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CROCODILE INDUSTRY IN UGANDA

by

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THE ONLY crocodile native to Uganda, *Crocodilus niloticus*, occurs in many areas of Uganda, notably the Lower Semliki, Lake Albert and the Albert Nile, Lake Victoria, Lake Kyoga, and many minor lakes such as Nakivali, Kajera and Kijanebalola. Crocodiles are also found throughout northern Uganda in West Nile, Acholi and Karamoja Districts, wherever there are bodies of water large enough to support them. Many cattle dams in northern Uganda support small crocodile populations, the begettors of which must have walked up to 40 miles to originally stock these dams, often only a few years after construction. There is one record of *Osteolamis tetraspis*, a West African species, occurring in Uganda (1) (2).

The crocodile was one of the most obvious features of Uganda in the early days of exploration, and is commented on by Baker, Speke, Burton, etc. Until the 1920s, the crocodile was largely undisturbed by man, despite a considerable number of mortalities suffered by women and children drawing water, bathing, etc. A familiar feature of the water collection points on lake and river shores, was a stout fence of poles driven into the bottom a few feet off-shore to protect water drawers. In some instances, crocodiles were even venerated by lake-shore dwellers, and the famous Lutembe lived for over 30 years at Dewe, near Entebbe, and could be called by her attendants to come and collect food which was thrown for her. She died in 1943 (3) (4) (5).

From the late 1920s to 1950, a crocodile extermination campaign was waged on Lake Victoria by the then Game and Fisheries Department. Hundreds of crocodiles were shot by special hunters, and teams patrolled the lake during the breeding season, digging up nests and destroying eggs. An account of this campaign is given by Pitman (1) (4) and results are shown in Table 1. The reason for it was primarily to assist the growing gill-net fishery on Lake Victoria. Gill-nets as a fishing method were introduced in Lake Victoria in 1908, and the fishing industry began to expand considerably. By 1928, a large gill-net fishery was in existence. Heavy populations of crocodiles made gill-net fishing almost impossible, as the reptiles stole fish from the nets, largely destroying them in the process. A secondary reason for the extermination campaign was to safeguard human life along the lake-shore.

Most of the adult crocodiles killed before the Second World War were left to rot. After the 1939-1945 war, the world trade in cured crocodile skins increased considerably, and professional hunters took many skins from Lake Victoria. After 1950, the economic return from crocodile trapping was sufficiently high to encourage extensive hunting by private interests, and the official extermination campaign ended. When the crocodile population of Lake Victoria had decreased, so as to make hunting uneconomic, hunters moved to Lake Albert and Lake Kyoga. Some details of the crop for these areas are shown in Table II.

The professional hunters of those days operated on a grand scale, often with a small fleet of launches and catching boats, the hunting staff living on their launch, and trappers and riflemen cleaning out an area before moving on to the

next. Two of the best-known names of this era were Von Hippel and Novotny. During this period, the crocodile was legally considered vermin and no licences were required for the hunting and killing or for dealing in skins. A number of unpaid amateur hunters were issued with rifles by the Game Department, to assist in the work of extermination. Very little work was done on the scientific side, and almost no information was collected from the large number of animals killed (see Table III).

By 1954, the crocodile population throughout Uganda, with the exception of the Semliki Game Reserve and the Murchison Falls National Park, had been reduced to such an extent that commercial hunting on a grand scale was not economic. Some hunting was still carried on by small-scale African trappers and by fishermen as a measure to protect their fishing gear. Exports of skins fell to as little as £7,000 in 1959. An excellent account of the methods of hunting of crocodiles and the official attitude to the animals during this period, is given in Rhodes (6).

The value of cured crocodile skins has risen steadily since those days, and there is no apparent decline in the demand for skins. Table IV shows the figures for quantity and value of crocodile skins exported, and it will be observed that this figure has risen to £109,000 per year in 1967. It has long been clear that many of the skins exported from Uganda in recent years as Ugandan skins, cannot, in fact, have been obtained from the crocodiles legally killed in Uganda. One source has been poaching from the Murchison Falls National Park, and an account of this is given in Cott (7), but this source has largely dried up, with increased control measures by Parks authorities. A number of skins originated in the Semliki River while there is a continual, but small supply from swamps and rivers in West Nile and East Madi. Most of the skins exported from Uganda today must come from the Congo and the Sudan, and are smuggled into Uganda. There is also a legal import from the Sudan, which is re-exported (Table V). This skin trade is of considerable value to Uganda, as will be seen from the tables. Apart from the export tax, the hard currency earned by the crocodile skins is most desirable. However, this business is bound to decline as the wild populations of crocodiles in the Congo and the Sudan suffer the same over-exploitation as has happened in Uganda. The world demand for skins is not expected to decline, and it would be unfortunate if Uganda were to lose this valuable export product. Recent work on the crocodile population of Lake Rudolf (Modha (8) and Graham (9)), shows that natural wild populations of crocodiles cannot sustain a very high cropping rate, and, in any event, it would be impossible to envisage a return to the days of large wild crocodile populations in Uganda, as this would be incompatible with the very valuable fishing industry.

The Fisheries Department has, over the years, steadily strengthened crocodile control legislation, and is presently endeavouring to conserve crocodiles in areas where this can be done without detriment to the fishing industry. It is to be hoped that the breeding population in the Murchison Falls National Park will be safeguarded for posterity, in view of its value as a tourist attraction, and of its importance for scientific study, being the last stronghold of the undisturbed wild crocodile in Uganda. At the same time, it may be possible to provide small local crocodile reserves in the Semliki River and other areas.

CROCODILE FARMING

Serious consideration is being given to the artificial rearing of crocodiles on crocodile farms to maintain the supply of crocodile skins for export. Crocodile farms are in existence in Malaya, Florida and Australia, but little information is available on these projects, and in any event, different species of reptiles are used. Until recently, very little ecological and physiological work had been done on the Nile crocodile, but useful papers have been written by Cott (10) and Modha (8)

and Graham (9). At the same time, the Fisheries Department in Entebbe has maintained stocks of crocodiles for the last 10 years, in captivity, on which observations on growth and feeding rates have been made. Experience in handling larger crocodiles, in hatching eggs and the care of fingerlings has been gained, and suitable enclosures and pens designed and constructed. The bases of crocodile farming can be simply summarised under three heads:—

- (a) supply of young stock;
- (b) cost of raising stock to marketable size;
- (c) sale of the end product.

(a) Supply of Young Stock

Early evidence from Uganda suggested that crocodiles did not mature until they were some 14 ft. long (male) and 12 ft. long (female). Graham (9) shows that crocodiles from Lake Rudolf mature approximately 5 ft. long (female) and 9 ft. long (male), but suggests that these are smaller sizes at maturing than elsewhere in Africa. Cott (10) showed, in a sample of animals from Zambia, that these matured at considerably larger sizes than Lake Rudolf crocodiles. Handling of large breeding reptiles in captivity would be difficult and has never yet been attempted for *Crocodilus niloticus*, although there are reports of successful copulation and egg-laying by *Alligator* spp. in Florida. Pitman (4) records 8 ft. female crocodiles in the Aswa River in Uganda, with well-formed eggs in the oviducts, and he at first considered these a sub-species of *Crocodilus niloticus*, but later concluded that these were *C. niloticus* maturing at a smaller size due to the restricted environment (9).

Until more knowledge is gained of the possibility of breeding *Crocodilus niloticus* in captivity, it would seem that a crocodile farming venture must depend on the collection of young stock from wild populations. Whether this is commercially feasible depends on the size of the existing wild populations available for egg collection. Crocodiles lay between 60 and 80 eggs per year, and despite considerable maternal care, a great mortality in eggs and fingerlings occurs in the wild (7). Artificial hatching of clutches of eggs at Kajansi Experimental Station has resulted in 70 per cent survival to one year old, and it would seem that collection and artificial rearing would eliminate considerable wastage. A survey is, at present, being conducted to estimate surviving wild populations, and give an idea of the possibility of collecting an economic number of fingerling crocodiles.

(b) Cost of Raising Stock to Marketable Size

The optimum size for sale is currently a 15 in. bellywidth skin. This size of skin can be taken from a crocodile 5 ft. 6 inch long, and from results already available, these can be grown from the egg in five years. By selection of fast-maturing stock and improved raising techniques, the time to reach a 15 inch bellywidth may well be reduced to four years. There may be a market for smaller crocodiles, "Hornbacks", *i.e.* small crocodiles, less than 3 ft. long, which are skinned so as to retain the horny scutes on the back. These are occasionally in demand for specialised ornamental leather, and might be a more profitable product. Appendix I shows the estimated costs for a production of 1,000 × 5 ft. crocodiles annually. It assumes an overall wastage of 33 per cent of the original stock over the 5-year period. Results from crocodile feeding data obtained by Uganda Fisheries Department show that a 5 ft. 6 inch crocodile, weighing approximately 80 lb., will have consumed 1,000 lb. of food, either meat or fish, wet-weight, during its lifetime.

(c) Sale of the End Product

The current price of a 15 inch top-grade belly-skin is Shs. 250. A few crocodiles killed after five years of captivity have produced the highest-grade skin, and it is reasonable to assume that first-quality skins will be produced by a properly-managed crocodile farm. There may be a sale for other parts of the animal, particularly to the curio and tourist trades, and there would be some 30 lb. of meat available from each crocodile for processing and re-feeding. There may be some outlet in the small, but increasing luxury market for bizarre and unusual canned food products. The value of each harvested crocodile at current prices is, therefore, taken at Shs. 280. Prices may well continue to rise. The costings in Appendix I show that the total cost of rearing a crocodile to marketable size totals Shs. 70 (less food). Accepting the sale price of Shs. 280 and the profit of 15 per cent on sales, this leaves Shs. 158 available for food stuffs during the crocodile's lifetime, and from (b) above, this means that food must be provided at 17 cents per lb. or less. If a source of suitable protein food is readily available at this price, a crocodile farm in Uganda may be a viable enterprise.

SUMMARY

The foregoing account gives a picture of the exploitation and control of the wild population of *Crocodilus niloticus* in Uganda from 1920 to the present day. The economic value of the crocodile is shown, and some idea is given of the possibility of maintaining this economic return to Uganda by farming crocodiles in captivity. The Uganda Fisheries Department is actively pursuing the issues which arise from the present status of the wild population, and the need for artificial rearing of crocodiles.

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The data in the following tables is compiled from the reports of the Uganda Game and Fisheries Department.

TABLE I: CROCODILES KILLED DURING ANNUAL GAME AND FISHERIES DEPARTMENT CAMPAIGNS ON LAKE VICTORIA

Year	Crocodiles Killed	Eggs Destroyed
1938	83	8,128
1939	97	5,404
1940	86	9,288
1941	126	11,720
1942	128	8,717
1943	210	10,806
1944	275	15,137
1945	206	14,430
1946	150	13,538
1947	152	9,128
1948	156	9,420
1949	211	10,788
1950	Campaign ended	
TOTAL ..	1,880	126,504

TABLE II: SKINS TAKEN AND VALUE

Year	LAKE KYOGA		LAKE ALBERT	
	Crocodile skins	Value	Crocodile skins	Value
1944 (April to December)	638	£ —	Nil	£ Nil
1945	1,465	—	Nil	Nil
1946	—	10,000 (to fishermen)	Nil	Nil
1947	—	—	—	—
1948	—	—	—	—
1949	—	—	—	—
1950	—	6,625 (export value)	—	8,250
1951	1,297	4,042	746	5,514
1952	6,000	24,000	1,000	4,000

TABLE III: CROCODILES KILLED AS VERMIN BY ONE LICENSED EXTERMINATOR AT JINJA

Year	Number
1947	173
1948	423
1949	564
1950	206
1951	126

Sometime in 1952 this exterminator's rifle burst.

TABLE IV: YEARLY EXPORTS OF WET SALTED CROCODILE SKINS FROM UGANDA
 COMPILED FROM ANNUAL TRADE REPORTS AND GAME DEPARTMENT REPORTS

Year			Centals (100 lb.)	Number of skins	Value
1939	..	..	2.7	n/a	£ n/a
1947	..	..	24.6	3,000	6,000
1948	..	..	1,174	—	—
1949	..	..	1,654	—	—
1950	..	..	7,146	—	14,875
1951	..	..	8,814	—	9,556
1952	..	..	1,557	—	36,034
1953	..	..	—	15,000	100,000
1954	..	..	1,919	15,000	56,252
1955	..	..	1,170	13,000	41,860
1956	..	..	780	6,000	28,677
1957	..	..	—	7,000	32,000
1958	..	..	1,144	—	29,594
1959	..	..	—	—	7,000
1960	..	..	—	—	—
1961	..	..	—	—	—
1962	..	..	—	—	—
1963	..	..	1,273	—	81,626
1964	..	..	1,388	—	131,082
1965	..	..	1,204	—	87,762
1966	..	..	575	—	59,124
1967	..	..	1,053	—	109,721
1968	..	..	450	—	52,068

TABLE V: IMPORTS OF WET SALTED CROCODILE SKINS TO UGANDA

Year			CONGO		SUDAN	
			Centals	Value	Centals	Value
1963	..	..	—	£	9	£ 252
1964	..	..	—	—	135	5,100
1965	..	..	—	—	54	1,660
1966	..	..	9	306	276	6,347
1967	..	..	—	—	95	6,547
1968	..	..	—	—	89	305

**(A) PROVISION OF STOCK (COLLECTION OF EGGS
AND FINGERLINGS—1,500 PER YEAR)**

(1) <i>Staff</i>	<i>Shs.</i>			
1 Farm Manager	}	Costs borne under (B) (2) below		
2 Assistants				
(2) <i>Transport and Travelling</i>				
Landrover and trailers (2,000 miles) ...	...	...	...	2,000
Boat and engine running ...	...	...	...	1,000
Night allowance for staff ...	...	...	...	1,000
Incidentals ...	...	...	...	1,000
TOTAL ...	...	...	...	<u>5,000</u>

i.e. Shs. 3/30 per crocodile collected.

Note: Eggs and fingerlings can be bought from casual finders at Shs. 5 each.

(B) FARM COSTS

(1) <i>Capital</i>	<i>Shs.</i>			
270 concrete tanks at Shs. 250 each ...	...	...	...	67,500
125 Brick pens at Shs. 1,000 each ...	...	...	...	125,000
Water Supply ...	...	...	...	2,000
Store ...	...	...	...	10,000
Skinning and Workshed ...	...	...	...	10,000
Contingencies ...	...	...	...	10,000
Total Capital ...	...	...	...	<u>224,500</u>
Amortized over 15 years ...	...	...	...	14,966
Cost per crocodile per annum based on 1,000 crocodiles surviving and assuming total farm stock averages 6,000 at any one time—Shs. 2/50.				
(2) <i>Staff Costs</i>	<i>Shs.</i>			
1 Farm Manager (G3/2) ...	...	...	...	27,780
1 Fisheries Assistant (E4-3) ...	...	...	...	4,160
4 Labourers ...	...	...	...	8,160
TOTAL ...	...	...	...	<u>41,540</u>
Cost per crocodile per annum (as above)—Shs. 7.				
(3) <i>Other Charges</i>	<i>Shs.</i>			
Equipment ...	...	...	...	2,000
Maintenance of pens and buildings ...	...	...	...	4,000
TOTAL ...	...	...	...	<u>6,000</u>

Cost per crocodile per annum—Shs. 1.

Total cost for 1 crocodile for 5 years—Shs. 70.

These costs are estimated only, and, while based on the best available information, will need revision.