peso, the family income in 2004 is only P2784.792 in 1999. Considering constant prices, or converting it to actual purchasing power, the 2004 level of income is then much lower than that of 1999. This is an indication of a "worse off " condition or lower level of welfare for the Cagayanens.

This may imply that the effects or impacts of illegal/ destructive fishing that has occurred in Cagayancillo have lingered. It would take longer for coral reefs to recover and restore the productivity of fishing grounds. Moreover, the disease which struck seaweeds for the past few years diluted a supposed-to-be very good source of income and livelihood for many Cagayanens. No wonder why more residents have resorted to farming as their main source of income/livelihood.

4. Change in Income Sources Composition/ Livelihood. As found by this survey, and compared to the 1999 survey by WWF-Philippines, the Cagayanens have shifted towards farming as main source of income and livelihood, relegating fishing only as second source of livelihood. This is understandable since households must ensure that staple food (rice, cassava and corn) has to be made available given that fishing is not a

stable source of income. In several occasions, respondents interviewed mentioned they cultivate cassava and corn which can provide them food / staple for about one to two months. Seaweed farming is also no longer a major source of livelihood because of the seaweed disease that resulted to severe losses.

The occurrences of illegal fishing have had also severe impact on the population of Cagayancillo, and on the conservation of Tubbataha Reefs. In the study of Subade and Subade (2004) shows that 76% of the surveyed residents in Cagayancillo cited illegal fishing has negative impact on people's economic conditions and livelihood. They believed that the destructive methods of fishing would eventually result to no catch, and hence no income, which would results to poor living conditions, suffering and hunger. Indeed, illegal/ destructive fishing is not sustainable - in the short run, it may give abundant catch or lots of money to the fishers, however, it would eventually destroy the marine environment, which is the source of livelihood of people. In addition,. the declaration of Tubbataha Reefs as no-take zone reduced fishing as the primary source of income of Cagayanens. The shift to farming as another source of livelihood may indicate their coping mechanism to ensure more stable supply of food.

5. Some indication of ageing population. Comparing the 2004 with 1999 data, population structure shows ageing of Cagayanen population, whereby the senior citizens now compose 21% of the population, compared to 18% in 1999. The 50-59 age cohort this year has reached 22%% compared to 17% in 1999. This will imply higher need for health services for these people, particularly the senior citizens.

6. Higher level of people's involvement in governance system. People's organizations and people's involvement in several activities seem to show greater participation of Cagayanens in governance. Though this data were not gathered in 1999 study, 73% (35 of 48) of those who mentioned the years/ period of their involvement indicated that it was only in the past two-three years that they have been involved in organizations. People's involvement in organizations, particularly fisher folks and other conservation

organizations are effective ways of hastening better governance towards sustainable resource management. The increasing level of participation of the coastal residents can be a good take off point and must be sustained.

SUMMARY AND CONCLUSIONS

As an end-of-project activity of the WWF-Philippines Tubbataha Conservation Project, the present socio-economic monitoring survey was conducted. A total of 110 respondents were randomly selected, proportionately distributed across the 12 barangays of Cagayancillo. Field interviews were undertaken by 11 interviewers, spot-checked and supervised by three field supervisors.

On the average, the respondent was 48 years old, with 7 years of formal education, has lived in Cagayancillo for 31 years and belonged to a family/household with 6 members. Almost all respondents owned their lots and homes, more than 50% of which were made of G.I sheets for roof and sawali, wood, wood/lawanit and or pawid/nipa for walling. At least 60% admitted they relied solely on rain-fed water tanks for water source. Electricity could barely meet a quarter of the respondents' lighting needs.

As to livelihood and income sources, Cagayanens had shifted to farming as the main source of their livelihood and income, while fishing was only second. Household income per month was P 3418.48 for a 6-member family/household, or P 2788.32 for the standard 5-member household/family. These shows below poverty threshold level of income for Cagayanens, since rural Palawan had a poverty threshold income benchmark of P4470.42 way back in 2002. Poverty incidence ranged from 67-79% of the Cagayanen households, an indication of further threat to environmental resources in Cagayancillo.

Cagayanens can/may just easily fall on the vicious cycle of poverty and environmental degradation, i.e. due to poverty, people would be pushed to further over-extract from environmental resources and may even use destructive methods to do so, further depriving

themselves of sustainable sources of livelihood, and even worsening their poverty conditions. The income data for 1999 and 2004 when compared, plus the people's perception that present aquatic resources are not in good condition, somehow allude to the possibility that the cycle is happening.

Some changes in socio-economic conditions may however show that Cagayanens are able to cope or are coping with the difficulties they are confronting. There is perception that many of the Cagayanens have moved to other places in search for better opportunities, a sign of less stress to the environmental resources. However, more people have moved into Cagayancillo in the past decade, which may be good if these people are well-skilled and would utilize resources in more sustainable manner. Secondly, more people were able to complete their high school education, an indication of better trainability of the populace, perhaps for other alternative livelihood outside fishing.

Despite the decreased income level for Cagayanen households (for the period 1999 to 2004), they were able to cope, such that, the perception is that there are more families/people who could eat 3 times a day and have enough food nowadays. The shift to farming as main source of livelihood may indicate their coping mechanisms to ensure more stable supply of staples corn and cassava, since rice had to be imported yet at higher price from mainland Palawan and Iloilo.

The good news can be the increasing involvement of people in coastal resource management and conservation. Perhaps more people have now realized the importance of protecting and sustainably managing coastal resources, which was their main source of livelihood. By including the people in the main Cagayancillo islands as beneficiaries of and participants in the conservation efforts and projects, WWF-Philippines/KKP has perhaps initiated a good momentum for a democratized and more sustainable stakeholders management of marine/coastal resources in Cagayancillo (which also includes Tubbataha Reefs). The momentum need to be sustained to ensure genuine success.

RECOMMENDATIONS

To sustain the momentum for continuous people's participation in coastal resource management and conservation, and eventually the alleviation of poverty in Cagayancillo, concerned policy makers and other entities need to consider the following options:

1. Formal and non-formal education and training in sustainable agriculture and farming for selected qualified Cagayanens need to be provided as soon as possible. Soil analysis by experts will provide best advise on the well-suited crops for different areas of Cagayancillo. Moreover, due to the unsustainability of chemical and fertilizer dependent farming/crop system, organic farming need to be explored as an option for higher yield.

2. Scholarships for selected qualified high school graduates from Cagayancillo need to be provided in order to increase income possibilities for these households, particularly the poorest of the poor households. Various sources can be tapped – municipal budget can request for yearly appropriation; Palawan congressmen; First Gentleman Arroyo will likely donate if given the proper communication and information; an NGO-sponsored program may be designed to ensure success of this scholarship.

3. In order to address the problem on illegal fishing, increase the Bantay Dagat or law enforcement capabilities of Cagayancillo LGU. The establishment of a Bantay Dagat is a laudable move. However, with only two boats running at 7-8 knots, patrolling the vast municipal waters of the 31-islands and islets municipality would be a gargantuan task. Additional patrol boats, and even faster boats will be needed to increase law enforcement and further minimize illegal fishing activities. Moreover, incentives on those who help arrest or find illegal fishers must be continued. In fact, these (cash) incentives must be expedited as soon as the arrest has been done, verified and documented.

4. Community-based ecotourism mainly based on marine and coastal resources and environment will be an option with very bright prospects for Cagayancillo. Details of this is discussed in Subade and Subade

(2004). This will properly complement environmental conservation with increasing household and municipal incomes.

5. The conservation efforts started by WWF-Philippines, should be continued for another 2-3 years. These conservation activities include among others, conservation management (includes financing, policy making), conservation awareness through information education campaign (IEC), community development, and research and monitoring. GEF or other funding sources may be tapped, and should seriously consider providing additional budgetary support for the fruitful work started by WWF-Philippines. As an experienced environmental NGO, and since it has already established good rapport and networking in Cagayancillo, WWF-Philippines is in the best position to continue and sustain the conservation efforts in the next 2-3 years.

As found by this study, it seems that the positive effects and fruits of conservation work still need to be felt and realized by many of the households. Conservation work and community development efforts take many years, not just five years, to take root and bear fruits. Continuity and sustainability of the efforts need to be ensured. WWF-Philippines need to seriously consider this matter.

6. Partnership and alliances with other government and non-government institutions need to be explored. They may provide needed manpower, financial support and scientific inputs to the coastal resource management in Cagayancillo.

7. Socio-economic monitoring study and survey can be done every two-three years for database development. Given the data recording can be put in place in the respective barangays the needed time and resources for data collection and field interviews can be lessened later on. Indicators of success/needs based from future monitoring studies will provide proper signals on what further interventions still need to be undertaken. These information and data are usually needed crucial inputs for good proposals for funding projects for the localities.

ACKNOWLEDGMENTS

This study was funded by the Kabang Kalikasan ng Pilipinas Inc. (WWF-Philippines) and by UNESCO (United Nations Educational Scientific and Cultural Organization) Contract No. 4500014225 through the Tubbataha Protected Area Management Board. The authors would like to acknowledge the support of Ms. Marivel Dygico, Team Leader of the WWF-Philippines Tubbataha Conservation Project, and Ms. Angeliq Sonco, Tubbataha Park Manager and Head of the Tubbataha Management Office, and the field assistance of Ms. Zoe Latumbo of WWF-Philippines. Assistance in data encoding and analysis was ably provided by Ms. Dianne Hope Tormon. In addition, the authors also thank the travel support of Conservation International-Philippines through the Philippine Association of Marine Science Foundation Inc., and of the University of the Philippines in the Visayas, to enable the authors in presenting the paper and participate in the 8th National Symposium in Marine Science held in Palawan State University, Puerto Princesa City on October 20-22, 2005.

REFERENCES

Arquiza, Y. and A. White. 1994. Tales from Tubbataha: Natural history, resource use, and conservation of the Tubbataha reefs, Palawan, Philippines. Mandaluyong City, Philippines: Rainee Trading and Publishing Inc.

Cesar, H.J. 2000. Coral reefs: their functions, threats and economic value. In Cesar, H. 2000. Collected Essays on the Economics of Coral Reefs. Boras, Sweden: CORDIO and SIDA.

McManus, J.W., Nañola Jr. C.L., Reyes Jr. R.B. & Kesner, K.N. 1992. Resource Ecology of the Bolinao Coral Reef System. International Center for Living Aquatic Resources Management, Manil, Philippines.

Subade, R.F. and A.L.A. Subade. 2004. Socio-Economic Impacts of Illegal Fishing on the Conservation of Tubbataha Reefs National Marine Park and UNESCO World Heritage Site, Cagayancillo, Palawan. Final Report of Research Project Commissioned by the Tubataha Protected Area Management Board under UNESCO Contract Number 4500014225 and the WWF-Philippines.

Uychiaoco A.J., Aliño P.M., Mielat E.F.B. & Campos R.T. 1995. Coral Reef Science and Management in the Philippines. In Philippines Coral Reef Information Network (PhilReefs).

Uychiaoco A.J. & Aliño P.M. 1995. Coastal Management in the Philippines. In Philippine Coral Reef Information Network (Philreefs).

Wells, S.M. 1984. What's Happening to Coral Reefs? Iclarm Newsletter. Metro Manila. Philippines.

WWF Philippines. 2000. Tubbataha Reef National Marine Park and World Heritage Site: Management Objectives, Strategies and Actions, p. 15.

White A.T., Ledesma M.C. & Ovenden M. 2003. Tubbataha Reefs National Marine Park, Palawan. In Philippine Coral Reefs Through Time: Workshop Proceedings. Second of the Atlas of the Philippine Coral Reefs Series. Coral Reef Information Network of the Philippines (PhilReefs), University of the Philippines Marine Science Institute, Quezon City, Philippines and the Marine Parks Center, Tokyo, Japan.

WWF Philippines 2000. Conservation of the Tubbataha Reef National Marine Park and World Heritage Site. A Project Proposal submitted to the UNDP-GEF.