

Crocodile farming: a multi-million dollar industry

By RIY Adan

Crocodiles in the Filipino culture symbolize corrupt government officials, but this image is fast vanishing with the economic potential that crocodiles offer.

Crocodiles are among the oldest creatures on earth, having survived for more than 200 million years. It is the last remaining member of the dinosaur family, and has not changed biologically through the years. Crocodiles have a long breeding life, which ranges from 25-30 years and a life span of almost 100 years.

There are 27 species and subspecies of crocodiles throughout the world. Eighteen of these are in danger of extinction and the rest are threatened with declining population due to overhunting and habitat destruction. Two known crocodile species in the Philippines exist, the *Crocodylus mindorensis* (freshwater crocodile), also known as the Philippine crocodile, and *Crocodylus porosus* (saltwater crocodile).

C. mindorensis is endemic in the Philippines. They are dwarf species, usually less than two meters in length, although rare individuals may reach nearly three meters and weigh less than 100 kg. They live in freshwater lakes, rivers, and marshes, where they feed on fish, water birds, lizards, and snakes. Babies prey on insects, small fishes, and frogs.

In contrast, the *C. porosus* that live in brackish and salt waters in the Philippines and elsewhere from Asia to Australia typically reached 4-5 meters in length and weighs over 1000 kg. They feed on large fishes and turtles. They are also the largest reptiles on earth, and among the most dangerous.

The crocodile's nature has always inspired reverence and fear in man. Crocodiles can attack at any time of the year, but they are more active in the warmer months and when in search of mates. Large males will assert their dominance by jealously par-



Skeleton of a 5.3 meter long crocodile and its hide will meet visitors in the CFI

trolling their stretch of territory. Savage supremacy battles rage, often leaving the vanquished dead or seriously injured.

The female crocodile is ready to breed when it is about 7 years old. After a long and often noisy courtship, the female builds a large, deep nest of layered soil and vegetation, which is heated by decomposing plants. There, she lays her eggs. Saltwater crocodile lays about 50-70 eggs while the freshwater crocodile lays about 30-40 eggs within a year.

Although feared in

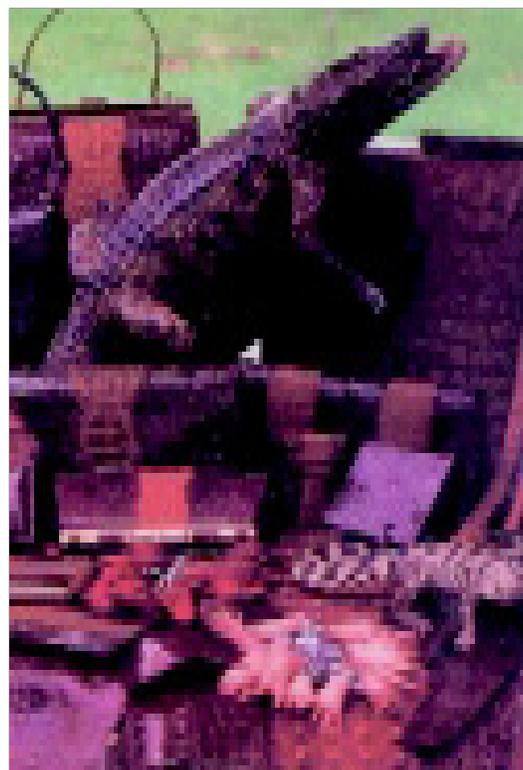
nearly every place they live, crocodiles are among the best of parents. The female crocodile tends the eggs carefully for 18 hours daily for the next three months, adding, removing, and shifting soil and vegetation to maintain just the right amount of temperature for her offspring. As hatching time approaches, she becomes increasingly aggressive, chasing away other crocodiles and any potential predators. The mother stands guard until the sound of peeping rouses her to dig out the 1 foot-long hatchlings and carry them gently in a pouch of skin stretched over her lower jaw to a crèche at a water's edge. Unfortunately, only about 1% of all baby crocodiles make it to adulthood. Thousands drown during flooding or are picked off by fishes and even by larger crocs.

Killing adult crocodiles, as is being done now, also drastically reduces the potential population. Moreover, toxic wastes from mines, destruction of marshes and riverine habitats, and the conversion of their natural habitats for fishponds additionally threaten their populations. Estimates have it that there are only about 100 Philippine crocodiles in the wild now.

Crocodile Farming Institute

To save the crocodiles from extinction in the country, the Crocodile Farming Institute (CFI) was established in August 20, 1987

The Samutprakan Crocodile Farm and Zoo in Thailand is the world's largest croc farm with over 60,000 crocs (right and below); ladies' bags and accessories made of crocodile skin (far right)



FROM THE INFO BROCHURE OF THE SAMUTPRAKAN CROCODILE FARM AND ZOO

at Barangay Irawan, Puerto Princesa City, Palawan. It started as a joint project of the governments of Philippines and Japan through the Department of Environment and Natural Resources (DENR) and the Japan International Cooperation Agency (JICA). In 1995, JICA funding ended and since then, the Philippine government solely manage and fund CFI through the Protected Areas Wildlife Bureau (PAWB) and the Palawan Provincial Environment and Natural Resources Office (PENRO). CFI is now one of the components of the Palawan Wildlife and Conservation Center. It aims to conserve the two endangered species of crocodiles in the Philippines, and to develop and introduce a suitable crocodile farming technology that will help uplift the socio-economic well-being of the Filipino people.

Captive breeding of both species is one of the strategies employed by CFI to fulfill its mandate of conserving the endangered crocodiles. They use artificial insemination and artificial incubation, which is easier and more efficient than depending on the crocodiles to mate and incubate their eggs naturally. Aside from the crocodile breeding and rearing activities, they also conduct ecological and biological studies, nutritional and biochemical studies and physiological and pathological studies. Moreover, CFI has entered into rearing agreement with private firms in the country to breed and propagate crocodiles. This move was spurred by the successful breeding of around 5,600 crocodiles out of the 79 heads CFI has bred since its establishment.

Several things are required before one becomes a cooperators of CFI. First, of course, is funding to start up a crocodile farm. The farmer must also undergo CFI training on safe and profitable crocodile cultivation and submit a barangay clearance certificate of community acceptance. The potential farm must also

have an abundant supply of food and water. There are six cooperators farming crocodiles in the country now. They buy the hatchlings from CFI and CFI monitors and give technical assistance to them.

CFI believes in the potential of commercial utilization of crocodiles as dollar-generating industry for the country. Crocodile farming is a very profitable business and could be a multi-million dollar industry.

Economic potentials

Some Filipino entrepreneurs found out a few years ago that there is money in crocodiles. Every bit and piece of this reptile is useful with nothing thrown to waste. Crocodiles are commercially viable once they reached 1.5 to 2 meters in size.

The economics of farming crocodiles actually depends on: (1) the ability to raise a large percentage of stock to harvest size in no more than three years; (2) availability of a cheap food source; (3) high leather prices; (4) maximizing tourist (gate toll); (5) the sale of by-products; and (6) continued research to refine husbandry techniques.

Crocodile's skin is prominently rare and expensive when converted to shoes, handbags, belts, wallets, jackets and other leather crafts. A bag made from crocodile skin is worth US\$5,000 in a boutique in New York. Skin prices are variable and range from US\$10-12 per inch belly width in the producing country. The highest prices are paid for species with relatively small scutes,

LIVE CROC PHOTOS BY I TENDECIA



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such as salt-water crocodiles. With the influx of wild skins diminishing due to depleted numbers and protective legislation, the market for farmed skins is expected to be relatively strong in the future.

Japan and France purchase approximately 80% of the crocodilian skins marketed annually. The rest are purchased by Singapore, USA, West Germany and United Kingdom (listed in descending order). France dominates the African and American market while Japan predominates in Southeast Asia. Philippines, on the other hand, has long been exporting reptile and aquatic animal skins mostly to Japan.

Processed crocodile meat is a delicacy in some countries. In the United States, people are eating dishes like cojambalaya, 'gator steak, and croco-spiced Cajun. Crocodile meat tastes like chicken meat if properly cooked. Its meat is tender, juicy and deliciously good even if it's 18 or 80 years old. Its meat is also good for people with Asthma, according to some Chinese traditions. Soup made from the reptile's penis is believed to be an aphrodisiac. The meat can also be canned for export to Hong Kong, Japan and other Asian and European countries. Crocodile meat pegs at \$20 per kilo in the international market.

Oil derived from its flesh also has a big market abroad. The teeth, head and bones of crocodile are turned into jewelry, unique souvenir items or decorative products. The bones can also be processed into animal feed.

The international trade in crocodiles and crocodile products is controlled by the IUCN (International Union for the Conservation of Nature) through CITES (Convention on International Trade in Endangered Species of Wild Flora and Fauna). The IUCN encourages sustainable use of crocodiles for skins and meat production as it is a legitimate conservation tool provided the use is sustainable and it creates commercial or other incentives to con-

serve both the crocodiles and the wetland habitats they occupy.

Tourism is another aspect of this reptile's marketing. Crocodilians are interesting animals and many farms are open to the general public who pay to view these "ferocious" animals and their tiny hatchlings in clean, natural surroundings. Many farms capitalize on this potential.

On another development, a recent news report revealed that the Department of Environment and Natural Resources (DENR) has proposed the use of crocodiles for industrial purposes. They can serve as efficient cleaners of big farms by eating the dead animals, thus eliminating the use of incinerators. This proposal (the "Adopt a Crocodile Program") came with the implementation of the Clean-Air Act where incinerators would be phased out within a three-year period.

Indeed, crocodile farming is gaining popularity. Thanks to current captive-breeding programs, crocodiles are safe from extinction. But as with other endangered species, protection of the crocodiles' natural habitats is still the best course in the long run, since these lakes, rivers, and marshes are of critical importance to the stability of watersheds and marine fisheries.

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150 days, with the eggs weighing up to 50 g. In 1993, they obtained 100 million eggs and were able to rear 250 immature fish offshore. However, a storm hit their site; about half survived but later died. The young tuna were known to have grown to 1 kg.

The technology to rear wild-caught fingerlings has been successful to some extent. Tuna mariculture will be practical if the supply of farmed fingerlings will become stable. Fingerling size for stocking in offshore cages is 10-20 cm.

On the other hand, Japan's Fisheries Agency since 1993 has spent Y1.2 billion in establishing bluefin tuna parent fish rearing and spawning facility in Amami Oshima. The project has been rearing 200 yearlings for breeding stock.

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