# Swallowed by a cayman : integrating cultural values in Philippine crocodile conservation

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# 6. ASSESSING THE EFFECTIVENESS OF ENVIRONMENTAL EDUCATION: MOBILIZING PUBLIC SUPPORT FOR PHILIPPINE CROCODILE CONSERVATION[1]

## INTRODUCTION

Communication, Education and Public Awareness (CEPA) campaigns play an increasingly important role in biodiversity conservation (Jacobson & McDuff 1998; Monroe 2003). The negative social impacts of State and market mechanisms to conserve biodiversity has stimulated a search for community-based approaches that advocate the participation of local resource users in decision-making processes and the integration of conservation and development objectives (Ghimire & Pimbert 1997; Berkes 2004). It is now widely recognized that disseminating information to and enhancing the knowledge of rural communities is essential for the sustainable management of natural resources (Baland & Platteau 1996; MEA 2005a). Conservation projects use a variety of social marketing techniques such as posters, comic books, billboards, flipcharts, newsletters and radio plugs to raise public awareness, change attitudes and influence behavior (Sutherland 2000). But only scant data exist on the cost-effectiveness of these efforts (Fien *et al*. 2001; Ferraro & Pattanayak 2006; Brooks *et al.* 2009). It is estimated that 40 to 50 percent of all CEPA campaigns fail, but as most of these education and communication efforts are not assessed the organizers never find out (Ostergaard 2002). CEPA campaigns can be significantly improved if experiences would be more thoroughly documented, compared and substantiated with scientific evidence (Sutherland *et al*. 2004; Steward *et al*. 2005). This is particularly relevant in developing countries, such as the Philippines, where financial resources for conservation are scarce, governments typically lack the capacity to enforce environmental legislation and poor rural communities often regard restrictions on resource use as arbitrary and illegitimate (Sodhi *et al.* 2004).

This paper assesses the effectiveness of a CEPA campaign for the conservation of the Philippine crocodile in the wild in the northern Sierra Madre on Luzon, the Philippines. Commercial hunting has led to the disappearance of this endemic species throughout most of its historic range (Ross & Alcala 1983). At present the species only survives in the northern Sierra Madre on Luzon and the Liguasan Marsh on Mindanao. With less than 100 mature crocodiles in the wild, the species is classified on the IUCN Red List as Critically Endangered (IUCN 2010). Since 2004 the Philippine crocodile is legally protected (by virtue of the Wildlife Act, Republic Act 9147). However most people in the Philippines, including many government officials, are unaware of the protected status of the species, or consider the enforcement of environmental legislation of low importance (van der Ploeg & van Weerd 2004). Philippine crocodiles continue to be killed for food or out of fear, most often without a response from the authorities. People

think crocodiles pose a threat to children and livestock. Moreover in Philippine society crocodiles are associated with egoism and greed: corrupt government officials and selfish athletes are called *buwaya*, crocodile in Filipino. These negative public attitudes inhibit in-situ crocodile conservation (Banks 2005).

In 1999 a conservation project was set up to save the species in the wild. Conservation efforts focus on 15 remote *barangays* (villages) in the municipality of San Mariano. In cooperation with the department of development communication of Isabela State University (ISU) a CEPA campaign was designed to mobilize broad public support for the conservation of the species in the wild. This goal is reflected in the slogan of the campaign: 'the Philippine crocodile; something to be proud of!' The underlying logic of the campaign is that by disseminating information on legislation protecting crocodiles, the killing of the species would stop. Between 2002 and 2008 the Philippine crocodile conservation project spent US$ 80,000 on environmental communication and education; approximately 25 percent of the total budget. In this chapter I aim to determine whether the CEPA campaign succeeded in raising awareness on the protected status of the Philippine crocodile, change attitudes towards the in-situ conservation of the species, and influence behavior of people living in Philippine crocodile habitat.

Changes in awareness, attitudes and behavior are affected by a diverse set of context-related factors that can often not be attributed to a specific intervention (Sollart 2004; Schacter 2002). Therefore, following Fien *et al*. (2001), I assess the CEPA campaign for the Philippine crocodile in San Mariano in terms of the material products of the project (outputs), the number of people exposed to the outputs (outreach), the changes brought about by the outputs in people's awareness and attitude (cognitive and affective outcomes), and the longer term cumulative effect of the CEPA campaign on people's behavior (impact) (figure 6.1).

## METHODS

### Study area

The municipality of San Mariano is located in the foothills of the northern Sierra Madre mountain range in the province of Isabela (figure 6.2). Approximately 45,000 people live in this remote rural area. Over the past century Ilocano, Ibanag and Ifugao immigrants have settled in the area. The Kalinga and Agta, the indigenous people of the northern Sierra Madre, now form small minorities (< 10 percent). San Mariano is one of the poorest municipalities of the Philippines: 60 percent of the people live on less than US$ 1 per day (NSCB 2005). The official literacy rate in the rural area is 81 percent, but only 37 percent of the inhabitants have attained secondary education (high school). Most people depend on farming: corn, rice and bananas are major cash crops. Harvesting

timber is another important source of cash income for many households. In 2001 the forests of the municipality were included in the Northern Sierra Madre Natural Park, the largest terrestrial protected area of the Philippines (IUCN protected area category II). Wetlands are intensively used by rural communities for fishing, washing and shading livestock, and the land around it for farming and logging.

A small and fragmented remnant Philippine crocodile population was discovered in 1999 in the municipality of San Mariano. Three breeding sites were identified in San Mariano: Dunoy Lake in barangay Dibuluan, Disulap River in Disulap and San José, Dinang Creek in Cadsalan. Hunting, the use of destructive fishing methods (fishing with dynamite, electricity and pesticides) and the reclamation of freshwater wetlands posed a severe threat to the remnant population (van Weerd & van der Ploeg 2004). CEPA activities focused on people living in or directly adjacent these 3 breeding sites. Crocodiles are occasionally reported in other villages in San Mariano. In these areas the Mabuwaya Foundation also disseminated information on crocodiles but much less systematic and frequent than in the core area. Philippine crocodiles no longer occur near San Mariano town; few CEPA activities were therefore conducted in the urban area.

Figure 6.1: Logical model to assess the effectiveness of CEPA campaigns (adapted from Fien *et al.* 2001; Ostergaard 2002; Schacter 2002).

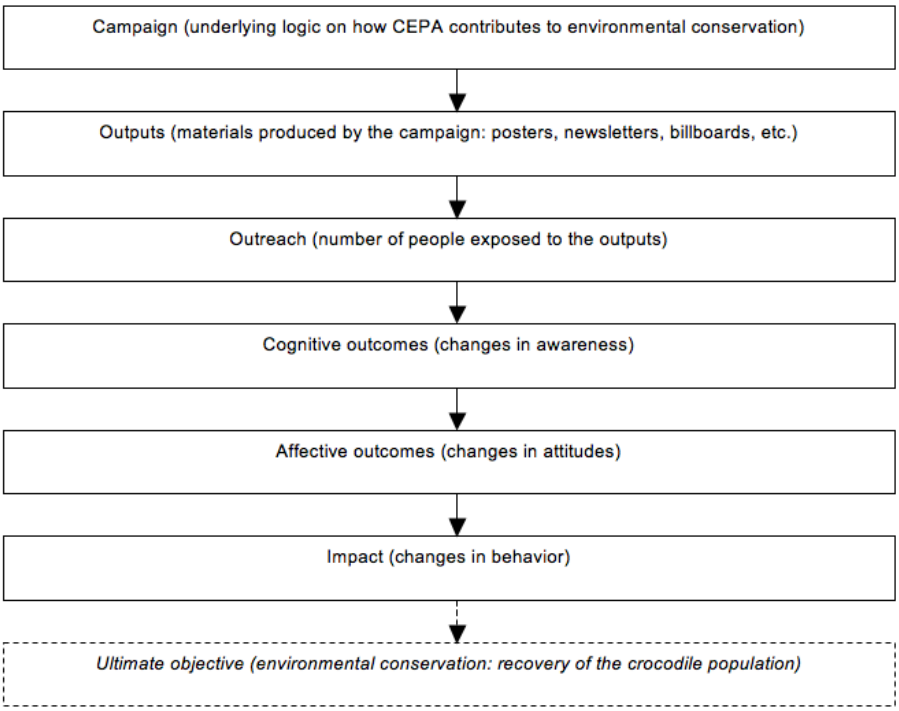
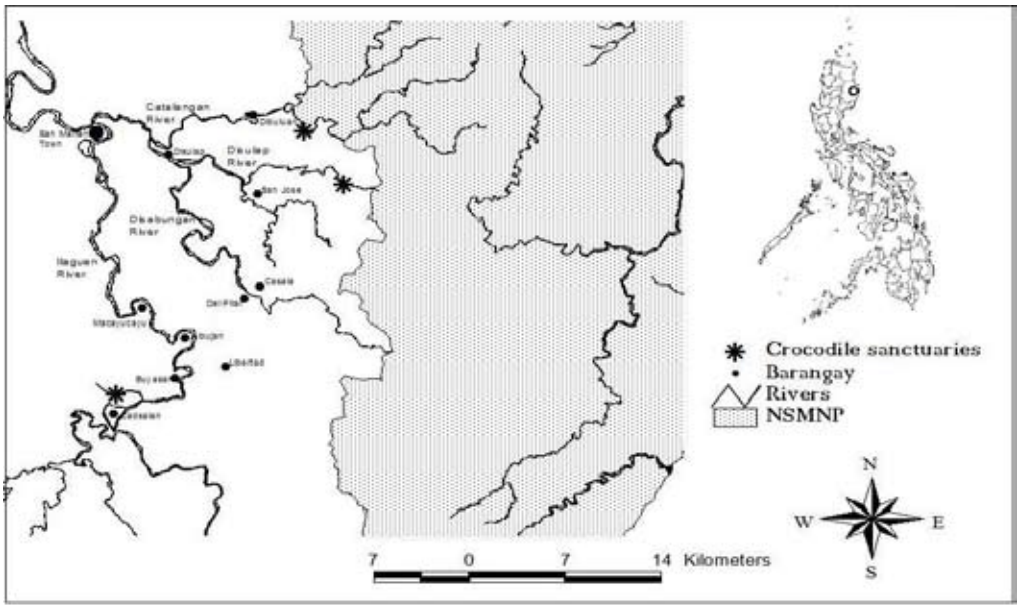


Figure 6.2: The municipality of San Mariano




Note: Philippine crocodile sanctuaries are marked with an asterisk. People living in barangays adjacent to these protected areas were specifically targeted in the CEPA campaign (Dibuluan, Disulap, San Jose and Cadsalan = core area). People in barangays where Philippine crocodiles are occasionally observed were exposed less frequently to the CEPA outputs (Casala, Del Pilar, Macayucayu, Ibujan, Buyasan and Libertad = peripheral area). Two barangays in San Mariano town that were not specifically targeted in the CEPA campaign were also included in the research (Zone 1 and Zone 2 = urban area). Barangays Batong Laban and Lapi (= control group) are located north of the municipality of San Mariano, outside this map.

## Data collection and analysis

I designed a structured questionnaire which included: (1) questions on the socioeconomic background of the respondent; (2) open and fixed-response questions on the Philippine crocodile and its conservation; (3) questions on the CEPA outputs (using pile sorting in which the respondents were asked to rank order photographs of CEPA outputs in terms of what was most useful for them); and (4) statements to measure attitudes towards crocodiles (using a standard 5-point Likert scales ranging from 'strongly agree' to strongly disagree'). Seven ISU students were trained to administer the questionnaire face-to-face. The questionnaire was translated in Ilocano, the lingua franca in North Luzon, and pre-tested with respondents in a village outside the research area.

A stratified random sample was drawn in 14 barangays, forming a gradient from being intensively subjected to CEPA outputs (the core area) to not receiving any information on crocodiles (the control group). Four barangays in San Mariano were

selected that have been the focus of intensive CEPA efforts (the core area): Dibuluan (total population 1,248), Disulap (1,866), San Jose (1,708), and Cadsalan (1,138). In addition, data was collected in 6 barangays in San Mariano that have been exposed to the CEPA campaign on a less frequent basis (the peripheral area): Buyasan (705), Del Pilar (1,374), Ibujan (688), Libertad (755), Macayucayu (603) and Casala (1,033). People were also interviewed in two barangays in San Mariano town (the urban area), where people were much less exposed to the CEPA campaign: Zone 1 (1,633) and Zone 2 (1,919). In the absence of reliable baseline data, 2 barangays were selected that served as a control group: Batong-Labang (2,379) in the municipality of Ilagan, and Lapi (2,602) in the municipality of Peñablanca.

This control group enables a counterfactual comparison (Ferraro & Pattanayak 2005; Schonbäg 2002). This naturalistic experiment is based on the assumption that these 4 areas differ only in their exposure to the CEPA campaign. This assumption was tested by comparing the socioeconomic background of the respondents in the 4 different areas. There were no significant differences between the age and sex of respondents in the control area and those in San Mariano. People in the urban area (San Mariano town) are better educated and more affluent than people in the core, peripheral and control areas. The areas also differ in terms of ethnicity. Batong Labang consists of Ilocano, Tagalog and Ifugao migrants, whereas most people in barangay Lapi are Itawis. Another possible confounding effect is that Philippine crocodiles were exterminated in Batong Labang and Lapi in the 1980s. The absence of crocodiles could in theory influence attitudes towards the species as people no longer know the species from their own experience.

In every village 40 respondents were randomly selected from a list of all inhabitants (the barangay profile), excluding children below 7 years old. When someone could not be interviewed on 3 separate attempts, another respondent was selected from a reserve list. A total of 549 respondents were interviewed. In Disulap only 28 respondents participated because people were busy harvesting corn. In Libertad 41 respondents were interviewed because a fisherman insisted of being interviewed. Nobody refused to participate in the research. Interviews took approximately 50 to 60 minutes. People were interviewed individually whenever possible. No payments were made for information. Respondents did not directly associate the ISU students with the Mabuwaya Foundation, the Department of Environment and Natural Resources (DENR) or the Local Government Unit (LGU); I therefore think that ‘politically correct’ answers were largely avoided. To minimize possible biases straightforward and simple questions were asked to the respondents (for example: is the Philippine crocodile protected by law?), which resulted in categorical variables (yes; no; don’t know).

Data from the questionnaire was encoded and analyzed in SPSS 15.0. Likert scales scores were transformed into nominal variables because respondents seldom strongly agreed or strongly disagreed with the statements. As I am primarily

interested in comparing the different areas against one another in order to determine the effectiveness of the CEPA campaign, I did not take a proportionate sample nor weighted the results. I used a binary logistic regression analysis (forced entry) to examine the effect of 12 CEPA outputs (billboards, wall paintings, posters, radio plugs, comic books, newsletters, school presentations, cultural show, puppet shows, school field visits, community consultations and training workshops) on cognitive outcomes (the likelihood that the respondents know that crocodiles are protected in the wild) and affective outcomes (the likelihood that the respondents support in-situ crocodile conservation). I compared the respondents who reported not being exposed to a specific output with the respondents who reported having seen the output, using odds ratios. The odds ratio determine whether the probability of a certain event is the same for two groups: in this particular case whether awareness of legislation of respondents is higher if they see a poster than if they did not see it, or whether support for in-situ conservation of respondents who have watched a cultural show is higher that of respondents who haven't. Odds ratios are now widely used in epidemiological studies, because they are a useful indicator of the strength of the relationship between two categorical variables (Tambashe *et al.* 2003). To test whether differences between the 4 different areas were statistically significant, I used a Pearson's chi-square test (a non-parametric test with unrelated comparison groups).

To assess the long-term impact of the CEPA campaign I relied on field observations and ethnographic methods. The Mabuwaya Foundation monitors the Philippine crocodile population in San Mariano on a quarterly basis using spotlight night surveys (van Weerd & van der Ploeg 2004). During these quarterly field visits information is gathered on crocodile mortalities, destructive fishing practices, human-crocodile conflicts and land use changes adjacent to the crocodile sanctuaries. Reported crocodile mortalities were verified on site. Informal interviews with fishermen, farmers and village officials provided qualitative insights on changes in people's awareness, attitudes and behavior.

## RESULTS

### Outputs and outreach

Table 6.1 provides an overview of the outputs and outreach of the CEPA campaign. Following Jacobson (1999) I differentiate between passive, active and interactive outputs.

The Mabuwaya Foundation distributed a quarterly newsletter to government agencies and communities living adjacent to crocodile habitat. Six informative posters were designed, of which 15,500 copies were distributed in San Mariano. Ten 60-

seconds radio plugs were broadcasted by a regional radio station (DWPE in Tuguegarao City). Billboards and wall paintings were placed on strategic locations throughout the municipality. A comic book was distributed to all elementary school children in San Mariano (7 to 12 years old). In addition, the foundation organized 22 puppet shows and gave 60 presentations in elementary schools in the municipality. Students of ISU performed a cultural show in 14 villages during the annual fiesta. Seven hundred high-schoolchildren (13 to 17 years old) and students (18 to 22) were brought to the field for 2 days to see the Philippine crocodile in the wild. The Mabuwaya Foundation also facilitated 48 community consultations to discuss crocodile conservation. Three training workshops were organized to enhance the capacity of barangay officials to enforce environmental legislation.

I compared the cost-effectiveness of these CEPA outputs (the cost per person per day), determined the outreach, and asked the respondents to rank the outputs. Placing a billboard requires a substantial investment (US$ 110); but as many people (around 1,000) see these large placards over a relative long period of time (2 years), billboards are the most cost-effective outputs on a per person per day basis (US$ 0.00015). Wall paintings are also cost-effective outputs. The largest mural is on the market in San Mariano town, which explains the high outreach in the urban area. People value the posters above other outputs and place them prominently on the walls of their homes. The radio plugs have the lowest outreach of all passive (self-interpretive) outputs. In the core area most respondents (63 percent) have seen the comic book. People seem not very interested in the newsletter: it got the lowest score in the preference ranking.

Active and interactive outputs are more costly. The school presentations, school field visits and training workshops were not included in the questionnaire as these outputs focus exclusively on schoolchildren, students and barangay officials. The puppet shows and the community consultations also target a specific audience (respectively elementary schoolchildren and directly affected people such as land claimants), which could explain the low outreach and ranking. The respondents highly ranked the cultural show.

Table 6.1: CEPA campaign for Philippine crocodile conservation in San Mariano

| Output | Circulation (number of copies) | Audience[1] | Production cost (US$ per copy)[2] | Exposure time[3] | Cost-effectiveness (US$ per person per day)[4] | Outreach (percentage of population)[5] | | | Community preference (ranking)[6] | Cognitive outcome (odds ratio)[7] | Affective outcome (odds ratio)[8] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Core area | Peripheral area | Urban area | | | |
| **Passive outputs** | | | | | | | | | | | |
| Billboard | 50 | 1,000 | 110.00 | 2 years | 0.00015 | 81 | 36 | 26 | 3 | 1.649* (1.062-2.562) | 0.884 |
| Wall painting | 3 | 1,000 | 200.00 | 2 years | 0.00028 | 39 | 6 | 54 | 5 | 1.053 | 0.424** (0.243-0.741) |
| Poster | 15,500 | 5 | 1.20 | 10 months | 0.00080 | 75 | 21 | 17 | 1 | 2.165 *** (1.370-3.420) | 1.432 |
| Radio plug | 10 | 25,000 | 80 | 60 seconds | 0.00320 | 17 | 20 | 7 | | | |
| Comic book | 8,000 | 5 | 1.20 | 30 school days | 0.00960 | 63 | 12 | 10 | 4 | | |
| Newsletter | 6,600 | 2 | 0.16 | 1 week | 0.01143 | 34 | 7 | 2 | 8 | 1.137 | 2.527* (1.031-6.193) |
| **Active outputs** | | | | | | | | | | | |
| School presentation | 60 | 40 | 10.00 | 30 minutes | 0.25000 | | | | | | |
| Cultural show | 14 | 400 | 200.00 | 30 minutes | 0.50000 | 37 | 24 | 15 | 2 | 1.547 | 2.878 ** (1.487-5.569) |
| Puppet show | 22 | 100 | 200.00 | 30 minutes | 2.00000 | 36 | 21 | 7 | 7 | | |
| School field visit | 37 | 20 | 160.00 | 2 days | 4.00000 | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Interactive outputs** | | | | | | | | | | | |
| Community consultation | 48 | 40 | 200.00 | 2 hours | 5.00000 | 23 | 10 | 1 | 6 | 3.106*** (1.633-5.908) | 1.282 |
| Training workshop | 3 | 80 | 6,600.00 | 1 week | 16.50000 | | | | | | |

Notes:

[1] The number of people exposed to a copy of an output (the audience) was estimated by staff of the Mabuwaya Foundation. Community consultations for example are on average attended by 40 people. The audience of the radio plugs was estimated by the regional radio station DWPE, and is limited to the listeners in the municipality of San Mariano.

[2] Production costs exclude distribution costs and salaries. The design of CEPA outputs was integrated in the development communication curriculum of ISU.

[3] Exposure time was defined as the period the outputs can be seen by the audience, and calculated on a per day basis (60 seconds counts as 1 day).

[4] Cost-effectiveness is calculated by dividing the production costs of an output by the audience (the total number of people who see the output) and dividing this by the exposure time (in days). For example, the cost-effectiveness of the posters is computed as follows: 1.2 US$ per copy / 5 people in a household / 300 days (posters are posted in a room of the house for around 10 months) = US$ 0.00080.

[5] Outreach (how many people in a village actually see or hear the outputs) was determined by asking the respondents which CEPA outputs they had seen or heard.

[6] To determine the community preference respondents were asked to rank the photographs of all outputs (Which was the most valuable output for you?).

[7] Odds ratios of having seen a specific output associated with awareness of legislation protecting crocodiles (Is the Philippine crocodile protected by law?). Model: Hosmer & Lemenshow $R^2$= 6.053, df = 8, $p > 0.1$. Cells without odds ratio are not significant, otherwise * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$.

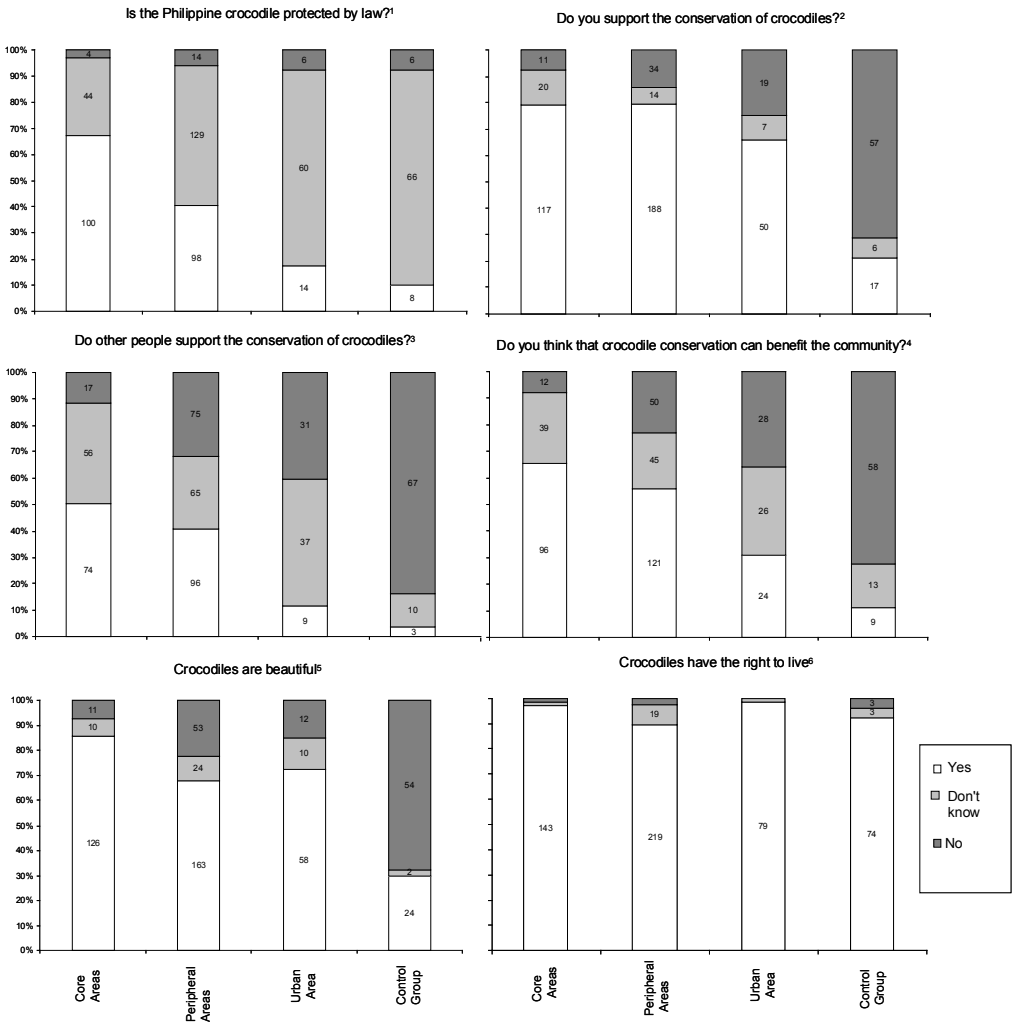
[8] Odds ratios of having seen a specific output associated with being supportive of legislation protecting crocodiles (Do you support the conservation of crocodiles?). Model: Hosmer & Lemenshow $R^2$ = 9.169; df =8, $p > 0.1$

## Outcomes

Table 6.1 compares the cognitive and affective outcomes of the various CEPA outputs. Billboards, posters and community consultations have a measurable positive effect on the respondents' awareness of environmental legislation: people who have attended a community consultation are 3 times more likely to know that crocodiles are protected than people who did not attend these dialogues (odds ratio 3.106). The wall painting, newsletter and the cultural show have a positive effect on people's support of in-situ crocodile conservation. The odds of a respondent being supportive of the conservation of the species after seeing the theater show is almost 3 times higher than of a respondent who did not see it (odds ratio 2.878). I could not quantify the cognitive and affective outcome of the radio plugs, comic book, school presentations, puppet shows, school field visits and training workshops. A possible methodological explanation could be that sample sizes were too small (training workshops are attended by barangay officials only; the comic books, school presentations, puppet shows and school field visits focus specifically on schoolchildren and students).

A counterfactual approach compares the cognitive and affective outcomes of the CEPA campaign in the 4 areas (figure 6.3). In the core area and the peripheral areas, respectively 67 and 41 percent of the respondents are now aware that the Philippine crocodile is protected by law, whereas in the control group 82 percent doesn't know if crocodiles are legally protected. 79 percent of the respondents in the core area and the peripheral area support the conservation of the Philippine crocodile in the wild; against 21 percent in the control group. When asked whether other people in the community support the conservation of crocodiles, 50 percent of the respondents in the core areas said yes; against 4 percent in the control group. The variance in these variables cannot be explained by age, sex, livelihood strategy, affluence, ethnicity or educational level. Sixty-five percent of the respondents in the core area think that Philippine crocodile conservation can benefit the community; in contrast with the control group where only 11 percent think that is the case. Most likely people refer to indirect cash benefits generated through specific attention from government agencies for areas where crocodiles occur: for example the prioritization of road maintenance by the LGU. Another remarkable difference is that 85 percent of the respondents in the core area think that crocodiles are beautiful animals, whereas in the control group only 30 percent see the aesthetic value of a crocodile. Surprisingly 93 percent of all respondents think that crocodiles have the right to live. As this is largely invariable over the areas, including the control group, this cannot be the outcome of the CEPA campaign.

Figure 6.3: Cognitive and affective outcomes




Notes:

[1] n=549, $\chi^2$= 93.9, df = 6, $p < 0.001$ ;

[2] n=540, $\chi^2$= 148.8, df = 6, $p < 0.001$;

[3] n=540, $\chi^2$= 145.4, df = 6, $p < 0.001$;

[4] n=521, $\chi^2$= 125.2, df = 6, p < 0.001;

[5] n=547, $\chi^2$= 113.8, df = 6, $p < 0.001$;

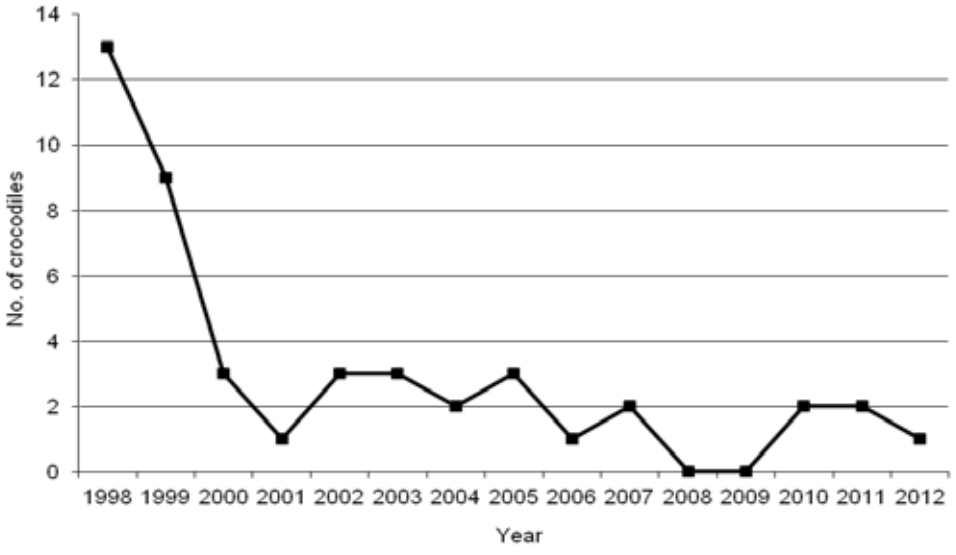
[6] n=548, $\chi^2$= 15.4, df = 6, not significant, $p > 0.0125$

## Impact

The CEPA campaign has contributed to the reduction of anthropogenic threats to crocodiles. Philippine crocodiles are no longer purposively killed in San Mariano (figure 6.4). But the species is still accidentally caught in fish nets or snare traps. Instead of eating the eggs people report crocodile nests to the village officials. The use of destructive fishing methods has been banned through barangay ordinances, and there have been several cases in which violators have been warned or penalized by local authorities. In 2007 for example 3 men were fined by the barangay captain of San Jose for fishing with pesticides in a creek near the crocodile sanctuary; an unprecedented case of environmental law enforcement in the northern Sierra Madre. Barangay officials and fishers say that the use of destructive fishing methods has significantly decreased. The clearing of riparian forest for corn production and the conversion of freshwater wetlands to rice paddies however continues, even when farmers are aware of environmental legislation and have a supportive attitude towards conservation.

Ultimately the success of the CEPA campaign will be determined by the number of Philippine crocodiles surviving in the wild. The Philippine crocodile population in San Mariano has increased from 13 non-hatchling crocodiles in 2002 to 64 in 2009. High hatchling mortality in the wild due to natural predation and the reclamation of suitable nursery pools prevent a rapid recovery of the population (van Weerd & van der Ploeg 2012). Environmental communication and education should therefore be part of an integrated strategy that includes habitat restoration, re-enforcement of the population and strengthening environmental law enforcement.

Figure 6.4: Mortality of Philippine crocodiles caused by humans in the municipality of San Mariano (1998-2012). Based on information provided by barangay officials in San Mariano, and verified on site.



## DISCUSSION

An assessment of the CEPA campaign for the Philippine crocodile in San Mariano can improve the cost-effective design and implementation of environmental communication and education programs, and further our understanding of people's awareness of and attitudes towards wildlife conservation (figure 6.5).

### Cost-effective outputs

Posters, murals and billboards are cheap and effective outputs to disseminate information to rural communities (Tambashe *et al*. 2003; Trewhella *et al*. 2005). In San Mariano it proved challenging to assure that posters reached the target audience: fishers and farmers living in close proximity to crocodile habitat. Too often posters ended up in government offices and schools in urban areas. Adding a calendar made the posters a valuable daily use-item for rural households. Murals and billboards attract a lot of attention and reinforce communal ideals of environmental stewardship, provided that they are in the right spot.

Radio plugs and newsletters should be used with reserve. Radio is a popular medium in the uplands of San Mariano, but the radio plugs had no measurable effect on people's awareness of, or attitudes towards the conservation of the Philippine crocodile. A possible explanation could be that the radio plugs were aired on a government-owned station (DWPE), whereas people prefer to listen to soap-operas on the commercial radio stations. My experiences in the northern Sierra Madre confirm findings that very few people actually read newsletters (Colchester *et al*. 2003). This is perhaps not surprisingly in areas where many people are illiterate. Nevertheless newsletters are useful to disseminate information on crocodiles to specific actors, such as teachers, forest rangers, local government officials and donors.

School presentations and school field visits are effective outputs to raise awareness among school children (Padua 1994; Cook 2008). During the school visits in San Mariano children often see the Philippine crocodile for the first time and react surprised that it is much smaller than on television. Entertainment education, such as theater performances and puppet shows, directly links to the daily life of people (Papa *et al*. 2000). The cultural show during the annual *fiesta* is highly valued by rural communities in San Mariano and positively affects people's attitudes towards crocodile conservation. These active outputs are expensive but can effectively enhance people's support for conservation.

Community consultations can build constituencies and contextualize concerns of directly affected people, and are as such indispensable outputs for environmental communication and education (de Groot & Zwaal 2007). During consultations people

ask questions, narrate their own experiences and forward solutions. These dialogues appear to be particularly effective to address irrational fears of crocodiles. Often people narrate personal experiences with crocodiles and claim the species does not pose a threat. Not surprisingly these views are often more trusted than the opinion of outside conservationists. Village leaders chair the consultations, thereby confirming and sanctioning the conservation message and integrating crocodile conservation in local governance. But sometimes these community dialogues also cause confusion (Jacobson 1999); for example on conflicting institutional mandates between LGU and DENR, informal land rights of farmers, or the role of government officials in illegal logging operations. Specific problems can be confrontational and cause discomfort among the participants.

Training community leaders in environmental legislation is an effective method to enhance capacities, strengthen law enforcement, create a sense of ownership and build trust between conservationists and rural communities (Baral & Heinen 2007). In San Mariano barangay officials who participated in the training workshops subsequently played a leading role in prohibiting destructive fishing methods and monitoring compliance. But as new local officials are elected every 3 years, it is essential to continue this training program over a longer period. This highlights the need for a long-term CEPA campaign that links wildlife conservation to the worldview and concerns of rural communities (Sillero-Zubiri & Laurenson 2001).

Figure 6.5: What is an effective CEPA campaign? A poster of the Mabuwaya Foundation hangs next to a cigarette advertisement in a house in barangay Cadsalan. Photo by J. van der Ploeg (2007)

### Cultural values

It is often argued that support for the conservation of potentially dangerous wildlife is strongest among urban, educated and affluent people (Naughton-Treves 2003). People in remote rural areas in contrast often regard predators as pests and a threat to livestock and children (Ericson *et al*. 2008). Also in the Philippines conservationists and policymakers assume that poor rural communities are antagonistic towards crocodiles, and argue that people living in crocodile habitat will only support conservation if they can derive cash benefits, for example through community-based ecotourism or sustainable ranching programs (WCSP 1997).

But the findings of this study contradict these utilitarian views. First, the emphasis on negative attitudes towards wildlife ignores the inherent positive views that people often also hold (Allendorf *et al.* 2006). Most respondents in this study for example acknowledged the intrinsic value (the right to live) of crocodiles, also in the control group. An effective CEPA campaign can enhance these inherent positive values and transform them into support for environmental conservation (Nolt 1996). Second, negative attitudes towards wildlife and legislation are not immutable. The CEPA campaign in San Mariano succeeded in changing people's knowledge of and feelings towards crocodiles and their conservation. Disseminating information on environmental legislation is an essential first step in transforming people's attitudes and behavior (Baland & Platteau 1996; Keane *et al.* 2010). Third, economic benefits are not a precondition for people's support for environmental conservation. Cultural values, such as pride, interest and fun, can in fact form an important incentive to support in-situ conservation, also for poor rural communities in the developing world (Padua *et al.* 1994; Butler 2000). In San Mariano people have become interested in the ecology of the species and take pride in the conservation of a rare and iconic animal in their village. Environmental communication and education can foster these positive values and provided a sound foundation for community-based conservation.

## CONCLUSION

Substantial gains can be made in environmental conservation by investing more in communication and education, particularly in the developing world. Most conservation projects have a CEPA component, but these activities are usually based on intuition, anecdotal information and personal preferences, and dependent on the intermittent availability of funding. This is reflected in the relative paucity of quantitative impact assessments of CEPA campaigns in the scientific literature. As a result the impact of environment communication and education is often underestimated. It is therefore essential that the experiences and lessons of CEPA campaigns across the world are more systematically evaluated and compared.

## ENDNOTE

1. Based on: van der Ploeg, J., M. Cauilan-Cureg, M. van Weerd & W.T. de Groot. 2011. Assessing the effectiveness of environmental education: mobilizing public support for Philippine crocodile conservation. *Conservation Letters* 4(4): 313-323. Jan van der Ploeg designed the study, prepared the questionnaire, trained the interviewers, analyzed the data and wrote the paper. Myrna Cauilan-Cureg supervised the ISU students in the field and assisted with data encoding. Merlijn van Weerd made the map, and supervised the quarterly monitoring activities of the Mabuwaya Foundation. Wouter de Groot provided comments on the text.