



Harvest and ranching of Nile crocodiles in Kenya

Introduction: Species, Use and Trade

The Nile crocodile *Crocodylus niloticus* is listed in CITES Appendix I, except the populations of Botswana, Egypt (with a zero quota for wild specimens traded for commercial purposes), Ethiopia, Kenya, Madagascar, Malawi, Mozambique, Namibia, South Africa, Uganda, the United Republic of Tanzania, Zambia and Zimbabwe, which are included in Appendix II. It is assessed as Least Concern in the IUCN Red List.

Kenya made a successful proposal to transfer its population of *C. niloticus* from Appendix I to Appendix II for ranching purposes at the Eighth Meeting of the Conference of the Parties in 1992.

Kenya has a large Nile crocodile population, with all the freshwater systems around the country having crocodiles. Other than Tana River system, some of the other major populations are distributed in Lake Turkana, Lake Baringo, Lake Victoria, Mara River, Ewaso Nyiro River, Athi/Galana/Sabaki River and other small tributaries. However, the population is thought to be declining overall due to habitat destruction, poisoning, human wildlife conflict, and movement of people towards the water in some areas. At the same time, crocodile populations have increased in areas where there is protection of the riverine ecosystems. A census of crocodiles in the country is planned to provide an accurate assessment of population status across the country.

In the Tana River County, in the Kenyan Coastal region, a crocodile ‘ranching’ programme has been established. This is a crocodile conflict hotspot, and the ranching programme was established to help reduce conflict. Wild-harvested eggs are collected and incubated, with hatchlings reared to maturity in farms. Crocodile skins are then sold for luxury goods (see Table 1). Community members collect eggs and sell them to one of three companies that hatch and rear them. Other community members are employed in crocodile ranches and mostly work as hatchling attendants in addition to other office functions. While women are not involved in egg collection, they are engaged in other areas and account for 15% of the Nile Crocodile Limited Ranch workforce, 16% in Galaxy Crocodile Farm Co. Ltd and almost 50% of the permanent staff in the Kazuri London Crocodile Farm.

Table 1: Number of pieces of *Crocodylus niloticus* belly skin exported from Kenya 2017-2018

Importer	2017	2018
Italy	0	776
Korea	1000	300
Singapore	6200	5823
Total	7200	6899

Tana River County is home to 47,414 households and almost 300,000 people, with an increasing human population and high fertility rates (over half the population is under 15 years of age). Only a third of inhabitants have a secondary education or above, and unemployment is very high. This county has one of the worst levels of income inequality in Kenya. It includes pastoral, marginal mixed farming, and mixed farming areas, as well as the Tana Primate Forest Reserve.

These communities, who are pastoralists and farmers, live in close proximity with the crocodiles along the Tana River system, and bear the cost of crocodile human conflicts. Human-wildlife conflict is a major issue in relation to crocodiles in Tana River County. The animals have caused havoc and death to communities while they access water for livestock or personal use along Tana River. Community involvement in wildlife enterprises has been encouraged in order to diversify local livelihoods and address human-wildlife conflict.

The Kenyan ranching programme is run in accordance with CITES Resolution Conf. 3.15 and guided by Kenya's Crocodile Management Plan of 1990 and the *Wildlife Conservation and Management Act* 2013. There are three companies in Kenya involved in crocodile ranching and trade, each of which has been allocated a particular area within Tana River from which they can buy eggs.

The programme is run with respect for traditional community institutions and structure. Egg collection is conducted after extensive consultation with the community leadership, and egg collectors are selected based on their local knowledge of the Tana River ecology and of the biology of *C. niloticus*. Egg collection and handling is a highly skilled activity.

Livelihood Benefits

Sustainable use and wildlife trade of Nile crocodile contributes to the livelihoods of Tana River communities in a number of ways – the most important are their financial, human and physical capital.

Income is one of the most important benefits and motivations for the community. One hundred egg collectors are employed by the three crocodile farming companies, in a region that has very few other employment options. In 2018, a total of over 13,000 eggs were collected (within the official quota of 28,000). Egg collectors are paid from USD 0.40 to USD 1.00 per egg, depending on which company they collect for and hatching rate success (bonuses may be paid for higher hatching success). At typical rates of hatching success and egg payments, the 2018 harvest generated approximately USD 9,162 in total for local community members. (Adjusted for purchasing power¹, this equates to approximately Int\$ 450,000 in local benefits.) For egg harvesters, this income constitutes around 30-40% of their household cash income. Some communities also gain additional income through rearing livestock which they sell to the crocodile farms for food.

Physical capital has been built through companies providing a range of important assets and facilities to the communities, including a maternity clinic, solar lights, basic sanitation (toilets), water pumps and provision of safe water (away from the river's edge to avoid crocodile attacks), connection of electricity, iron sheets for roofing, cattle husbandry infrastructure and supplies (e.g. cattle dip, cattle crush, abattoir), and the provision of boat support during flooding.

Crocodile enterprises have boosted food and health care. One crocodile farm (Kazuri London Crocodile Farm) has partnered with World Food Bank, an NGO. After slaughtering the crocodiles, they donate the meat to the NGO, which processes it as packed lunches and gives it for free to students in schools. The maternity clinic is a key asset. Previously, women often used to die during delivery or on the way to hospital which was very far away. Once the clinic was built, with funds from the crocodile

¹ Using 2017 purchasing power parity conversion factor for Kenya of 50.1 (<https://data.worldbank.org/indicator/PA.NUS.PPP?view=map>)

companies, the county government then established a dispensary and employed medical practitioners. The facility has incorporated the use of traditional birth attendants, takes women for delivery to hospital, and offers follow-ups on the babies and mothers after delivery. It has employed additional support staff from the local community. This clinic now delivers 10-15 babies per month, sees 40-60 patients in the antenatal clinic per month, sees 20-30 outpatients per day, and carries out pre-referral treatment for emergency cases.

Communities have also benefited individually in terms of skills and capacities, through training of egg collectors in collection methods that increase hatchability, in animal husbandry, in management, and/or customer service. Some employees have been sponsored by the farms to attend conferences to learn relevant approaches.

If communities could not participate in trade of this species, they would lose important income and other community benefits, including access to medical services, sanitation, and water. This would have serious knock-on impacts on crocodile conservation through removing any financial or social incentives for their conservation. There are no clear alternatives to replace this income and other benefits. Tourism could be contemplated, but the area is insecure politically and so receives very low levels of visitation.

One way livelihood benefits could be improved is through capacity building, education, and awareness raising of the broader local community and local government, so that they understood the benefits that community members were gaining from crocodiles and the potential of this trade for the local economy.

Conservation Impacts

The Kenya Wildlife Service (KWS) is a state agency mandated to manage, protect and conserve wildlife, and is the CITES Management Authority. It supports community wildlife enterprises in order to diversify livelihoods and support conservation objectives. The harvest and trade is beneficial for the conservation of Nile crocodiles in a number of different ways. The current main threats for wildlife in Kenya are poaching, habitat loss and human-wildlife conflict. The rural communities in the Tana River area have typically held a very negative perception of crocodiles, as they attack and kill both humans and livestock. Before the ranching programme, communities gained no benefits from crocodiles – only danger and harm. Poisoning and retaliatory killing of crocodiles were therefore well known. This limited and regulated harvest incentivizes people to tolerate and support crocodile populations rather than killing them in retaliation for human-wildlife conflict – there is now little or no poisoning of crocodiles in this area.

Through the benefits gained by community members from egg collection, employment and other community benefits, the support for conservation, crocodiles and crocodile enterprises among local leadership and the county government has increased. For example, the community is very happy about the maternity clinic, and this facility has enhanced partnership between conservation practitioners and the county government of Tana River. Such benefits have solidified the sense of a unified community quest to conserve Nile crocodiles, taking the place of what was a very difficult and largely hostile relationship.

In addition to these on-the-ground conservation benefits, the data collected from egg collection provides important information to indicate the status of the crocodile populations. Where species are not harvested, typically little monitoring takes place due to lack of funds.

There are a number of measures to ensure crocodile harvest does not deplete populations. The survival rate of Nile crocodile hatchlings in the wild is less than 2%. The ranching companies must release 4% of hatched crocodiles back to the Tana River ecosystem to enhance their population, ensuring that hatchlings released back are more than the number of hatchlings of the eggs hatched in the wild. Eggs are collected seasonally from zones delineated along the Tana River system, based on

quotas set according to previous population estimates. The rest of the year is a closed season. KWS monitors and ensures that wildlife enterprises are in compliance with laws (including CITES requirements), carries out capacity building, and carries out research, along with the Scientific Authorities, to assist in science based management of wildlife resources.

Livelihood benefits are crucial to improved local attitudes toward crocodiles. If opportunities to trade in CITES-listed species were removed, this would remove monetary and social incentives to conserve the animals, exacerbate local conflicts with crocodiles, and would be very likely to result in increased poaching and poisoning of Nile crocodiles. In the Tana River ecosystem this could result in their population reducing dramatically, because this is an open, not protected, ecosystem. Increased use of alternative livelihood options – livestock and agriculture – would result in increased use of river resources in this scarce water country, and increased pollution.

Lessons for CITES Implementation: Challenges, Successes and Failures

This study makes clear that local livelihood benefits from trade can be key to conserving CITES-listed species, particularly when these species impose heavy costs on local populations, such as Nile crocodiles. The CITES listing of Nile crocodile has been beneficial, as it has *inter alia* supported stronger controls and transparency, and enabled a dialogue with import states.

A key reason for the success of this venture is its links to grassroots community members and close consultation with community and county government leadership. Trust was built between community members and KWS. Once the egg collectors were recruited, they were trained in best practices of egg collection. The training continues on the basis of emerging needs and issues. This framework has cemented trust and created a sustainable wildlife enterprise.

The greatest weakness of the ranching programme is that the local county government has not fully recognized the importance of crocodiles to the local economy. Crocodile harvesting and management have not been integrated into local planning processes. The crocodile industry is seen just as a source of tax revenue (i.e. \$1 per egg collected), rather than a source of diversified and sustainable livelihood opportunities that could be actively supported for the benefit of local communities, conservation of the crocodiles, and mitigation of crocodile-related conflicts. This could be achieved through awareness campaigns, incentives and funding support for additional community groups seeking to become involved. There is also need to harmonise the roles and function of different government institutions to avoid duplication of oversight duties.

Key References

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