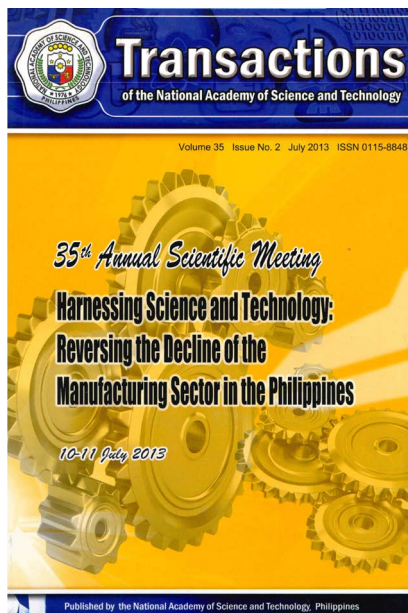


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Status of the Crocodile (*Crocodylus porosus*, Schneider) Industry in the Philippines

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Keywords

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Technical Session Papers

**STATUS OF THE CROCODILE (*Crocodylus porosus*, Schneider)
INDUSTRY IN THE PHILIPPINES**

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Abstract

Crocodiles in the Philippines are listed in the Appendix 1 of the Conservation on International Trade of Endangered Species of Wild Fauna and Flora (CITES). But based on the wide distribution of the *Crocodylus porosus*, a closed-cycle breeding for commercial trade is permitted though the *Crocodylus mindorensis* is for conservation. The result of the technology transfer program of the Philippine government CITES registered facility pave way for the birth of crocodile farming industry in the Philippines. In 1999, six (6) private commercial farms that successfully passed the stringent evaluation process have pioneered this non-traditional industry on Saltwater Crocodile farming. The coalition of crocodile farmers or the *Crocodylus Porosus Philippines Inc.* (CPPI) strengthens the sustainable use and management or value-driven conservation of the two crocodile species in the Philippines. CPPI farms have advanced the industry, providing new technology, innovations and facilities in accordance with international standards. Numbers of crocodiles have increase to approximately 25,000 for leather industry. There were about 4,000 *C. porosus* skins that have been exported from 2008-2012 and projected to have a total of 10,000 skins available for export in the next 5 years. CPPI is also working towards the conservation of two species of crocodile in their natural habitat in southern Philippines. The industry recognized their responsibility to the Filipino people and its future generations. Government support to access more competitive technology, increase social acceptability of crocodile meat as

alternative protein source, support for the development of by-products, and increase support for research and conservation is recommended.

Keywords: crocodile industry, *Crocodylus porosus*, *Crocodylus mindorensis*, conservation

Introduction

There are 22–23 crocodylian species distributed throughout the tropical and subtropical regions of the world. Crocodylians have been considered as obstacles to human exploitation of land and resources. But they are also considered a source of highly marketable products (their skins) and to a lesser extent their flesh and eggs for human food. As a result of the destruction and conversion of their habitats to other uses as well as overexploitation, they have become endangered except for one species, the American Alligator.

Ancient peoples revered or worshipped crocodiles. Sobek was a crocodile-headed god of ancient Egypt. Until now, the Nile Crocodile is worshipped and protected by certain tribes in Madagascar. The bible has references to crocodiles in the religion of ancient Hebrews. In ancient China crocodiles were recognized as lord of scaled reptiles. In the Philippines, there is evidence that natives in Agusan Marsh protect crocodiles because they believe they are useful. Crocodiles also figure in works of art and literary works.

In the Philippines two species of crocodiles exist: the Indo-Pacific Crocodile or Estuarine Crocodile (*Crocodylus porosus*) and the endemic Philippine Crocodile (*Crocodylus mindorensis*). Both *C. porosus* and *C. mindorensis* are listed in Convention in International Trade of Endangered Species of Flora and Fauna (CITES) Appendix I (only for conservation and no commercial export). These species were once widespread throughout the country but are now restricted in distribution mainly because of human agricultural activities and habitat change. In this regard, information on crocodile economic and ecological impacts needs to be disseminated.

What is often not realized is the fact that crocodiles play an important ecological role in aquatic environments as *keystone species* that maintain system structure and function by their activities. They circulate nutrients

through their large body biomass movement and amounts of metabolic wastes they produce for nutrient recycling, thus result in fishery production in wetlands (lakes, rivers, and marshes). For example, Lolong was large (more than one metric ton in weight), ate several kilos of food per unit time and produced large amounts of metabolic wastes in Agusan Marsh. It must have contributed to the fish production of Agusan Marsh.

At the present time, the crocodile industry, which began 12 years ago in the Philippines, pertains only to the Estuarine Crocodile as the Philippine Crocodile is strictly for conservation. The interest in farming crocodiles started with Crocodile Farming Institute in Puerto Princesa, Palawan established by the Department of Environment and Natural Resources (DENR), with Japan International Cooperation Agency (JICA) financial support. Farms of both species have been established by the private sector in Mindanao and the provinces surrounding Manila. There are more individuals of the Indo-pacific or Estuarine Crocodiles (~20,000) than the Philippine Crocodile (~100) in these farms.

Legal Framework

The crocodile farming industry in the Philippines is strictly regulated by the Convention in International Trade of Endangered Species of Flora and Fauna (CITES). It is an international agreement of member countries to regulate trade of red-listed species to promote crocodylian conservation and legal trade that does not threaten the survival in the future. Mercado (2008) states that the *Crocodylus porosus* wild population in the Philippines is listed in Appendix I, while the captive population can be applied for CITES “downlisting” to Appendix II for the use of closed-cycle breeding upon production of second or F2 generation, making commercial international trade of their product less regulated.

In 1980 Silliman University in collaboration with the Smithsonian Institute pioneered the advent of modern crocodile farming in the Philippines by establishing a conservation breeding and rearing program of *Crocodylus mindorensis*, a critically endangered species (Mercado 2008). With the establishment of the Department of Environment and Natural Resources (DENR) RP-Japan Crocodile Farming Institute (CFI), Palawan in 1988 (now renamed as Palawan Wildlife Rescue and Conservation Center, PWRCC), a farming technology of crocodiles in the Philippines was developed. This joint

collaboration project primarily aims to promote the socio-economic well-being of the local communities through the development and introduction of suitable crocodile farming technology.

After a decade of farming technology development, the DENR issued the Department Administrative Order (DAO) 98-64 or the General Rules and Regulations on the Establishment of Crocodile Farms in the Philippines in 1998 to ensure that the conservation of biodiversity and its utilization must be consistent with sustainable development. Finally in 1999, in compliance with the Philippine government's commitments to the CITES and the Convention of Biological Diversity (CBD), the DENR issued the Department Administrative Order (DAO) 99-45 or the *Rules and Regulation on the SALE AND FARMING OF SALTWATER CROCODILE* (Lim 2008). This objectively aims to develop local capability on Saltwater Crocodile Farming through the transfer of technology generated by Crocodile Farming Institute (CFI), promote the conservation and sustainable use of *Crocodylus porosus* and ensure equitable-sharing of benefits derived from the said resources and to generate revenues that will help sustain all activities of CFI towards the conservation of *Crocodylus mindorensis* and *Crocodylus porosus* and enhancement of crocodile farming technology in the Philippines.

This legal framework defined the stringent selection process for choosing competent private poultry and piggery farms that would utilized their original *Crocodylus porosus* founder stock from the Philippine government CITES registered facility for the leather industry and direct trade for animals produced in commercial farms.

In 2007, some conflicting regulations were harmonized by developing policies and guidelines concerning conservation and sustainable utilization of crocodiles. Participants of the Forum on Crocodiles in the Philippines adopted seven resolutions as results of the forum workshop sessions. Among these with major concerns on crocodile farming are (1) Resolution aimed at Improving Legal and Administrative Issues Associated with Crocodile Conservation, Management and Sustainable Use in the Philippines; and (2) Resolution Proposing "Crocodiles as Livestock" or the Transfer of Crocodile Industry from DENR to Department of Agriculture (DA). Such resolutions have come up with joint DENR-DA policy/guidelines on the specific roles and joint responsibilities of the agencies on crocodile farms. The DA issued the Department Administrative Order (DAO) 26 Series of 2012 or Guidelines

on the Hygienic Slaughtering of Captive-Bred Saltwater Crocodile (*Crocodylus porosus*) for Food to safeguard the health of the consuming public from zoonoses and other hazards posed by exotic or unconventional meat. The overlapping legal mandates and unclear jurisdictions of DA and DENR over the farming of crocodiles need further dialogue.

Inception of Crocodile Farming

In 2000, six (6) Philippine citizen private commercial farms from 19 shortlisted out of nearly 80 applicants successfully passed the evaluation process for the Establishment of Crocodile Farms in the Philippines conducted by the Crocodile Farming Institute (Mercado 2008). These six farms pioneered this non-traditional industry and participated in commercial crocodile farming to develop local capability on Saltwater Crocodile farming. This was the birth of crocodile industry in the Philippines. There are three farms in Luzon and three farms in Mindanao (Table 1).

Table 1. Number of juvenile Indo-pacific crocodiles (*Crocodylus porosus*) acquired by Crocodylus Porosus Philippines Inc. associated farms from 2000-2002.

REGISTERED CROCODILE FARMS IN THE PHILIPPINES	PARENT STOCK
LUZON	
Coral Agri-venture Farm Inc. Morong, Rizal	2200
Golden Acres Farm Inc. Lipa, Batangas	150
Pulunan Farm Trece Martirez, Cavite	500
MINDANAO	
JKMercado & Sons Agricultural Enterprises Inc. Kapalong, Davao, Del Norte	500
Valderrama Aqua Culture Inc. Toril, Davao City	300
Philippine Ostrich and Crocodile Farm Opol, Misamis Oriental	250

The initial concept was that the Crocodile farmers or "Cooperators" (DAO 99-45) would obtain young crocodiles from the government for grow-out until commercially available size (Mercado 2008). The government was tasked to undertake health condition monitoring, collect data on the growth development of crocodiles and provide sufficient technical assistance through the Technical Extension Team (TET) composed of representatives

from CFI, PAWB and concerned DENR Regional/Field Offices. But after 2-3 years of try out rearing, the skin quality was judged substandard by the international industry due to inappropriate rearing facility for producing quality, Class “A” skins. CFI unsuccessfully provide substantial developing technical expertise to private farm due to project technical instability. Mercado (2008) stated that with great capital investments on infrastructure, set-back on payback period and lack of market for “Grow-Out”, the “Cooperators” had no choice but to retain the stocks and convert to close-system breeding in order to utilize rapidly maturing crocodiles. CPPI associated farms became “accidental” crocodile breeding farms.

Industry Development and Economic Contribution

The six (6) commercial farms have been successfully engaged in commercial farming and business activities rather than crocodile farming prior to the establishment of *Crocodylus Porosus Philippines Inc.* (CPPI) in October 2000. CPPI, a coalition of legitimate crocodile farms in the Philippines was organized to strengthen ties between crocodile breeding farms. It was primarily aimed to develop crocodile farming industry, promote crocodile conservation, and educate public on the ecological importance of the crocodiles in the Philippines. CPPI thought that as an association they could deal with many private and government interactions regarding crocodile industry (Mercado 2008). In coordination with the Philippine Government, CPPI pioneered the crocodile skin industry in the Philippines. CPPI envisioned for healthy human-crocodile coexistence towards sustainable crocodile management and conservation. Likewise, it aims for conservation through sustainable use and management or value-driven conservation of the two crocodile species in the Philippines.

This industry utilizes part of their in-house hog and poultry by-products into alternative cash commodity as crocodile feeds. According to Limketkai (2008), there is a need for crocodiles to be part of a method for by-product disposal. Commercial farms were developed by integrating large scale supply of culled layer/grower chickens and individuals with unwanted developmental growth from piggeries and poultry operations as satisfactory foods for the crocodiles. Thereby, converting this operational loss into cash commodity and ensuring non-competition with humans for food consumption. Mercado (2008) suggests that as long as the crocodile industry is attached with the livestock industries, the positive growth of the crocodile

industry is assured. Limketkai (2008) defines crocodile farming in the Philippines as simply a logical extension of the poultry and hog industries. Hog and poultry farms supplied about 2-3% of crocodile population biomass equivalent to meat per feeding.

From 2000-2008, CPPI associated farms in consultation with the Philippine government struggled to reinforce the industry order to keep abreast with the fast growing changes in husbandry management for quality skin production. After 8-years of high capital expenditures on infrastructure development and painstaking husbandry consultations to resolve farm issues and some capital errors, CPPI farms have obtained the most current and "State of the Art" technology. CPPI has significantly advanced the local crocodile farming industry to the extent of bringing in new technology and research outcomes on farm designs, innovations on husbandry practices, provisions of slaughterhouses, CITES recognition, introduction of meat products, and the near perfection of leather industry, bringing it closer to achieving international standards for crocodile farming and conservation.

Coral Agri-venture Farms Inc., Pag-asa Farms and Pulunan Farm have successfully breed crocodiles in 2005, for skin production and exhibit purposes (Mercado *pers. com.* 2013). Three (3) other farms such as Golden Acres Farm Inc., Valderama Aquaculture Farm Inc. and the Philippine Ostrich & Crocodile Farm Inc. are developing their individual breeding farms following the most recent general husbandry standards for crocodile skin production. Both Coral Agri-venture Farms Inc. and Pag-asa Farms of JK Mercado & Sons Inc. obtained the most recent farming technology advancement and infrastructure development. To date, CPPI associated farms have approximately 25,000 crocodiles housed in a variety of facilities depending on their needs.

Crocodile breeding cycle consists of four stages: the breeding, incubation and hatching, nursery, and two phases of grow-out for skin production. Breeding pens were designed in an environment simulating its wild natural habitat. These pens are ideally located in a restricted and less disturbed area in the farm to minimize physical stress during the breeding season at the start of summer months to the end of the rainy season. Majority of breeding pairs were kept in communal structure with 1:3 or 1:4 male to female ratio while others are in 1:1 ratio. An overall average clutch size range of 45-60 eggs was collected for matured female *Crocodylus porosus* breeders. Eggs are

artificially incubated in various types from modified upright box-type (single stage) to a walk-through incubator with temperature (range 29-34°C) preferably 32°C and humidity of 99+%. At given constant incubation temperature, hatching occurs on average from 75-80 days. Hatchlings were kept in warm conditions (32-33°C) for about 3-5 days immediately after hatching to ensure absorption of the yolk before they are transferred to the nursery pens. In nursery pens, crocodile are housed in dark environment with temperature controlled equipment for almost a year. When transferred to growing pens, juvenile crocodiles are graded regularly depending on size/age classes for 2-3 years until reach the desired marketable size. The addition of pre-harvesting facility and the Bureau of Animal Industry - National Meat and Inspection Service (NMIS) AAA Certified crocodile slaughterhouse conformed to the Good Manufacturing Practices (GMP) Standard Food Safety and Certified Hazard Analysis and Critical Control Points (HACCP) Food Safety Management. These are the latest innovations of the industry.

The industry has contributed to the economy through the production of valuable *Crocodylus porosus* export quality salted raw skin as the primary product. Of secondary importance is the introduction of crocodile meat as protein source for humans. Caldwell (2011) reported that the overall volume of world trade in classic crocodilian skins had an exported annual average of 1.3 million skins. *C. porosus* skins trade report (Table 2) are mainly extracted from the main producers such as Australia, Indonesia, Malaysia, Papua New Guinea, Singapore and Thailand which steadily increased from 2000-2009. Philippines crocodile farms started its contribution to the world crocodilian trade in 2008. This skin export in the Philippines was contributed by Pag-asa Farms of JKMercado & Sons (JKM) in 2008 and Coral Agri-venture Farms Inc., (CAVFI) in 2009 under the CFI CITES accreditation A-PH052.

Only the commercial utilization of *Crocodylus porosus* is permitted in the country. In 2010, JKMercado & Sons Pag-asa Farms obtained CITES accreditation (A-PH053) for farm-bred *Crocodylus porosus*, the first and only CITES registered facility among CPPI member farms. Together with CAVFI, the largest commercial crocodile farm in the Philippines, these farms moved their way forward to continuously help this small developing industry of the six registered farms. Crocodile Farming Industry in the Philippines is mainly focused on salted raw skin production. With the establishment of two crocodile slaughtering facilities, there were a total of about 4,000 *C. porosus* skins that have been exported from 2008-2012 for leather industry. The

tedious skin tanning process is mainly done in export countries such as Singapore and Japan.

Secondary to skin production, the introduction of crocodile meat as alternative protein source for humans are slowly coming in to the market. CAVFI have pioneered the introduction of these products locally in the Philippines. At present, frozen and processed meat products are slowly gaining its contribution to the local economy, an average of almost a ton of meat per month, equivalent to 45% of annual meat productions are consumed for domestic use. Crocodile meat products are available in selected stores and restaurants nationwide. Export of raw frozen meat products in neighboring countries and in the world central regions needs compliance to government regulations and provisions. Other by-products (such as crocodile oil and blood) are being developed for pharmaceutical purposes. In Subosa *et. al.* (2008) they found out that the crocodile serum of captive *Crocodylus porosus* and *Crocodylus mindorensis* at all stages exhibited antibacterial property against human pathogens. The University of the Philippines Manila has initiated their scientific research on the possibilities of utilizing the important antimicrobial and antioxidant peptides that could be present in crocodile blood to fight human infections.

Table 2. Reported trade in *Crocodylus porosus* skins, 2000-2009.**

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Australia	13,296	11,849	*10,423	*14,744	*12,741	*20,409	*16,123	*21,314	28,626	*26,990
Indonesia	3,172	3,456	3,277	2,732	3,968	4,714	3,825	5,151	5,718	4,996
Malaysia	*559	*675	*662	*618	*1,450	*1,058	*1,684	*1,273	*1,043	*587
PNG	8,336	10,676	9,332	8,000	11,043	10,222	10,208	12,675	14,074	11,910
Philippines	0	0	0	0	0	0	0	0	*20	285
Singapore	438	762	584	470	*693	538	1,712	1,653	1,877	0
Thailand	0	805	0	0	300	500	600	3,149	2,560	1,229
Total	25,791	28,223	24,278	26,564	30,728	37,441	34,152	45,215	53,918	45,997

* Figure wholly or partly derived from import data

** Caldwell, J. (2011). World Trade in Crocodilian Skins, 2007-2009.

UNEP-WCMC: Cambridge

Moreover, with the current trend of production and management systems in CPPI associated farms, it is projected that a total of 10,000 *C. porosus* salted raw skins will be contributed by the Philippines through CPPI export in the world crocodilian skin trade in the next five years.

Support for Conservation

Crocodile farming industry in the Philippines is not mainly geared towards generating income for individual farms. Cooperators, CPPI staff, affiliate scientists and researchers are active members of the Crocodile Specialist Group (CSG) of IUCN Species Survival Commission (SSC), a science-based network of experts that advises governments and wildlife management agencies, evaluates the conservation needs of crocodylian populations, initiates research projects, conducts surveys of wild populations, provides technical information and training, and initiates conservation programs. There are 7 out of 9 Filipino CSG members working in various CPPI crocodile conservation programs in the country.

The industry had take its part as major supporter for the successful conduct of the first ever FORUM ON CROCODILES IN THE PHILIPPINES in 2007 and the 21st CROCODILE SPECIALIST GROUP WORKING MEETING of the International Union for the Conservation of Nature - Species Survival Commission (IUCN-SSC) in 2012. Both gatherings of crocodile conservation experts were hosted and organized by Crocodylus Porosus Philippines Inc. (CPPI) along with the Protected Areas and Wildlife Bureau (now Biodiversity Management Bureau) of the Department of Environment and Natural Resources, the National Museum of the Philippines, Silliman University and other governments and corporate partners held at the Museum of the Filipino People, National Museum of the Philippines, Manila, Philippines.

The forum was a three-day Filipino dialogue with foreign conservationists. It enlightened aspects of the conservation and management of two species of crocodiles in the Philippines. Joined by more than 125 scientist and conservationist representing 14 countries, it is the first of its kind in the Philippines. The 21st IUCN-SSC Crocodile Specialist Group (CSG) Working Meeting was attended by 116 foreign scientists, conservationists, researchers and members of the CSG from 31 countries joined by 62 delegates around the Philippines representing government and non-government organizations. This event opened up opportunities, especially to Asian countries, to present their work and exchange ideas with others actively involved in the conservation of crocodylian species in various parts of the world. Results of these concerted efforts urged the 15th Congress of the Republic of the Philippines to pass a Philippines Senate Resolution

No. 790 to direct the proper Senate committee, to conduct an inquiry in aid of legislation, on strengthening and augmenting existing laws protecting the two species of crocodiles in the country.

Through the expertise and guidance of the CSG, CPPI implements crocodile management programs to re-establish viable wild population through strong involvement in scientific research, habitat protection, and awareness campaign in order to preserve the two species of crocodiles in the Philippines in their natural habitats. CPPI is working for the conservation of two species of crocodile in the wild, focusing primarily in three priority sites on Mindanao:

- (1) Siargao Island Protected Landscape and Seascape in which 36 juvenile *Crocodylus mindorensis* have been released to the natural habitat;
- (2) Agusan Marsh Wildlife Sanctuary where it aims to provide a long-term management plan that will address issues on human-crocodile coexistence; and
- (3) Ligawasan Marsh Game Refuge & Wildlife Sanctuary where it targets further research & the development of a conservation action plan to increase the populations of both species.

With these efforts, CPPI recognizes that the commercial crocodile industry in the Philippines has the responsibility to the Filipino people and future generations to help conserve these two species of crocodiles in their natural habitats.

Recommendations

The crocodile industry in the Philippines represented by CPPI encourages the government to support CPPI's attempt to access more competitive technology for skin production, increase social acceptability of crocodile meat as alternative protein source, support the development of by-products for therapeutic use, provide the legal framework and necessary documentation for the sale of products. With the increased demand for the legal source of pre-cooked processed crocodile meat products, there is a need for more awareness to reverse negative perceptions of crocodiles. Farm bred crocodiles are considered non-wild forms, thereby allowing crocodiles to become livestock under the regulatory functions of DA.

An increase in government support for conservation research would provide direct benefits to the Filipino people through community-based ecotourism as source of livelihoods for local communities. The increase in the wild population of crocodiles would also increase the productivity of wetlands, thus benefiting those fishing villages with crocodiles in the wild. This highly regulated industry can be a model for commercial and conservation partnership.

References

- Caldwell J. 2011. World Trade in Crocodilian Skins, 2007-2009. UNEP-WCMC: Cambridge.
- Lim TMS. 2008. Department of Environment and Natural Resources Policies Governing Crocodiles in the Philippines. *In*: Alba E, Lagartija, M., editors, National Museum Papers Volume 14-2007 Edition Special Issue: Proceedings Forum on Crocodiles in the Philippines. National Museum of the Philippines, Ermita, Manila. 35-36.
- Limketkai HO. 2008. Crocodiles as Livestock. *In*: Alba E, Lagartija M, editors, National Museum Papers Volume 14-2007 Edition Special Issue: Proceedings Forum on Crocodiles in the Philippines. National Museum of the Philippines, Ermita, Manila. 40-45.
- Mercado VP. 2008. Current Status of the Crocodile Industry in the Republic of the Philippines. *In*: Alba E, Lagartija M, editors, National Museum Papers Volume 14-2007 Edition Special Issue: Proceedings Forum on Crocodiles in the Philippines. National Museum of the Philippines, Ermita, Manila. 26-34.
- Mercado VP. 2013. President, Crocodylus Porosus Philippines Inc., Pag-asa Farms, Kapalong, Davao del Norte, Philippines.
- Subosa BNF, Cruz CJG, Garcesa AMT. 2008. Antibacterial Property of Crocodile Serum on Selected Human Pathogens. *In*: Alba E, Lagartija M, editors, National Museum Papers Volume 14-2007 Edition Special Issue: Proceedings Forum on Crocodiles in the Philippines. National Museum of the Philippines, Ermita, Manila, pp. 140-150.

Website

- Coral Agri-venture Farm Inc. [Internet]. Libis, Quezon City: [unknown date]. [cited 2013 June 24]. Available from: www.coralfarms.com.ph/index.ph

- Crocodile Specialist Group [Internet]. c2014. What does the CSG do? [cited 2013 July 24] Available from: <http://www.iucncsg.org/pages/What-Does-the-CSG-Do%3F.html>
- Department of Agriculture [Internet]. Laws/Issuances. 2012. Administrative Order No. 26. [cited 2013 July 20]. Available from: <http://www.da.gov.ph/index.php/laws-issuances/administrative-orders/24-ao-2012/3478-ao26>.
- Department of Environment and Natural Resources [Internet] Laws and policies. 1998. Administrative Order No. 98-64 [cited 2013 June 26]. Available from: <http://www.denr.gov.ph/policy/1998/pawdao98-64.pdf>.
- Department of Environment and Natural Resources [Internet]. 1999. Administrative Order No. 99-45 [cited 2013 June 26]. Available from: denr.gov.ph/policy/1999/pawdao99-45.pdf. 16p.
- Fifteenth Congress of the Republic of the Philippines. 2012.P.S.R.No. 790; [cited 2013 July 18]. Available from: www.senate.gov.ph/lisdata/1340011258!.pdf
- J.K. Mercado & Sons Agricultural Enterprises, Inc. [Internet]. Davao del Norte, Philippines. [date unknown]. [cited 2013 July 20]. Available from: <http://www.jkmercado.com/2010/02/news-jkm-is-now-cites-accredited.html>.
- The Official Website of *Crocodylus porosus* Philippines, Inc. [Internet]. Conservation Projects; [cited 2013 June 24]. Available from: www.philippinecrocodile.com.ph/conservation_projects.html
- The Official Website of *Crocodylus porosus* Philippines, Inc. [Internet]. Crocodiles as Livestock; [cited 2013 July 18]. Available from: www.philippinecrocodile.com.ph/crocodiles_as_livestock.html