

WELFARE INDICATORS FOR THE SLAUGHTER / KILLING OF FARMED CROCODILES IN KENYA

Dr Kwoba N Emmah (BVM)

2016 Intern at *World Organisation for Animal Health* (OIE) Nairobi
Master of Science in Veterinary Public Health (candidate)
Department of Public Health, Pharmacology and Toxicology
UNIVERSITY OF NAIROBI – KENYA
emmiesusan38@gmail.com

1.0 CHAPTER ONE

1.1 Introduction

Crocodiles are vertebrates belonging to the Phylum Chordata and class Reptilia. They are cold blooded animals and breathe through lungs. Their skins are covered with hard scales and females produce hard or leathery shelled eggs laid in water that protect the growing embryo. There are several species of crocodiles in the world but the species common to Africa and Australia is the fresh water Nile crocodile (*Crocodylus niloticus*).

All crocodylians are listed in appendices 1 or 11 of the *Convention in International Trade of Endangered Species in Wild Fauna and Flora* (CITES) meaning that they are either endangered in the wild as a result of trading in their skins or are sufficiently vulnerable that they may be endangered if engaging in their trade is not closely controlled. The data from CITES indicates that rearing crocodylians in captivity has increased and replaced the wild harvest of skins for commercial purposes. The primary motivation for farming crocodiles is the harvesting of their skins, while meat, live animals and teeth are only important as by-products (Brazaitis, 1987; Van Jaarsveldt, 1987).

Skins from crocodiles have been used by humans for centuries for religious and traditional functions and in the fashion industry (Britton, 2002). Crocodylian skins are a highly prized fashion commodity and people pay a high premium for owning any accessory that is made out of crocodylian leather. In the 1920's, these skins were associated with luxury items, especially high-priced shoes, but by the 1930's they started using them for mass production of items. The peak in trade of crocodylian skin was reported between 1945-1960 (Luxmoore, 1992).

Crocodylian skins undergo a strict grading system from a scale of 1 to 5, where a first grade skin (the most highly prized skin) has absolutely no marks, scratches, or any other defect on it. A fifth grade skin is one that has so many defects that the crocodile farmer

would make a loss from selling it. There are three main cuts of skin: the belly, the back-strap and the horn-back skin, which are used in the manufacture of belts, wallets, purses, handbags, shoes, watch straps, and even clothing.

Ranching crocodilians involves the collection of the animals from the wild and their rearing in a controlled environment. Ranching is a biologically safe method of harvesting crocodiles because it harvests the youngest stage of life which experience the highest mortalities in the wild (Hutton *et al.*, 2001). Captive bred crocodilians are born in a controlled environment, with better chances of juvenile survival.

In Kenya, crocodile ranching started on a small scale in the 1970's. Currently there are 9 licensed crocodiles farms and ranches which keep crocodiles for the purposes of production of skins, meat and also for tourism. However, only 4 farms practice the slaughtering of crocodiles under regulation of the Kenya Wildlife Service (KWS) which is the CITES management authority. The Crocodile Producer Association of Kenya (CPAK) claims to represent crocodile farmers at the coast but does not fulfill any other administrative functions of KWS. Crocodile skins produced in Kenya are exported with CITES permits that use the source code R (Ranching) or C (Captive).

Table 1. *Crocodile farms and ranches in Kenya by 2016*

Ranch/Farm name	Location	County	Ranching Captive breeding
Galaxy Crocodile Farm	Sagana	Kirinyaga	Ranching
Malindi Crocodile and Snake Park	Malindi	Kilifi	Captive
Kenya Crocodiles Farm (Mamba Village)	Mombasa	Mombasa	Captive
Nairobi Mamba Village	Nairobi	Nairobi	Captive
Larfarage Ecosystem	Mombasa	Mombasa	Ranching/ Captive
Baobab Crocodile Farm	Mombasa	Mombasa	Ranching/Captive
Nile Crocodiles	Kilifi	Kilifi	Ranching
Kazuri/London Crocodile Farm	Malindi	Kilifi	Ranching/ Captive
Haller park	Bamburi	Mombasa	Ranching/Captive

1.2 Licensing and inspection of crocodile farms in Kenya

The *Kenya Wildlife Service* (KWS) is the authority responsible for licensing and inspection of game farms. The KWS does not have specific published guidelines for the different species but considerations in terms of size, kind of species and their habits and number of individuals to be farmed is taken into account during the licensing. Crocodiles

need to be kept in open enclosures of different sizes for different age groups. Adult crocodiles should be kept in large enclosures and if the enclosures are small they should contain few animals. The juveniles should be separated from the adults to avoid cannibalism.

An application to farm crocodiles is made to the Director of the Kenya Wildlife Service through the nearest regional offices located at the County which comprises of County Wildlife Conservation Committees. This is in line with the Wildlife Law (The Wildlife Conservation and Management Law) 2011, Act cap 378, sections 43 and 48. Once the application has been approved, officers from the KWS are sent to the farm for inspection and verification of the farm and a license is given which should be renewed annually. The KWS conducts periodic monitoring and inspections to ensure the farm is maintained at the required level. In case of a breach to any requirement, the license to practice is withdrawn. However, upon reapplication the license can be re-issued upon satisfaction that the requirements have been met. Large scale enterprises may require an *Environmental Impact Assessment* (EIA) from the *National Environmental Management Authority* (NEMA) before licensing under the Environmental Management and Coordination Act, No 8 of 1999.

Most of the crocodile products are rarely marketed within the general public outlets but end up in the tourist and export outlets. Distributors of such products require a certificate from the KWS before they can accept the products from the suppliers. The KWS also regularly inspects the distributors to ensure compliance with the set regulations.

If the product is destined for export, it should have a tag supplied by CITES, which indicates the source of the game product.

1.3 OIE guidelines on slaughter/ killing of animals

The *World Organisation for Animal Health* (OIE) has published welfare standards for slaughter (for human consumption) or killing of animals for disease control in the OIE Terrestrial Animal Health Code (2016). These recommendations address the need to ensure the welfare of food animals during pre-slaughter and slaughter processes until they are dead. The personnel that engage in the process of slaughter play a big role in the welfare of the animals and should therefore be competent i.e. having undergone formal training and have practical experience in terms of animal behaviour. Any distractions that may cause approaching animals to stop, balk or turn back should be excluded from new facilities or removed from existing ones. During loading, the type of vehicle used for transport and space allocation should be as recommended for that species. Feed and water should be provided during transit. Animals should be handled in

such a way as to avoid harm, distress or injury and any sick or injured animal should receive immediate humane slaughter to alleviate pain and suffering. Methods of restraint causing otherwise avoidable suffering should not be used in conscious animals. Care such as the provision of feed and water should continue till the time of slaughter. The stunning equipment should be maintained properly and applied correctly according to the manufacturer's instructions. The stunning method to be used should result in a state of unconsciousness immediately and animals should be bled as soon as possible after stunning. Restraining methods which work through electro-immobilization or immobilization by injury are not acceptable in any species. The use of the electrical *stunning* method with a single application on the leg is ineffective and unacceptable in any species. The *slaughter* method of brain stem severance by piercing through the eye socket or skull bone without prior stunning is not acceptable in any species either.

A decision to kill the animals for disease control should be made and executed by a competent authority and the killing executed humanely. Biosecurity measures should be put into place to minimize disease spread and the carcass deposited by a competent authority.

1.4 PURPOSE OF THE STUDY

The *World Organisation for Animal Health* (OIE) has developed welfare standards for terrestrial and aquatic farmed animals but there are none for slaughter for meat or harvesting of skins and killing for disease control of farmed reptiles. There is increased pressure from animal welfare proponents for such standards to be developed for farmed reptiles, including crocodiles. The present study aims at identifying the various welfare indicators for slaughter/killing of crocodiles for skin and meat in Kenya, which may be considered for future standard setting by the OIE.

2.0 CHAPTER TWO

2.1 MATERIALS AND METHODS

2.1.1 Study area

This study was conducted in the Mombasa and Kilifi Counties of Kenya. The two counties were selected because they host the majority of crocodile farms in Kenya. Kilifi County covers a total surface area of 12,610 km² and accounts for about 2% of Kenya's total surface area. It borders the counties of Tana River to the North, Taita Taveta to the West, Mombasa and Kwale to the South and the Indian Ocean to the East. Mombasa County is located in the South Eastern part of the Coastal region of Kenya. It covers an area of 229.9 km². It borders Kilifi County to the North, Kwale to the South West and

3.0 CHAPTER THREE

3.1 RESULTS AND DISCUSSION

The data collected show that 2 out of the 4 farms keep crocodiles for skins as a primary product and meat as a secondary product. The other 2 farms use crocodiles for tourism purposes in addition to providing meat and skins. Two of the largest farms export their meat and skins to the United Kingdom while the other two sell their meat to restaurants locally (within the country) and the skins to the export farms.

3.1.1 Transportation and space allocation.

Three out of the four (3/4) farms reported that the crocodiles are moved to a slaughterhouse within the farm and slaughtered there while the remaining farm transports and slaughters its crocodiles together with the neighboring crocodile farm. The crocodiles are electro-immobilized prior to transportation which is not acceptable for any species according to the welfare recommendations of the OIE. All four farms use vans and pickup vehicles for transportation of the crocodiles to the slaughterhouse and there is no specific number per vehicle. Respondents from two farms said they pack as many as they want to slaughter, while the others pack 20 to 30 crocodiles on a pickup vehicle. In all four farms, animals of different ages and sexes are mixed in the vehicles during transportation. This points to a possibility of crocodiles piling on top of each other, which may affect the quality of the skin and meat obtained. The time the crocodiles are held in transit varies depending on the location of the slaughterhouse. Two farms hold the crocodiles in transit to the slaughterhouse for approximately 30 minutes, while the others for 10 minutes and 1.5 to 2 hours respectively. None of the farms reported any distractions during transportation and removal from transporting vessels since the crocodiles are always unconscious when being transported. The four farms reported that for crocodiles to move, they must first be electrocuted then manipulated by human beings while still unconscious.

3.1.2 Planning and preparations

The data obtained shows that planning of the journey from the farm to the slaughterhouse is done by the managers, owners or slaughter department. Fifty percent of the respondents however reported that no preparations and considerations are done prior to transportation of the crocodiles to the slaughterhouse, 25% would ensure that means of transport are available while another 25% would ensure that the means of transport and the labour for slaughter is adequate and available before planning the movement.

3.1.3 Care and documentation before slaughter

Crocodiles are starved for 24 hours prior to slaughter to reduce feeding expenses and cases of vomiting during transportation. The documentation compiled includes the following information: date of slaughter, length from head to tail, weight of the live animal, the age and the skin grade. An age of 2 years and a length of 2 metres from head to tail would be considered for slaughter.

3.1.4 Examination after offloading

None of the farms reported examining the crocodiles for injuries therefore emergency slaughter for the injured is never practiced.

3.1.5 Grouping before slaughter

In two of the farms, crocodiles are grouped before slaughter on the basis of the skin grade while the other remaining farms don't do any grouping before slaughter. The skin quality is graded from 1 to 5 based on the presence and absence of physical wounds and damages.

3.1.6 Restraint and Slaughter

In all the farms, electrocution is the restraint method for transportation prior to slaughter. The unconscious animals are then slaughtered with knives by dislocation of the cervical vertebrae and the animals bled immediately. The cuts made on the skin differ depending on the buyer's preference. None of the farms has backup services in case the primary stunning (electrical stunning) fails. If the animal does not respond to the first electrical shot, which is common with mature crocodiles, the process is repeated.

3.1.7 Personnel involved

The people involved in the slaughter are familiar with the behaviour of crocodiles although they don't possess any certificates of qualifications. They were trained on the farms by either the owners or managers. This indicates the need for a competent authority to be involved in the training to ensure adequate and sufficient knowledge and skills and uniformity.

3.1.8 Disease transmission during transportation

None of the farms reported diseases that are likely to be transmitted in the process of transportation to the slaughterhouse. None of the respondents was willing to share information on the disease history of the farm

3.1.9 Killing for disease control purposes

None of the farms has ever killed crocodiles for disease control purposes therefore information on how it is carried out was not obtained.

3.2 DISCUSSION AND RECOMMENDATIONS

Currently there are no published welfare recommendations to be adhered to during slaughter and/ or killing for disease control of farmed reptiles. The following may be addressed by the OIE in future standard settings on welfare of farmed crocodiles for skin and meat, based on similar provisions in the existing OIE welfare standards for terrestrial animals;

1. Minimum qualifications for the personnel involved in killing and slaughter should be clearly stated and so should the competent authority that oversees the whole process. The persons who are involved in loading, moving, care, restraint, stunning and slaughter of the animals play a critical role in the welfare of those animals. They should therefore have adequate knowledge on animal behaviour and welfare recommendations and their application. This competence can be gained through formal training and practical experience demonstrated through a certificate from the competent authority.
2. The person responsible for planning the movement of the crocodiles from the premises to the slaughterhouse should be clearly defined and so should the preparations that ought to be done prior to the movement and the accompanying documentations. Part of the preparations include ensuring transport vessels are available and well maintained. The date, time, place of offloading and unloading should be well documented. Each animal should have a unique identification documented for animal traceability purposes. The stocking density estimate of the transport vessels should also be documented.
3. The type of vessels to be used in transport and their carrying capacity should be well defined in terms of volume and space allocation by animal. The knowledge on space required per animal is key to avoid overloading. The animals should be able to lie down without being on top of one another and allow for necessary thermoregulation. Space allowance for each animal should consider other factors like vehicle/container design, length of the journey, quality of roads and need for provision of feed and water. In Europe, crocodiles are transported in crates following trapping, chip identification and sexing. The transport crates are comfortable for the crocodiles and ensure the safety of handlers. These are

secured against the escape route of the animals and are fitted with air ducts to ensure proper ventilation.

4. Methods of restraint prior to transportation of the animals should be elaborated. Electro-immobilization or immobilization by injury such as breaking legs, leg tendon cutting, and severing the spinal cord is not acceptable in any species because it causes pain and stress to the animal.
5. The time limit of animals in transit should be defined. The electrocuted animals may regain consciousness if held in transit for too long and this may require another electrical shot before slaughter.
6. Injured and sick crocodiles should be identified and examined after offloading and given emergency and humane slaughter.
7. The type of care prior to slaughter/killing should be defined. Starving the animals for 24 hours prior to slaughter is an indicator of poor welfare. Water and feed should be provided till the time of slaughter.
8. Stunning methods for killing of crocodiles should be defined. The method used should immediately provide a state of unconsciousness. Electrical stunning is the most common stunning and slaughter application method. In most domestic animals a frequency of 50 Hz and an alternating current (AC.) are preferred. The equipments used should be maintained and applied correctly according to the manufacturing recommendations. Backup services should be made available in case the primary stunning method fails. Stunned animals should be bled immediately or should not be stunned when slaughter will be delayed.
9. Transport is a significant factor in disease spread. Biosecurity measures should be put into place to minimize disease spread and environmental contamination. The vessels used should be thoroughly cleaned with water and approved chemicals (disinfectants) prior to loading and before re-use. *Salmonella* species are the most relevant bacterial hazards in reptile meat. There are very few studies about salmonellae in crocodiles. They however consistently report a common occurrence of several serotypes in both clinically healthy farmed and wild crocodiles (EFSA, 2007)

3.3 Conclusions

Animal production, stunning and slaughter procedures should aim to ensure high quality products, as well as to protect animal welfare. Handling and slaughter of crocodiles is more risky and demanding in terms of knowledge, skills, experience and supervision than handling and slaughter of livestock. Speed and minimization of stress, pain and suffering during capture and transportation of the crocodiles are crucial as far as their welfare is concerned. The personal safety of the handlers should be considered in the whole slaughter process and so should the competent authority to oversee the process. Therefore, there is need for guidelines on how the above procedures should be done. The guidelines should address both animal welfare and human safety.

References

CITES (2006) Status of Ranching and trade in the Nile Crocodile (*Crocodylus niloticus*) in Kenya. Report of Kenya to the CITES Secretariat in accordance with Res. Conf. 11.16 May 31, 200

CITES (2004). Review of crocodile ranching programmes conducted by a crocodile specialist of IUCN/SSC

Britton, A. (2002). A Brief History of Crocodylian Conservation. www.flmnh.ufl.edu/cnhc/cbd-con-1e.htm.

Hutton, J., Ross, J.P. and Webb, G. (2001). *Using the Market to Create Incentives for the Conservation of Crocodylians: a Review*. IUCN/SSC Crocodile Specialist Group. 28 pp

Louwrens, C., Hoffman, P., Fisher, P. and Sales, J. (2010). Carcass and meat characteristics of the Nile crocodile (*Crocodylus niloticus*). *Journal of the Science of Food and Agriculture* 80:390-396 ,

Luxmoore, R.A. (Ed.) (1992). *Directory of Crocodylian Farming Operations*. 2nd edition. IUCN, Gland, Switzerland and Cambridge, UK. 350 pp

Ronald (2012), Applying for a KWS permit to practice game farming. Livestock Kenya, Connecting farmers and professionals.

OIE (2016). Animal Welfare. Terrestrial Animal Health Code (volume 1), pp 277 – 400