The Philippines’ Crocodile, *Crocodylus mindorensis* (Schmidt, 1935)

Needs of conservation actions and proposal for a crocodile sanctuary in Philippines and in Europe.

By David OUDJANI
What is the Philippines Crocodile and why is it so special?

The Mindoro crocodile, *Crocodylus mindorensis*, is one of the most endangered crocodile in the world. Since year 2008, this species is listed as “Critically endangered” by the IUCN: the wild population is estimated between 250 to 1000 animals, distributed on a remnant part of the historical range, with isolated populations no more interconnected. This species lives in freshwaters damaged by human activities; furthermore, their natural habitat overlaps the ecosystems visited by the estuarine crocodile, which threaten the Mindoro crocodile by possible hybridization.

Even if the IUCN/CSG placed this crocodile on high priority species in need of active conservation actions, and even if the Philippines’ government started to protect actively this emblematic reptile, each supplementary effort for Mindoro crocodile conservation is valuable and should be considered as another step against the Philippines’ biodiversity erosion.

Why protecting the Philippines Crocodile?

*Crocodylus mindorensis* is a key species in the wetlands of the Philippines archipelago as this species is one of the apex predator. Surviving since millions years ago, this species is well-adapted to the swamps and freshwaters habitats and has a strong role of regulation of the aquatic fauna. This species both regulates many other aquatic species and acts as a major actor in the trophic chains; the crocodile is also a natural cleaner of the ecosystems.

Furthermore, the Philippines Crocodile is one of the most endangered species of crocodilians in the world and is one of the patrimonial species of the Philippines. The conservation of this species is on the top list of the actions of IUCN/CSG.

Which are the threats toward the Philippines Crocodile?

With a total population estimated between 250 and 1000 animals living in the wild, on a patchy distribution with isolated groups living mainly on man-disturbed areas, this species is on the edge of extinction and must be protected by all the possible ways, to avoid a dramatically issue within the next years.

The main threatens to Mindoro crocodile are: human disturbances, pollutions of the freshwaters, illegal hunting (including destruction of crocodiles
in human-crocodile conflicts), collateral damages linked to human activities (non-sustainable fishing methods, destruction by nests by the cows...), and in a more natural way: hybridization with *C. porosus*, destruction of remnant populations by natural cataclysms because of too small size of insular population (for ex. Tsunami...), lack of populations gene flows that leads to over-inbreeding.

**Do some protection plans already exist, and what to do next?**

Yes, both in the Philippines and overseas zoologists took a responsible attitude toward *Crocodylus mindorensis*. But, there is always things to improve or to develop, on each part of the Philippines Crocodile conservation plan.

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**In the Philippines:**

Many crocodile farms or private breedings exist in Philippines since many decades, with a profitable business model and good results in term of zootecchnical management. But the main species to be bred is *C. porosus*, the estuarine crocodile, for commercial purposes (legal meat and skin trade). *Crocodylus mindorensis* is only bred as a “side species” since it’s not a species able to generate profits on a large scale, opposite to the estuarine crocodile.

The way for Mindoro crocodile’s breeding valorization is to involve the local croc farmers in sustainable use of Philippines’ natural resources and to put the conservation breeding programs as a duty for companies using natural resources as a successful business. An active involvement in endangered species conservation should be a part of each croc farm business plan, and should be seen as an opportunity for communication, and eco-responsibility.

A big issue in the local breeding is the hybridization with the estuarine crocodile, which happens frequently in captivity. This issue is one of the most important to avoid as this genetic pollution reduce to zero all the breeding efforts. The hybrids animals do not have any ecological value and represent a huge menace for the natural populations (in case of later animal releases in the wetlands, or some always possible escapes from the farms).

Our next step should be to assess more accurately the situation in Philippines croc farms and private breedings regarding the Mindoro crocodile, following the global captive population through a studbook on the whole Philippines territories. This should include a strict survey on the captive animals (numbers, sex, ability for reproduction both of animals and enclosures) and on their genetics (taking out the hybrids, working only with pure animals, directing
some artificial gene flows between the breeding facilities by directing some animals exchanges between farms).

A studbook has been launched in Philippines by the Palawan Wildlife Rescue and Conservation Center; conservation plans are undertaken by the Mabuwaya foundation, the Crocodile Conservation Society and the Zoological Institute of HerpaWorld in Mindoro. There is a usual cooperation between Philippines and Germany.

-Overseas:

Europe counts few captive Mindoro crocodile, most of them between UK, Czech Republic and Denmark. To today's date, no studbook is launched by the ESB foundation. No information was collected about their genetics and there are no proofs that such animals are genetically pure or not.

To fill this gap, it’s a priority to launch an European Studbook for *C. mindorensis* and to start a genetic survey of the captive animals within Europe. This should be done as quickly as possible and should be done before importing new animals to Europe, to work with only animals that can be usable in term of conservation plans. There is no sense to import not pure animals, or to hybridize them with not pure captive ones.

America counts a few captive individual. A Studbook has to be launched and should be directed by the Gladys Porter Zoo. Even if there is not a strong involvement in the US regarding the Mindoro Crocodile, a future cooperation in term of conservation has to be settled between Europe and the US.

What can we do to save the Philippines Crocodile?

Even if the Philippines governments and many organizations (IUCN/CSG, local crocodile farms, universities,...) take the problem seriously, it’s still very important to collaborate on the Philippines Crocodile conservation on the different way the species is threatened.

Farming in captivity in the Philippines with modern and efficient breeding methods, and with captive populations genetic surveys is one of the multiple way to save the endangered Philippines Crocodile.

Protecting the wetlands and globally the whole ecosystems and all the
species that inhabits there is the first condition to protect the crocodiles’ populations on a large scale. This includes protecting the areas from pollution, urbanization, water harvesting in the sensible areas and wood harvesting in the protected wetlands.

Educating the population is another important step. The thematic of human/crocodilians conflicts is a well-known subject. Sensibilization to ecology to both the People and the local authorities is as important as studying true solution to avoid the human/crocodilian conflicts and to help to keep human and crocodilians as good neighbours.

Leading surveys of the wild populations (dynamics, nesting, risks of hybridization...) is also a duty to know exactly the evolution of the different patchy population of *C. mindorensis* and being able to take decisions on the future conservation actions.

Our proposal for participating on the Philippines Crocodile conservation will focus on the following topics.
Topics in detail:

TOPIC N°1: Wetlands protection in remote southern areas

Financing natural habitat protection and cooperating with the local government to create new protected areas, especially wetlands, and communicating on large scale to involve the local rural inhabitants. This has been started already on the local scale, but there are many places in need of action, mainly in the southern remote place where still exist dynamic populations of *C. mindorensis*, but where the central government authority has difficulties to maintain his actions. Those southern islands in trouble with some militarized groups are a major action point. The main difficulty is to manage to act there without any troubles due to the militarized groups.

The main axes of protection are:
- protecting the wetlands from the human disturbances (pollution, unsustainable irrigation, destruction of natural habitats)
- opening a dialog between rural populations and the government to solve the classical human-crocodiles conflicts and managing to gain the local population acceptation of the wild animals, limiting the illegal killing of individual; educating children in the way to be eco-responsible.
- following the hybridization issues with *C. porosus* in those areas.
- assessing a survey on the wild populations dynamics in the southern areas.

The solution in practise:

By creating a Sanctuary for endangered wildlife, we would be able to enhance the protection of the remote wild natural areas where inhabit the Mindoro Crocodile. Working together with the Philippines government make possible to access some remote areas, for sampling datas about the crocodiles, and then being able to propose which areas are in need of protection and proposing usefull solutions based upon our own collected datas.

The ecotourism and the possible international dotations for such a wildlife Sanctuary would permit to work on a large scale on the remote southern places of Philippines, where the classical studies are not followed on a regular basis due to lack of funds to access those remote areas.

By protecting the southern patchy populations of Philippines Crocodiles, the Sanctuary would improve the global action plan for *C. mindorensis*. 
TOPIC N°2: Financing local farming and sustainable use of *C. mindorensis* and derivated products

This topic is already on the trail and local organizations make a great job there. One of our pole of interest should be to assess how globally the *mindorensis* are farmed actually, and to see how to improve it, by financing farms evolutions, consulting regarding the breeding methods (to increase the reproduction results and managing the sex-ratio results, etc…).

**The solution in practise:**

Creating a wildlife Sanctuary focusing on Mindoro Crocodile would help to collect datas and learn more about the Philippines Crocodile biology and captive breeding. Finding true evolutions in the breeding processes and finding new sustainable methods to farms the crocodiles on long-term is one of the goals of such a project.

TOPIC N°3: Financing both studies of wild populations’ dynamics and human impact (ecology, risk of hybridization assessment, impact of human activities on the wetlands).

Financing a global survey of populations’ genetics, to be able to identify pure and hybrids animals both in local farms, in captive animals worldwide, and in wetlands close to the sea, where hybridization with *C. porosus* can be an issue.

This could lead to a “global” and worldwide scale studbook.

**The solution in practise:**

The Sanctuary would be the opportunity to organize a large scale data collecting about the crocodiles populations dynamics and estimating the human impacts, finding the most important wetlands to protect immediately from human destruction. An eco-touristic activity would provide a sufficient income to lead such surveys, and permit to have open-access to all the localities, to lead some exhaustive data collecting in sight of an efficient global action.
TOPIC N°4: Breeding the species out of the country of origin

This should be setted up first at the European level, then opening to the US organizations is the mandatory evolution. Importing groups of certified pure Mindoro crocodiles is a first step to launch it. An unique breeding program is to launch in Europe, to link to a ESB participation (as a first step to be coordinated within the EAZA organization).

The solution in practise:

The Sanctuary in Philippines and it’s alter ego in Europe, near Bratislava, Slovakia, would work together to breed the species outside of the country, with the goal of researches, public education and sensibilization, and global fund raising to save the Philippines Crocodile. Communication in Europe is an important step on the goal to save the crocodiles.

Receiving a few couples of Mindoro Crocodiles in the european facilities is the way to open a global communication plan regarding this species and sensibilizing the international citizens to the risks that can lead the Mindoro Crocodile to extinction.

Being able to reproduce them would be the first step of an international breeding cooperation and a way to collect datas about artificial propagation of the species.
TOPIC N°5: Educating the population and working on the human/crocodilian conflicts

The human/crocodilian conflict is a regular issue debated during the CSG workshops. Crocodilians are apex predators and traditionally cause fear and accidents amongst the populations. In the rural areas, the people work closely to the water bodies, and are in contact with the crocodiles on a regular basis.

The usual evolution of the encounter is turning good; the crocodiles are usually shy to people, and people remains careful. Philippines crocodiles are known to be medium sized crocodiles, not willing to hunt people in the majority of cases.

Unfortunately, some accidents can happen, and obviously, the giant and potential human hunter Crocodylus porosus (= Sea Crocodile) can me mistaken with the Philippines crocodile. Then, unfilthy crocodiles can be killed or persecuted, sometimes on a regular basis when accidents destroyed families.

On the other hand, people do not often understand why the central government protect the crocodiles and not the citizens, and much misunderstanding can follow in the rural and often poor areas.

The solution in practise:

By creating a wildlife sanctuary, and communicating on biodiversity and particularly on the importance of the crocodiles in the ecosystems, it’s possible to communicate with the locals and working on sensibilization to environment and helping to pacify the human/crocodilians encounter.

Working with the local people in rural areas and organizing exhibits and “crocodilians encounters” (where people can learn to know the animals and respect them) is a way to stop the illegal killing of crocodilians. Any laws cannot stop families to kill (even protected) crocodilians, when they believe it can kill their kids. But teaching them to live close to the crocodile in a safe way is a much more promising method.
CONCLUSION:

Working on an European Network working on Philippines’ herpetofauna and especially the Mindoro Crocodile, to coordinate effort of different zoos and professional herpetologically involved specialists to save and breed the Philippines’ fauna is an ongoing and promising project.

This first document is a way to understand what’s done and what must be done. But some more accurate information must be taken from the local and international specialists already in place. Those information have to be compiled with local and international data we must collect first in Philippines and then to different zoological centers (London, Danmark, etc). This new comprehension and accurate data are mandatory to start an EFFECTIVE action plan that have to increase the standards of what’s already going on with the Mindoro crocodile conservation. The main idea of what we should do is on the trail, now we must communicate with all the already-existing partners involved in Philippines’ crocodiles conservation to be really efficient and not overlapping what’s already done by the colleagues.