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**Citation**
Ploeg, J. van der, Arano, R., & Weerd, M. van. (2011). What local people think about crocodiles: Challenging environmental policy narratives in the Philippines. *The Journal Of Environment & Development*, *20*(3), 303-328. Retrieved from https://hdl.handle.net/1887/18063

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The Journal of Environment & Development
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*The Journal of Environment Development* 2011 20: 303
DOI: 10.1177/1070496511416743

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Journal of Environment & Development
20(3) 303–328
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DOI: 10.1177/1070496511416743
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# What Local People Think About Crocodiles: Challenging Environmental Policy Narratives in the Philippines

**Jan van der Ploeg[1], Robert R. Araño[2], and Merlijn van Weerd[1]**

## Abstract

This article challenges several assumptions that have shaped environmental policy in the Philippines. Policy makers assume that people are antagonistic toward conserving crocodiles in the wild and think that the enforcement of environmental legislation in a context of widespread rural poverty is illegitimate and ineffective. They argue that these negative public attitudes can only be transformed by generating revenues for rural communities, for example, through crocodile ranching or ecotourism. Despite the evident failure to conserve crocodiles in the wild, this thinking continues to underpin policy and practice in the Philippines. A community-based conservation project in the northern Sierra Madre on Luzon puts this utilitarian logic in perspective. The project succeeded in transforming hostile attitudes toward crocodiles and mobilized broad societal support for the protection of the Philippine crocodile and its freshwater habitat. Cultural values, such as pride in the occurrence of this rare and iconic species, form an important incentive for people to support the preservation of the species in the wild. These experiences highlight the importance of moving beyond ideological positions in discussions on biodiversity conservation, and enable the design of integrative and innovative solutions to conserve wildlife in human-dominated landscapes.

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**Keywords**

preservation, conservation, Philippine crocodile, sustainable use, governance

## Introduction

In January 2007, the undersecretary of the Department of Environment and Natural Resources (DENR), Jose Ferrer, gave a keynote speech at a scientific forum in Manila. His speech exemplifies the way policy makers in the Philippines think about conserving crocodiles:

> If there are any creatures that are capable of provoking a range of emotions from us, they are crocodiles. [. . .] When we see crooks in government, we call them crocodiles, when we see fat-bellied policeman on the streets, we call them crocodiles. [. . .] But how do you conserve a creature despised by so many? After World War II, demand for crocodile skin skyrocketed. Hunters were all too happy to relieve the reviled Indo-Pacific crocodile of its profitable skin and uncontrolled harvests reduced the wild population dramatically. Not that many people cared. To most, the only good crocodile was a dead one. [. . .] Several years after we first implemented the Philippines' crocodile recovery program, Indo-Pacific crocodile numbers (although in captivity) are now approaching densities not seen before. Tourism has become a major force with crocodiles as a star attraction. Even those who still dislike crocodiles acknowledge their economic importance and would never want to see them vanish. Such is the importance of linking conservation with people. [. . .] Local people must see that their crocodiles are important, not only to the environment, but to themselves. [. . .] Those of us who admire crocodiles need only to know that they exist, but this opinion is very much the exception for the people who have to share their habitat with crocodiles. When animals threaten your livelihood, or even your life, it influences your opinion about those animals. (Ferrer, 2008, pp. 7-9)

This view has dominated Philippine environmental policy, science, and conservation over the past 25 years. Policy makers assume that rural communities are antagonistic toward conserving crocodiles in the wild. It is argued that these negative attitudes can only be transformed by providing economic incentives: in a context of rural poverty, crocodile conservation can only be justified when it generates revenues through sustainable use (Ortega, Regoniel, & Jamerlan, 1993; C. A. Ross, 1982; Wildlife Conservation Society of the Philippines [WCSP], 1997).

In this article, we question this reasoning. We argue that it is based on several flawed assumptions on people's attitudes toward crocodiles and environmental conservation. In rural areas where crocodiles still occur in the wild, such as the northern Sierra Madre on Luzon, people do not necessarily oppose the enforcement of environmental legislation protecting crocodiles and wetland habitat. The narrow focus of

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policy makers on economic incentives ignores the cultural values of rural communities and risks further marginalizing poor people by deviating attention and resources from environmental protection. Despite the optimism of undersecretary Ferrer, the Philippines' crocodile recovery program has been a failure: crocodiles remain severely threatened in the wild (P. J. Ross, 1998; van Weerd, 2010), and people living in crocodile habitat have not profited from tourism or the sale of crocodile leather. However, as the speech of the undersecretary reveals, this utilitarian rhetoric still dominates environmental policy in the Philippines. In this article, we will investigate what policy makers think about rural communities and crocodiles and why these ideas remain, even in the face of contrary empirical evidence, so pervasive. This is important as the erroneous assumptions of officials and institutions responsible for environmental conservation and human welfare can have detrimental consequences for people and nature (Dove, 1992).

Environmental policy often rests on a set of simplified assumptions about a problem and how it can be solved (Hoben, 1995). These assumptions take the form of a narrative—a story that provides a logical framework for defining and simultaneously solving an environmental problem. Ferrer's speech highlights several distinctive characteristics that make policy narratives so potent. First, simplifications are useful to deal with the many uncertainties that characterize social and environmental change and necessary to mobilize resources and support in the political arena (Li, 2002). Second, policy narratives tend to promote universally applicable, technical solutions (Ferguson, 1994; Long & van der Ploeg, 1989). The Philippines' crocodile recovery program was inspired by the successful experiences in Papua New Guinea, where commercial crocodile ranching has become a major economic activity and has contributed to the rapid recovery of crocodile populations.[1] Third, narratives are deeply embedded in policy, society, and culture to the extent that they become "conventional wisdom" (Leach & Mearns, 1996). Finally, policy narratives tend to obscure uncertainties and alternative perspectives (Keeley & Scoones, 2003; Sheil & Wunder, 2002). Facts and ideas that do not fit the dominant view are dismissed as being ineffective, unscientific, or simply impossible. These characteristics make it difficult, even in the face of contradicting empirical evidence, to challenge the hegemonic narrative.

Criticism on the sustainable use paradigm is often dismissed as "resurgent preservationist thinking" (Wilshusen, Brechin, Fortwangler, & West, 2002).[2] Since the 1980s, the idea that the protection of wildlife can best be achieved by giving rural communities a direct economic interest in the survival of species has gained prominence, mainly in response to the negative social impacts of protected areas in developing countries (Hutton & Leader-Williams, 2003; Western & Wright, 1994). Exclusionary and punitive efforts have been replaced by a more participatory incentive-based strategy: a paradigm shift from "preservation through protectionism" to "conservation through sustainable use" (Adams & Hutton, 2007; Pimbert & Pretty, 1997). Implicitly, this is often presented as a radical break: a move from old ways of preserving nature to "new conservation" (Hulme & Murphee, 1999, p. 277). In this view, preservation is

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**Table 1.** Preservation Versus Conservation

| | Preservation | Conservation |
|---|---|---|
| Policy tool | Protected areas | Sustainable use |
| | "Fines and fences" | "Use it or lose it" |
| Philosophy | Intrinsic values | Utilitarian values |
| Rural communities | Destructive | "Stewards of the environment" |
| | Ignorant | Traditional ecological knowledge |
| | Irrational | Marginalized, egalitarian |
| Nature | Pristine wilderness | Human-dominated landscapes |
| Wildlife and people | Conflict | Coexistence |
| Governance | Authoritarian | Participatory |
| | Centralized ("top-down") | Devolved ("bottom-up") |
| | Technocratic | People-oriented |
| | Protectionist | Comanagement |
| | "Fortress conservation" | "Community-based natural resource management" |

Source: Adapted from Blaikie and Jeanrenaud (1997, p. 61), Pimbert and Pretty (1997, p. 302), Campbell (2002, p. 31).

equated with the authoritarian protection of pristine wilderness by the neocolonial state and conservation with community-based natural resource management and wise use (Table 1). This ideological dichotomy between preservation and conservation is, however, unhelpful for a good understanding of the evolution of environmental policy in the Philippines and risks impeding wildlife conservation efforts on the ground.

In this article, we question the premises that underlie crocodile conservation in the Philippines, specifically the views of government officials that negative attitudes of rural communities inhibit in-situ wildlife conservation, that the enforcement of environmental legislation is ineffective and illegitimate, and that cash benefits are a precondition to mobilize public support for wildlife conservation. In the next section, we provide details on the research methodology. In the third section, we describe the two crocodile species that occur in the Philippines and document the changing views of Philippine policy makers on the role of rural communities in environmental conservation. We will then present a qualitative case study of the Crocodile Farming Institute (CFI), the national crocodile recovery program to which the undersecretary Ferrer refers in his speech. In the fourth section, we describe a community-based conservation project in the northern Sierra Madre on Luzon: the Crocodile, Rehabilitation, Observance and Conservation (CROC) project. We document how hostile attitudes toward crocodiles are transformed by raising awareness, show that there is a broad societal basis to strengthen environmental law enforcement, and suggest that cultural values such as pride in the occurrence of a rare and iconic species can form an important motivation for rural communities to support wildlife conservation. In the conclusion, we investigate the implications of this "counternarrative" for crocodile conservation in

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the Philippines (Roe, 1995, p. 1065). A single case study can obviously not counter a paradigm. However, the experiences in the northern Sierra Madre call for a more critical, and above all empirical, examination of evidence that supports the dominant conservation narrative. Such a reversal of thinking is urgently needed to break the impasse that has characterized crocodile conservation in the Philippines over the past 25 years.

## Method

This article is largely based on our research, education, and conservation activities in the northern Sierra Madre over the past 10 years. After the rediscovery of a remnant Philippine crocodile population in the municipality of San Mariano in 1999, we designed and implemented a conservation project to protect the species in the wild: the CROC project, later institutionalized as the Mabuwaya Foundation (van der Ploeg et al., 2008; van Weerd, 2000). This participatory action research obviously implies a certain bias. However, our long-term involvement in the conservation of the species also provides a unique inside-view of environmental policy discourses in the Philippines. Our field experiences in the northern Sierra Madre offer new insights on how to mobilize local support for the protection of threatened species and question the ideological positions in the conservation versus preservation debate.

The qualitative case-study on CFI was constructed through formal interviews and informal conversations with key respondents: CFI staff members, DENR officials, crocodile farmers, scientists, and members of the International Union for Conservation of Nature (IUCN) Crocodile Specialist Group. In addition, we conducted an extensive literature review of reports, workshop proceedings, and newsletters produced by CFI.[3] The section on the CROC project is based on fieldwork in the northern Sierra Madre over the past 10 years. We rely on field observations and unstructured interviews with local government officials, forest guards, village leaders, farmers, and fishermen. Information on the number of crocodiles surviving in the wild has been collected by staff members of the Mabuwaya Foundation on a quarterly basis since 1999.

## Background

### *Crocodiles in the Philippines*

Two crocodile species occur in the Philippines: the Philippine crocodile *Crocodylus mindorensis* and the estuarine crocodile *Crocodylus porosus* (Groombridge, 1987). The estuarine crocodile is widely distributed in mangroves, lakes, and river estuaries throughout Southeast Asia and Northern Australia. Large individuals grow up to 6 m. The Philippine crocodile in contrast is a relatively small crocodilian: the largest individual caught in the wild measured 2.7 m. The species is endemic to the Philippine archipelago. It mainly occurs in inland freshwater wetlands (Ross & Alcala, 1983; van Weerd & van der Ploeg, 2003).

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Commercial hunting for crocodile skins in the Philippines started during the American colonial period and intensified after World War II. Professional hunters systematically searched, killed, and skinned crocodiles throughout the country. No specific legislation was enacted to regulate the harvesting and selling of crocodile skins in the archipelago; by the end of the 1960s, crocodile populations were severely depleted (van der Ploeg, van Weerd, & Persoon, 2011). In 1975, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) banned all international trade in Philippine crocodile skins. Ten years later, the Philippines' estuarine crocodile population was also placed on CITES Appendix I.

In 1981, Charles Ross, an American biologist working for the Smithsonian Institute, conducted the first nationwide crocodile survey, and estimated that there were less than 500 Philippine crocodiles surviving in the wild (C. A. Ross, 1982). Fifteen years later, the IUCN Crocodile Specialist Group revised this figure to less than 100 mature individuals (P. J. Ross, 1998). Based on this small population and the continuous rapid decline of the wild population, the Philippine crocodile is classified on the IUCN Red List as Critically Endangered (IUCN, 2010). The species is currently restricted to a few localities in northern Luzon and the headwaters of the Liguasan Marsh on Mindanao (van Weerd, 2010). Estuarine crocodiles are also threatened with extinction in the Philippines (WCSP, 1997). However, with large and well-protected populations in Papua New Guinea and Australia, the species is not globally threatened (IUCN, 2010).[4]

Responding to the alarming decline of crocodile populations, the Philippine government initiated an ex-situ conservation program for the estuarine and Philippine crocodile in 1987: CFI. In 2000, the government created the Philippine Crocodile Recovery Team and drafted a recovery plan for the Philippine crocodile (Banks, 2000). Since 2004, both species are officially protected under Philippine law: the Wildlife Act (Republic Act 9147) prohibits the killing of crocodiles. Crocodiles occur in several protected areas: specifically the Northern Sierra Madre Natural Park on Luzon, Naujan Lake National Park on Mindoro, Balabac Island Marine Reserve on Palawan, and the Liguasan Marsh Game Refuge and Agusan Marsh Wildlife Sanctuary on Mindanao (Mallari, Tabaranza, & Crosby, 2001; WCSP, 1997). The DENR is the mandated government agency to conserve crocodiles in the Philippines. However, despite these policy interventions, the two crocodile species in the archipelago remain severely threatened in the wild. Crocodiles continue to be killed for their meat, out of fear, or for fun. The widespread use of destructive fishing methods poses a heavy toll on remnant crocodile populations (van Weerd & van der Ploeg, 2003). In addition, the reclamation and degradation of freshwater wetlands inhibit a recovery of the two species in the wild (DENR & United Nations Environment Program, 1997; Thorbjarnarson, 1999).

## *Philippine Environmental Policy*

The sustainable use of natural resources has been the guiding principle for Philippine environmental policy since the turn of the 20th century.[5] To reduce forest degradation and maximize government revenues, the American colonial foresters tried to create

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favorable conditions for private investment in the forestry sector. Rural communities were viewed as squatters and portrayed as resource destroyers, and efforts were made to punish and resettle these *kaingineros* (Magno, 2001). In 1932, the Insular Bureau of Forestry established the first national parks and game refuges in the archipelago (Act 3915) and stressed the need to resettle slash-and-burn farmers from these public lands (Villamor, 2006). However, plagued by a shortage of trained personnel, defects in administration and communication, low morale of field staff, public discontent of forestry regulations and levies, and lack of support from local authorities, the forestry service was unable to enforce its own decrees (Bankoff, 2009).

The Third Philippine Republic (1946-1972) reaffirmed the state's claim to all forests and wildlife and continued to see corporate logging and mining as the engines of economic growth. During these "years of plunder," state-sponsored logging and mining concessions ravaged the Philippine forests and wetlands (Broad & Cavanagh, 1993; Vitug, 1997). In 1975, environmental destruction, rural poverty, and civil unrest forced the Marcos regime (1965-1986) to adopt substantial policy reforms. Presidential Decree 705, known as the Revised Forestry Code, reorganized the corruption-plagued forestry service. The decree aimed to control illegal harvesting, rehabilitate critical watersheds, and grant stewardship rights to forest-dwelling people. However, on the ground, the policy reforms had little effect (Grainger & Malayang, 2006).

The fall of the Marcos dictatorship in 1986 marked a paradigmatic change in the relationship between the state and rural communities. The Aquino (1986-1992) and Ramos (1992-1998) administrations initiated a range of "people-centered" policy reforms that emphasized participatory decision making and equitable access to natural resources (Utting, 2000). Community-based natural resource management became the national strategy to foster sustainable development and social justice. Underlying these reforms was the idea that environmental protection is not possible without also addressing the livelihood concerns of the rural poor. It radically transformed the rights of rural communities and the responsibility of government in natural resource management. Rural communities were granted access to natural resources under long-term tenure arrangements. Providing basic services to rural communities became a key task for the DENR: foresters were called on to "cease being known as enforcers of regulations, but rather as development workers" (Custodio & Molinyawe, 2001, p. 203). Decision-making powers were devolved to local governments and human-rights activists and scientists were appointed on key positions in the new DENR. This transition is embodied by Dr. Angel Alcala, who headed the department from 1992 to 1995. Alcala, Philippines' foremost herpetologist, had pioneered the creation of community-based marine protected areas and established an ex-situ research program for the Philippine crocodile at Silliman University (Alcala, Ross, & Alcala, 1987). As DENR secretary, he oversaw the forestry service transition from a centralized regulatory body favoring extractive industries toward a "rural development agent" advocating community-based approaches (Magno, 2001, p. 280). Having worked for more than 20 years with subsistence fishing communities in the Visayas, Alcala knew from his own experience that punitive measures were ineffective and difficult to justify (Goldoftas, 2006).

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To ensure the consent and cooperation of impoverished people living in and adjacent protected areas, it was in his view necessary to generate economic benefits from these reserves; in the case of marine sanctuaries through ecotourism and spillover effects (Alcala & Russ, 2006). In 1992, the landmark National Integrated Protected Area System (NIPAS) Act was passed through Congress (Republic Act 7586), which provided a regulatory framework for people's participation in the management of protected areas. Substantial investments were subsequently made by international donors to build the capacity of the DENR, municipal governments, and civil society organizations to manage protected areas, conserve wildlife, and alleviate poverty.

At the local level, however, the idealistic rhetoric of community-based resource management is contradicted by how these policies are implemented (Severino, 1998). The DENR remains plagued by political patronage, corruption, institutional conflicts, and high overhead costs (Utting, 2000). Wildlife conservation and the management of protected areas are still considered somewhat trivial issues in the DENR bureaucracy: the Protected Areas and Wildlife Bureau (PAWB) is the smallest of the six bureaus of the department. In the regional, provincial, and community offices of the DENR, there is little attention for wildlife conservation. In these field offices, the paradigmatic policy changes have passed largely unnoticed. With urban middle-class backgrounds and a vocational education in extractive forestry, most Philippine foresters still consider rural communities ignorant and incapable of managing resources and see crocodiles as vermin. A hierarchical bureaucratic culture, a low esteem for field activities, and the professional bias of DENR personnel toward timber extraction further hamper the enforcement of environmental legislation on the ground (van den Top, 1998).

Under President Estrada (1998-2001), corruption in the DENR thrived and further policy reforms were suspended. The increasingly authoritarian Macapagal-Arroyo administration (2001-2010) again saw extractive industries, especially mining, as the engine of economic growth and aimed to reverse the trend toward decentralization and participatory decision making (Hutchcroft, 2008). The Wildlife Act of 2004, for example, combined a technocratic view of resource management with a complete disregard of the societal context of the Philippine uplands (van der Ploeg & van Weerd, 2004). It prescribes a minimum penalty of 6 years in jail for "destroying wildlife species" or "squatting in critical habitat."

## "Conservation Through Sustainable Use": The Crocodile Farming Institute

As early as 1977, policy makers and scientists played with the idea of establishing crocodile farms "to minimize the dangers being posed by these dangerous reptiles to men as well as to animals and to turn to a more productive purpose instead" (Philippine Council for Agriculture and Resources Research, 1977, p. 1130). In 1983, the Bureau of Forestry Development in cooperation with the Japan Reptile Skin and Leather Association made detailed plans to develop a large-scale crocodile leather industry in the Philippines. Eventually, this initiative led to the creation of the CFI in 1987.

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**Figure 1.** The Crocodile Farming Institute aims to conserve the Philippine crocodile (front) by generating public revenues through farming estuarine crocodiles (back)
Source: Photo by J. van der Ploeg (2004).

Based in Puerto Princesa on Palawan, CFI had two main objectives: (a) to conserve the two endangered crocodile species in the Philippines and (b) to promote the socio-economic well-being of local communities through the development and introduction of crocodile farming technology (Ortega, 1998). This "bold and imaginative project in the true spirit of conservation through sustainable utilization" (CFI, 1995, p. 3) was made possible through a US$2.6 million grant from the Japanese International Cooperation Agency (JICA). The Philippine government also invested US$1.6 million in the construction of the farm. The underlying idea of CFI was to develop a leather industry along the lines of the successful crocodile ranching program in Papua New Guinea: regulate hunting, establish private commercial crocodile ranches, engage rural communities in the collection of eggs, and improve the processing and marketing of skins (Blake & Loveridge, 1975; Dembner, 1990). It was envisioned that the sustainable use of crocodiles would provide an incentive to conserve crocodiles in the Philippines: "By [. . .] providing local inhabitants within protected areas the opportunity to derive economic returns through regulated harvests, ranching crocodiles is the most effective and sustainable program of conservation" (Ortega et al., 1993, p. 133). In theory, the project design was elegant. In practice, however, the sustainable use model failed (Figure 1).

Estuarine crocodiles were captured from the wild to breed in captivity. A "pilot grow-out crocodile farming program" was developed in which juvenile estuarine crocodiles were to be loaned out to farmers to be reared (CFI, 1995, p. 8). The profits

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**Figure 2.** The Crocodile Farming Institute maintains around 541 Philippine crocodiles in captivity.
Source: Photo by M. van Weerd (2006).

of the sale of the leather would be shared between the farmers and the government. Initially, CFI aimed to target "low-income Filipinos in the countryside" (CFI, 1995, p. 9). However, concerns about the farmers' capacity to invest, animal welfare, and possible competition over feedstock for crocodiles with food production for human consumption led to a different strategy. In 1999, six agricultural entrepreneurs were selected to set up commercial crocodile farms with technical support of CFI. The idea was that mortalities from hog and poultry farms would provide a reliable source of feedstock for crocodiles and at the same time save money on the destruction of so-called "double dead meat" (Mercado, 2008, p. 31). However, instead of buying juvenile crocodiles yearly from CFI, these entrepreneurs associated in Crocodylus Porosus Philippines Inc. (CPPI) eventually opted to start breeding estuarine crocodiles themselves. They now own approximately 6,000 estuarine crocodiles and have the capacity to breed thousands estuarine crocodile hatchlings per year. Members of the IUCN Crocodile Specialist Group advise CPPI on crocodile farming, tanning procedures, and CITES regulations. The farms, located near urban centers, function as closed-circuit crocodile farms: eggs and hatchlings are not harvested from the wild as was originally envisioned but bred in captivity. As such, the farms do neither have nor create a direct economic interest in preserving crocodiles in the wild or wetland habitat.[6] Problems with husbandry and government permits have so far hampered the export of crocodile leather (Limketkai, 2008). Meanwhile, estuarine crocodile populations in

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the wild continued to decline and rural communities living in crocodile habitat have not profited from the emerging leather industry, as was originally envisioned by CFI.

CFI's conservation efforts for the Philippine crocodile focused almost exclusively on captive breeding. From the start, it was argued that negative public attitudes toward crocodiles and the lack of law enforcement in protected areas made in-situ conservation of the species impossible. It was argued that "with the country's economy in bad shape" and "peace and order problems in parts of the Philippines" it was "impractical," "extremely difficult," and "very expensive" to conserve crocodiles in the wild (Ortega, 1992, pp. 2-4). In an evaluation of the activities of CFI, the IUCN Crocodile Specialist Group endorsed this reasoning:

> There remain only minor pockets of habitat in which *C. mindorensis* exists today, and none appears to be protected. [. . .] perhaps most important, the species is widely regarded as vermin in the Philippines and the probability of [it] surviving in the wild is low. (Messel, King, Webb, & Ross, 1992, p. 99)

In this view, captive breeding was "the only option left" (Ortega, 1998, p. 108). From 1987 to 1994, CFI acquired 235 Philippine crocodiles to stock the farm in Palawan. Most came from an existing crocodile farm in Mindanao (the Davao Crocodile Park), but individuals were also caught from the wild. Concerns that the farm was thereby contributing to the decline of the Philippine crocodile were waived:

> Under normal circumstances the removal of breeding adults from depleted wild populations to stock a farm is to be discouraged, because it depresses the reproductive rate of the wild population and slows its recovery. However, it's wrong to leave small nucleus of breeding adults in areas where they are being killed by local people and where their habitat is being alienated to create rice terraces. It would be foolish not to place them in a captive breeding program where their survival is guaranteed and where they can contribute to a conservation program. Such is the situation in the Philippines. Abandoning *C. mindorensis* in the wild, before real protection can be accorded to them in reserves or sanctuaries would probably have resulted in the final extinction of the species in the Philippines. (Messel et al., 1992, p. 100)

CFI successfully bred Philippine crocodiles in captivity in 1989. Five years later, it had more than 700 Philippine crocodiles (Ortega, 1998).

Several wetlands were identified as potential sites where these animals could be reintroduced and, in the long term, form a basis for a crocodile ranching program. However, negative attitudes, habitat degradation, and the civil insurgency were considered to form insurmountable obstacles:

> The [Agusan] marsh is being affected by the growing community of Manobo tribal people residing in the marsh, illegal logging, downstream effects of mining, illegal fishing, wildlife poaching and trading, exotic fish seeding, and

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> slash-and burn farming. [. . .] Liguasan Marsh in Cotabato on the other hand has always been under the control of the Moro Islamic Liberation Front (MILF), a secessionist group. Much of its original area has been converted to agricultural lands and much of this kind of development is still expected to happen. (Ortega, 1998, p. 107)

In Manguao Lake on Palawan, CFI had to reevaluate its plans to reintroduce the species because of opposition from local politicians and communities (Palawan State College, 1991). As a result, CFI largely abandoned its plans to create wetland sanctuaries and reintroduce Philippine crocodiles in the wild.[7] In 1994, technical support and funding from the Japanese government was ended. The management of CFI was transferred to PAWB. In 2000, CFI was renamed the Palawan Wildlife Rescue and Conservation Centre (PWRCC). The following year, the management of PWRCC was transferred from PAWB to the government-controlled Natural Resources Development Corporation (NRDC), in an attempt to cut the annual operational costs, which amounted to PHP8 million (US$160,000) per year. PWRCC had to sustain its own operation costs, mainly through entrance fees from tourists. At present, PWRCC maintains around 541 Philippine crocodiles and 450 estuarine crocodiles in captivity (Figure 2).

CFI successfully bred crocodiles in captivity and succeeded in establishing a crocodile industry. It made headway in educating the general public about the economic importance of crocodiles (Figure 3). However, little was done to inform rural communities living in crocodile habitat on the risks and benefits conserving crocodiles.[8] The activities of CFI have not led to the protection of crocodiles in the wild or to the improvement of rural livelihoods. Nonetheless, the attention of the national government, scientists, and international donors continues to be almost exclusively focused on market-based approaches to conserve crocodiles. Research activities are focused on husbandry, genetics, and diseases of the captive population, and discussions on protecting crocodiles in the wild tend to revert to the management of the captive population.

## "Something to Be Proud of!": The Crocodile Rehabilitation, Observance, and Conservation Project

In 1999, surveys by staff of the Northern Sierra Madre Natural Park Conservation Project (NSMNP-CP) confirmed the presence of a remnant Philippine crocodile population in the northern Sierra Madre (van Weerd, 2000).[9] In cooperation with local governments and Isabela State University (ISU), a research and conservation project was designed to protect the species in the wild. In 2002, conservation efforts were continued under the CROC project (van der Ploeg et al., 2008). In 2003, the Mabuwaya Foundation was established, a nonprofit organization dedicated to the conservation of the species in its natural habitat. Field activities are funded by international conservation organizations and zoos.[10] Over the past 10 years, conservation

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**Figure 3.** The Crocodile Farming Institute educates the public on the sustainable use of crocodiles
Source: Photo by J. van der Ploeg (2004).

efforts have concentrated on three sites in the municipality of San Mariano: Disulap River, Dunoy Lake, and Dinang Creek (Figure 4).

San Mariano (N 17° E 122°) is one of the 37 municipalities of Isabela Province and covers an area of approximately 1,500 km$^2$. Around 45,000 people live in the 36

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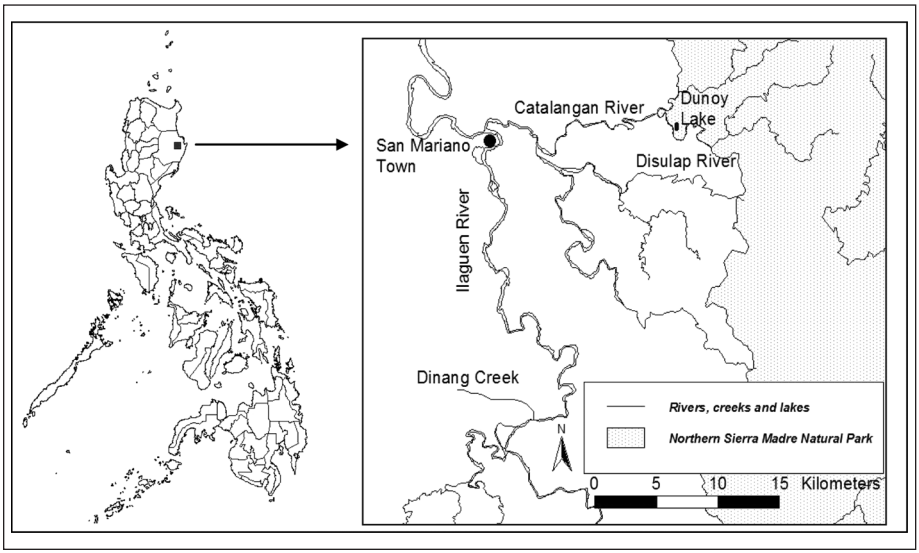


**Figure 4.** Philippine crocodile breeding sites in the municipality of San Mariano: Dunoy Lake, Disulap River, and Dinang Creek

barangays of the municipality. The population is still rapidly growing (2.25% per year), largely due to immigration. San Mariano is an ethnic melting pot: the majority of the people are Ilocano, Ibanag, and Ifugao migrants who settled in the area in search of arable land. The Kalinga and Agta, the indigenous peoples of the northern Sierra Madre, nowadays form small minorities. San Mariano is one of the poorest municipalities of the country: 60% of the people live on less than US$1 per day (National Statistical Coordination Board, 2007). Most people depend directly on the land: corn, banana, rice, and sugarcane are dominant crops. Fishing is an important part of people's daily subsistence. Harvesting timber is another important livelihood activity for many rural households. In the 1960s, San Mariano became one of the centers of the corporate logging industry in Cagayan Valley. Logging and slash-and-burn farming deforested large parts of the municipality. Corporate logging was banned in 1992. In 1997, the remaining forests were included in the Northern Sierra Madre Natural Park (NSMNP), the largest terrestrial protected area of the Philippines. Law enforcement is, however, virtually nonexistent: DENR officials are unable and unwilling to enforce environmental legislation in this remote rural area. Violations by the rural poor are informally sanctioned: a practice locally called "humanizing the law" (van den Top, 1998, p. 219).[11]

As in other parts of the Philippines, commercial hunting depleted the Philippine crocodile population in San Mariano. Older respondents remembered how "Moro hunters" systematically searched the rivers, enchanted crocodiles, stabbed them

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underwater, distributed meat, and sold the skins. In many other cases, local people "cleaned the river from crocodiles" to protect children and livestock (van der Ploeg, van Weerd, & Persoon, 2011, p. 253). In some areas, the army shot crocodiles "to protect the local populace" (van der Ploeg et al., 2011, p. 253). Crocodiles were occasionally trapped in fish nets or fish traps or killed when fishing with dynamite, electricity, or pesticides. Crocodile nests were destroyed and the eggs consumed. Hatchlings were collected to be sold to pet dealers. Agricultural encroachment of riparian forests and the conversion of wetland habitat into irrigated rice fields also posed severe threats to the remaining crocodiles. Most people were unaware of environmental legislation protecting crocodiles and wetlands.

In-situ crocodile conservation activities are spearheaded by the local government of San Mariano. After an intensive lobby of the NSMNP-CP, the *Sangguniang Bayan* (municipal council) proclaimed a stretch of Disulap River as a crocodile sanctuary in 2001 and declared the Philippine crocodile as the flagship species of the municipality (van Weerd & General, 2003).[12] In 2004, the municipal council deputized 12 people to guard the breeding sites: the *Bantay Sanktuwaryo* (sanctuary guards). These local wardens, farmers and fishermen who live adjacent to crocodile habitat, receive a small monthly allowance and health insurance. They report violations of the municipal ordinance to the barangay officials and the municipal mayor and guard crocodile nests.

In cooperation with ISU, the Mabuwaya Foundation designed a public awareness campaign to inform rural communities on the conservation of the Philippine crocodile. Centered on the theme "the Philippine crocodile something to be proud of!" the campaign aimed to foster a sense of pride in the occurrence and protection of the species. The foundation distributed posters, calendars, comic books, and newsletters to rural communities living in crocodile habitat; placed billboards on strategic locations to inform people on legislation protecting crocodiles and wetlands; brought schoolchildren to the NSMNP to see crocodiles in the wild; organized puppet shows and cultural dances (Figure 5); and facilitated community consultations to discuss crocodile conservation with fishers, farmers, and village leaders. These environmental education activities have raised people's awareness of environmental legislation protecting crocodiles in the wild and transformed people's attitudes toward the species. In 2007, we interviewed 549 people on Philippine crocodile conservation to quantify the impact of the public awareness campaign for the Philippine crocodile in San Mariano through a counterfactual comparison. Sixty-seven percent of people living in close proximity to Philippine crocodile habitat now know that the species is legally protected, compared with a mere 10% in areas that were not subjected to the public awareness campaign. In the three breeding sites, 79% of the people now support the conservation of the species in the wild, in contrast to 21% in the control group. Sixty-five percent of people in villages adjacent to Dunoy Lake, Dislap River, and Dinang Creek think that crocodile conservation benefits the community, against only 11% in other areas. As a result, Philippine crocodiles are no longer purposively killed (see van der Ploeg, Cauilan-Cureg, van Weerd, & de Groot, 2011 for details on methods, results, and discussion).

Training workshops were organized to capacitate barangay *kagawads* (village councilors) and *tanods* (civilian law enforcers) to design and enforce environmental

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**Figure 5.** A public awareness campaign mobilized broad public support for crocodile conservation in the northern Sierra Madre
Source: Photo by J. van der Ploeg (2006).

legislation (Cureg, Bagunu, Ponce, & Valencia, 2005) (Figure 6). Barangay councils have subsequently adopted 17 ordinances protecting crocodiles and wetlands, for example, by banning the use of destructive fishing methods or proclaiming no-fishing zones. There is broad societal support for these local legislative measures. People are confronted with environmental degradation, especially the decline of freshwater fish stocks and the degradation of watersheds, and want government to address these issues. Barangay ordinances are discussed during community consultations and barangay council meetings: As a result, everybody in the village is aware of these regulations and local officials feel empowered to enforce them. In February 2005, for example, a farmer was fined PHP500 (US$10) by the barangay captain of San Jose for burning a part of the buffer zone of the Disulap River municipal crocodile sanctuary. In April 2006, three teenagers were fined PHP1,500 for using pesticides to catch fish in Diwagden Creek. The fact that people are penalized for violating environmental legislation is unprecedented in the northern Sierra Madre.

The ultimate indicator for the success of the CROC project is the number of crocodiles surviving in the wild. The crocodile population in San Mariano recovered from 12 nonhatchling crocodiles in 2000 to 64 in 2009 (van de Ven et al., 2009). Crocodiles are no longer purposively killed in the northern Sierra Madre, although isolated incidents

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**Figure 6.** The Mabuwaya Foundation organizes training workshops to capacitate local government officials
Source: Photo by M. van Weerd (2008).

still occur and crocodiles are accidentally caught in fish traps and gill nets. Village officials report that the use of destructive fishing methods has substantially decreased. Fishers claim that, as a result of protective measures, fish stocks are recovering.[13] However, the conversion of freshwater habitat for rice cultivation and the clearing of riparian forests continue to threaten the Philippine crocodile population in the northern Sierra Madre. To facilitate a recovery of the Philippine crocodile population, it will be necessary to continue the conservation project for a considerable period (Figure 7). A major challenge remains the financial sustainability of conservation activities, as the CROC project mainly relies on foreign funding.

## Conclusion

Efforts to conserve crocodiles in the Philippines have focused almost exclusively on sustainable use. The commodification of the species has, however, failed: The two crocodile species that occur in the Philippine archipelago remain severely threatened in the wild, and communities living in crocodile habitat have not profited from ranching or ecotourism. The "use it or lose it" narrative has shifted financial resources away from in-situ environmental protection (Thorbjarnarson, 1999) and reinforced the

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**Figure 7.** Schoolchildren release a captive-raised juvenile Philippine crocodile into the wild. Source: Photo by M. van Weerd (2010).

perception of policy makers, scientists, conservationists, and the public that crocodiles cannot be protected or reintroduced in the wild (Alcala, 2008). However, despite these shortcomings, the idea that only economic incentives can transform people's antagonistic attitudes toward crocodiles continues to underpin conservation policy and practice in the Philippines.

In this article, we challenged this dominant environmental policy narrative. In the northern Sierra Madre, a public awareness campaign has mobilized public support for

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the conservation of the Philippine crocodile in the wild. Defying cultural prejudice, the local government of San Mariano proclaimed the Philippine crocodiles as the flagship species of the municipality. Village councils banned destructive fishing methods and created small protected areas to protect the species and its freshwater habitat. Philippine crocodiles are no longer purposively killed and the population in the northern Sierra Madre is recovering, although it remains critically small. The San Mariano case demonstrates that much can be gained by disseminating information on environmental legislation to rural communities and capacitating local governments to design and enforce environmental legislation (Baland & Platteau, 1996). In rural areas such as the northern Sierra Madre, there is a broad social basis to protect ecosystem services on which poor rural households depend. By integrating Philippine crocodile conservation in sustainable wetland management, it is possible to engage local governments and rural communities in the protection of the species and its freshwater habitat. The experiences in the northern Sierra Madre also suggests that the conception of incentives purely in terms of cash benefits is too narrow and potentially counterproductive (Berkes, 2004). Too often, the "promises" of policy makers fail to materialize, which lead in rural communities to feelings of disappointment and mistrust (Goldoftas, 2006, p. 69). By focusing on economic benefits, conservationists also risks deviating attention and funding away from environmental conservation (Utting, 2000). Cultural values, such as pride in the occurrence of an iconic species, interest in ecology, or joy of seeing a large animal in the wild, can also form an important incentive for poor rural communities to support wildlife conservation (Infield, 2001).

Throughout the Philippines there are numerous examples of small-scale conservation projects implemented by small civil society organizations that succeed in engaging rural communities in the preservation of threatened species (Posa, Diesmos, Sodhi, & Brooks, 2008). Much can be gained if these local experiments can be replicated in other areas of the country, with institutional and financial support of national government and international donors.[14]

Such counternarratives enable us to move beyond ideological simplifications that contrast preservation with conservation. By equating preservation with centralized decision making and the authoritarian protection of wilderness on one hand, and conservation with participatory planning and wise use on the other hand, scholars risk making a caricature of conservation action on the ground. In practice, things are more complex: the "old" preservationist ideology and the "new" conservation orthodoxy often intermingle (Hulme & Murphee, 1999). The preservation–conservation dichotomy confounds multiple dimensions and thereby risks minimizing the space for novel solutions (Borgerhoff Mulder & Coppolillo, 2005). It is essential to differentiate between, for example, governance and normative values (Table 2). Such an analysis reveals that many state-led conservation programs such as CFI are "strong on participatory rhetoric but in practice tend to follow a top-down approach where most of the critical decisions are prescribed by the funding agency and the government" (Utting, 2000, p. 176) and that many community-based conservation initiatives such as the

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**Table 2.** Moving Beyond the Preservation-Conservation Debate

| | Normative values | |
|---|---|---|
| Governance | Intrinsic values | Utilitarian values |
| National government (centralized)<br>Civil society (decentralized) | • National parks<br>• Captive breeding<br>• Local initiatives for the protection of flagship species<br>• Private reserves | • Extractive reserves<br>• Sustainable use<br>• Integrated conservation and development projects<br>• Ecotourism<br>• Community conservancies |

Source: Adapted from Borgerhoff Mulder and Coppolillo (2005, p. 300), Robinson (2011, p. 962).

CROC project aim to preserve species by appealing to intrinsic values. In the end, conservation projects and policies must be designed by what works in a specific context, not on the basis of ideology (Robinson, 2011). "Fortress conservation" can be effective and legitimate in areas where uncontrolled resource extraction will lead to irreplaceable environmental damage, but not in human-dominated landscapes where the rule of law is absent. Sustainable use can function as an income-generating mechanism and thereby generate local support for conservation, but not for critically endangered species such as the Philippine crocodile. The challenge is to free the conservation discourse of moral prejudice and ideological narratives and instead focus on the design of integrative and innovative strategies that effectively conserve wildlife.

## Author's Note

The title is derived from Marshall Sahlins (1995) book: How "Natives" Think. About Captain Cook, For Example.

## Acknowledgment

The authors would like to thank D. Rodriguez, J. Guerrero, M. Balbas, S. Telan, W. van de Ven, W. Calapoto, and A. Macadangdang of the Mabuwaya Foundation, M. Caulian-Cureg and D. Aquino of Isabela State University, R. Antolin, G. Rebong, R. Sumiller, and R. Manalo of the Department of Environment and Natural Resources, and J. Miranda of the municipal government of San Mariano for their support in the collection of data. G. Persoon, J. D. van der Ploeg, T. Minter, and three anonymous reviewers provided valuable comments on this article.

## Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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## Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

## Notes

1. So-called "epistemic communities" are instrumental in the dissemination (and endurance) of these blueprint solutions (Haas, 1992). McGregor (2005) has highlighted the role of the IUCN Crocodile Specialist Group, a network of international "crocodile experts," in promoting sustainable use.
2. The preservation ideology originated in the United States in the late 19th century. Inspired by John Muir and his activism to safeguard Yosemite Valley, it aims to create protected areas free from human interference (Worster, 1977). Preservationists believe that wilderness should be valued in its own right and argue that the state has to protect wildlife from the insatiable demands for development of a rapidly growing human population. Conservationists, in contrast, think that nature can only be safeguarded if it is valued economically. Its main architect, Gifford Pinchot, the founder of the U.S. Forestry Service, campaigned for the sustainable and efficient use of renewable resources "for the enduring good of men" (Pinchot cited in Worster, 1977, p. 266).
3. Much of the grey literature is difficult to find. Cited reports of the IUCN Crocodile Specialist Group, DENR, and CFI can be obtained through the authors. All project reports of the Mabuwaya Foundation are available on www.mabuwaya.org.
4. The estuarine crocodile is a "forgotten species" in the Philippines, largely neglected by government and conservation organizations (Alcala, 2008, p. 21). The only in-situ conservation initiative for the estuarine crocodile of which we are aware is the sanctuary created by the municipal government of Maconacon in barangay Reina Mercedes in the northern Sierra Madre in 2007.
5. Few people have been as influential in shaping the Philippine environmental policy discourse as Gifford Pinchot. Pinchot toured the islands for 6 weeks in 1902, during which he reorganized the Insular Bureau of Forestry and drafted a report that provided the basis for the 1904 Forestry Law (Bankoff, 2009).
6. For an elaborate discussion on the increasingly tenuous links between the crocodilian skin industry and the conservation of wild populations of crocodilians, see McGregor (2005). In an effort to secure government permits to export crocodile leather, Crocodylus Porosus Philippines Inc. has recently supported several initiatives to conserve the Philippine crocodile in the wild.
7. Most probably Philippine crocodiles never naturally occurred on Palawan. Genetic concerns about interisland hybridization and ethological concerns about adaptation to the wild of captive-bred crocodiles continue to obstruct the reintroduction of Philippine crocodiles in the wild.
8. "Information, Education and Communication" (EIC) was an important objective of CFI (CFI, 1995, p. 34). Informative posters and newsletters were distributed to government offices, lectures about crocodiles were given in schools on Palawan, and a "crocodile conservation week" was organized annually in Puerto Princesa (Ortega, 1998). Nowadays,

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PWRCC mainly focuses on providing organized tours on the breeding facility for tourists: The breeding facility in Puerto Princesa attracts around 40,000 visitors per year, making PWRCC a top tourist attraction in Palawan. However, these activities mainly target the urban middle class and tend to reinforce the dominant policy narrative that crocodiles cannot be preserved in the wild.

9. The NSMNP-CP aimed to strengthen the management of the Northern Sierra Madre Natural Park. This integrated conservation and development project was funded by the Netherlands government and implemented by PLAN International.
10. Crocodile conservation activities in the northern Sierra Madre have been financially supported by (in chronological order): Conservation Leadership Program, Chicago Zoological Society, Critical Ecosystem Partnership Fund, WWF-Philippines, Haribon Foundation, Netherlands Committee of IUCN, Van Tienhoven Foundation, WWF-Netherlands, Rufford Foundation, Prince Bernhard Fund for Nature, U.S. Fish and Wildlife Service, Peoples Trust for Endangered Species and the provincial government of Isabela. In addition, several zoos provide financial support to the foundation: Melbourne Zoo, Ocean Park Conservation Foundation Hong Kong, Cullen Vivarium, Chester Zoo, London Zoo, Zurich Zoo, Koln Zoo, Bergen Aquarium, Henry Doorly Zoo, St. Augustin Alligator Farm, Pittsburgh Zoo, Cleveland Metroparks Zoo, Phoenix Zoo, Oregon Zoo, Crocodile Zoo Denmark, and Gladys Porter Zoo.
11. In fact concerns for people's livelihoods are often used by DENR officials to mask incompetence, corruption, or political interference (Utting, 2000; van der Ploeg, van Weerd, Masipiqueña, & Persoon, 2011).
12. The Local Government Code of 1991 entitles municipalities to enact and enforce ordinances to protect natural resources within their jurisdiction (van der Ploeg & van Weerd, 2004).
13. Fish spillovers of no-fishing areas can effectively reduce poverty of local resource users (Leisher, Sanjayan, Blockhus, Kotoleon, & Larsen, 2010).
14. The conservation of biodiversity in the developing world will continue to depend to a large extent on external funding (Clémençon, 2006; Ferraro & Kiss, 2002).

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