

PROSPECTS OF CROCODILE FARMING IN BANGLADESH

Anwar Hossain
A.H.M Ehsanul Huda
Ehsaan Uddin Ahmed

1.0 Introduction

Crocodile farming is a new concept for the entrepreneur, of Bangladesh as historically this industry never existed in Bangladesh. During the last decade the international demand for crocodile skin has increased tremendously which has turned this industry into a lucrative option for entrepreneurs worldwide. The major exporters of manufactured crocodile leather products are Italy, Germany, United States, Spain, France and United Kingdom. Though this crocodile farming and leather tanning industry is a new business idea but as the technology required for this industry is already available in Bangladesh, the weather and other natural factors are suitable for crocodile growth and a huge demand for crocodile leather is existing in the world market, a great opportunity is existing in the international trade of crocodile skin for the business people of Bangladesh, who want to take the challenge of exporting these home grown products to foreign market. If this industry is given priority and if this industry becomes popular among the entrepreneurs of Bangladesh, within a very short time, this industry will become one of the largest exporting and foreign currency earning sector of Bangladesh. Whether Bangladesh can take this opportunity to become successful in the export business of crocodile skin is a matter of further inquiry.

In this paper we have endeavored to analyze the international market scenario of crocodile trade in prospect. We also looked into the potential of Bangladesh to step into this trade, starting from crocodile farming.

The paper further seeks to highlight the international experience of crocodile farming and trading and suggest strategies Bangladesh may undertake in this respect.

1.1 Objectives

This paper attempts to provide a clear picture of the export opportunity of crocodile skin from Bangladesh. It also seeks to highlight world level trade of crocodile skin, and prospect of crocodile farming in Bangladesh.

1.2 Methodology

This paper has mainly used secondary sources for analyzing the export scenario and international market growth trends of crocodile skin.

Reviewing the secondary data, the international marketing opportunity of crocodile skin have been ascertained and based on that some recommendations have been made to seize this opportunity.

2.0 Crocodile Farming and its Prospect in the World Market

In an ideal world we do not need to use wildlife product. But in reality the "ideal world" does not exist. There is a strong commercial demand for crocodile products. This demand will be satisfied either by regulated, properly managed commercial businesses or by illegal poaching. The poaching will continue, unless we can get the skin buyers into proper markets, where they can get crocodile products easily and safely.

As many species of crocodiles are threatened or endangered, the world production and supply of crocodile skins and leather is regulated by the United Nations framework known as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). There are over 100 countries that are signatories to the treaty and must abide by the provisions of management, production and trade in crocodiles and crocodile products.

2.1 World Supply Scenario of Crocodile Leather

Crocodile leather items are exotic items which have high demand among upper end consumers around the world. Though the demand is high very few countries are responsible for supplying the crocodile leather world wide as per the demand of craftsman and final consumers, Naturally some countries historically had the privilege of being crocodile growing countries but because of huge demand the culture of commercial crocodile farming started among some countries of South East Asia, South America and Australia during the 90s. In 2003, global stocks of crocodiles and alligators were estimated at 1,233,704 (FAOSTAT2004)

Table 1.1: Global Stocks of Alligators &.Crocodiles - 2003

Country	Stock Numbers	Percentage (%)
Australia	8 185	.66
Colombia	771456	62.53
United States	219 519	19.40
Zimbabwe	63...	5.11
South Africa	26926	2.18
Cambodia	35380	2.05
Papua New Guinea	24 867	2.01
Venezuela	24 640	1.19
Zambia	15733	1.27
Guyana	10559	.85
Other	25374	2.05
TOTAL	1 233 704	100

Source: FAOSTAT, 2004

From the above table it is seen that over two thirds of the world's stock numbers of crocodiles/alligator, are recorded in Colombia (>2.53%) and the United States (19.4%). Other countries with large stocks of captive crocodiles/alligators include Zimbabwe, South Africa, Cambodia, Papua New Guinea and Venezuela Most of these countries are historically crocodile growing countries because of the geographic location and environmental scenarios. From the above table it is seen that countries that have undertaken commercial farming have now on accumulated only 2.05% share of the total world stock except for the commercial farms of Australia and United States.

2.2 International Trade Scenario of Crocodile Skin

From 2001 to 2003, over 4 million crocodilian (includes alligator and crocodile) skins were traded worldwide (Caldwell 2003). Trade in crocodile skins can be divided by the trade in 'classic' crocodile skins versus other crocodile skins. Classic crocodile skins consist of all crocodile skins except for the caiman. Classic skins are recognized by the absence or presence of only a very few osteoderms (skin bones). The bones increase the difficulty of the tanning process and the risk of tearing the skins during tanning (Zajicke 2003).

Global trade in crocodile skins is estimated at US\$500 million/annum, with exports to Singapore, France, Italy and Japan accounting for approximately 70% of total trade (Crocodile Specialists Group 2003; Caldwell 2003). There are 23 species worldwide, with the most commonly traded skins being the American alligator and caiman. Together alligator and caiman skins accounted for 83% of world trade in 2003 (McGregor 2004) with Colombia and the United States the two major suppliers in these markets. Other important suppliers of crocodile skins include Zimbabwe, Zambia and Papua New Guinea.

Table 1.2: World alligator and crocodile exports - 2001-2003

Types of Crocodile Skin	Market Share (%)
Caiman	66.1
American Alligator	20.6
Saltwater Crocodile	1.9
New Guinea (freshwater)	2.5
Nile Crocodile	8.7
Others	0.2

Source : Caldwell 2003 (UNEP WCMC unpublished Trade data)

The caiman (usually harvested from the wild) is the most traded skin in terms of total volume (Table 1.2), although not necessarily in value, as it is one of the least expensive of all crocodile skins. The smallest volumes of traded skins include the Australian freshwater crocodile, Morelet's crocodile and the Siamese crocodile.

3.0 Market Potential of Crocodile Leather

Crocodile leather is mainly used in shoes, handbags, small leather goods and watchstraps. Imports of all manufactured goods for 2003 totaled nearly 3,80,000 items, with over half of these items made from alligator skins (Table 1.3). The majority of crocodile products are exported from Italy, Germany, United States, France, Spain and United Kingdom.

Table 1.3. World imports of manufactured items - 2003

Manufactured Item	Number	Percentage (%)
Watchstraps	178 417	47.03
Shoes (pairs)	111 054	29.27
Leather products (small)	81665	21.32
Handbags	6035	1.39
Belts	1878	0.49
Leather products (Large)	160	0.04
Wallets	85	0.02
Total	379 314	100

Source : Caldwell 2003 (UNEP WCMC unpublished Trade data)(6)

A significant proportion of skin exports are re-imported in value added form by the original skin producing countries, indicating that uniting and manufacturing activities are occurring offshore. This is evidenced by the exports of alligator skin products from Italy to the United States. Similarly, there is a high flow of (salted caiman skins from Colombia to Panama and a correspondingly high, volume of finished caiman products being imported from Panama back to the United States (Caldwell 2003). The most significant importers of manufactured crocodile products are Japan and the United States. Domestic alligator leather consumption is high in the United States, with most popular import items being watchstraps from Sweden (as a European transit port) and shoes from Italy. The US market has been mainly focused towards the male consumer with the most popular items made from exotic skins being handbags, boots, wallets and belts. A recent study conducted by the Louisiana State University highlighted the opportunity to diversify the market into women's apparel and accessories and interior furnishings (Belleau & Summers 2004). Japan sources the majority of manufactured leather product imports from Italy, followed by Germany, Spain and the United States, most of which are made from crocodile or American alligator. In 2003, Japan imported over 45 000 manufactured crocodile products, with the most popular items being watchstraps and handbags (Caldwell 2003).

4.0 Farming Procedures of Crocodiles practiced world wide

Crocodile farming is a new concept as this industry has become popular during the last decade. Historically crocodile skin products are being liked by the upper end consumers worldwide. At one time the countries where crocodile grows naturally used to control the supply part of the market worldwide, through illegal poaching and be-hiding of crocodiles. As the demand of crocodile skin products have grown enormously researchers started thinking of developing farming procedures to grow crocodiles commercially during 80s. These kinds of research have contributed in developing proven farming procedures for crocodile rearing and be-hiding of crocodiles. At the beginning, the farming procedures were only practiced in USA and Australia but now these procedures are popular all around world. The procedures are very easy and can be maintained by employees of the farms around the world as it does not require education but requires training under experienced farming trainer at the beginning to understand the procedures. So even Bangladeshi village people can also learn the technique from an experienced farming trainer and can follow it to become an experienced farming trainer themselves. The simple procedure of crocodile farming and skin tanning are portrayed in-low:

4.1 Breeding

In conventional farms, crocodiles have usually been bred in large open ponds. These large ponds often have made it difficult to monitor which males were mating with the females. A factor in the success of a farm is the production of offspring and so it is important to know if there is a breakdown in the breeding cycle, such as, with an infertile male or unreceptive female.

4.1.1 The Breeding Pens

The breeding pens are built in blocks of five pens, with one male pen in the middle of four females pens. Each crocodile has its own wet and dry area to recreate a natural surroundings. In order to allow mating to take place, each female's pen can be merged with the male's pen. All the females, from each block will mate separately with the male, and after mating the female crocodile will wait for signs of the approaching monsoon before she will build her nest.

4.1.2 Nesting

The nesting season for Crocodiles, usually occurs in late January, with thunder and rain being triggers for the female to begin construction of her nest. She will build her nest by using her hind legs to rake

up grass, mulch, and sand into a mound. The nest is usually raked up over 3 or 4 nights and once the temperature and conditions inside the nest are right, she will open the nest and lay between 40 and 70 eggs.

The nests can be up to 90cm (30 inches) high and rely on the decomposition of the plant matter to generate the heat needed for natural incubation of the eggs. As can be seen from the above picture, the female-crocodile will guard her nest to prevent any would-be nest robbers stealing her clutch of eggs.

4.1.3 Construction of Croc Pen

Crocodiles are cold-blooded reptiles and so they cannot regulate their body temperature. To overcome this, they need to 'Thermo regulate', which means that if a crocodile becomes too hot it needs to slide into its pool to cool off. If the crocodile's temperature starts to fall too much it will return to the dry area, which has both sun and shade, to warm its body to the correct temperature.

4.2 Egg Collecting

After the female crocodile has laid her eggs, they need to be removed from the nest as soon as possible. This will ensure the maximum number of eggs make it through incubation. The female's pen is designed in such a way so as to allow the removal of the eggs in complete safety for staff, and with no physical stress to the female crocodile. The pens use a system of isolation gates which retain the female in her pond and away from the nest while the eggs are being collected.

4.2.1 Size of Egg

The size of crocodile eggs are between 70 to 90mm (2.5 to 3.75 inches) long and 40 to 60mm (1.5 to 2.5 inches) in diameter. It will normally take from 15 to 20 minutes for the female to lay her clutch of eggs.

One important feature of crocodiles is that the developing crocodile has to be able to breathe whilst inside the egg. Shortly after being laid, an air pocket develops inside the egg. The embryo will grow in such a way as to ensure its nostrils are protruding into the air packet, and thus allowing the unborn crocodile to breathe inside the egg.

4.2.2 Eggs Position

Therefore, it is essential that when the egg is placed into the incubator it must be in the same position as it when it was laid. If the eggs are turned over during incubation, the developing crocodile will drown as it will be unable to breathe.

4.2.3 Hatchling

After being removed from the nest, the eggs are cleaned in sterile solution and placed in the incubators at a temperature of 32 degrees Celsius. Hatchlings are born after an 80-day incubation period, and the sex of the crocodile is determined by the temperature of the incubator. Once one crocodile has started to hatch, it will call out and excite the rest of the young in the clutch and they will start hatching.

The eggs are inspected daily, to ensure they have banded, and the developing crocodile is still

4.2.4 Baby Croc

The newborn crocodiles will be normally 30cm (10 to 12 inches) in length. In nature, hatchling mortality is extremely high, with approximately 0.5% or 1 in 200, surviving to maturity.

4.3 Growing Out

The young crocodiles are kept inside .1 climatically controlled environments. The grow-out pens are insulated, soundproofed buildings in which the crocodiles will live, until they are suitable for processing.

Their reduced exposure to the sun minimizes damage to the skins and allows the farm to produce some of the finest skins,

The controlled environment simulates optimum growing conditions for the young crocodiles and in less than three years crocodiles will reach a length suitable for processing.

Whilst inside tin- growing pens, the main staple of the crocodiles' diet consists of poultry. The chicken diet satisfies the animals nutritional requirements and as well as developing healthy.

4.4 Processing of Crocodile Skin

When the crocodiles reach approximately 2 meters (5 to 6 feet) in length, they are ready for processing, providing their skins are in a good condition.

In order to process the crocodiles, the farmers have traditionally shot diem. However, under new technology they are stunned, with a low amperage stun-gun, and then inspected (or any defects in their skin. If the skin is unblemished, a small incision is made .u the base of the skull and they are bled whilst asleep. If the animal's skin is not suitable for processing, h is put aside and after a few minutes will wake up unaware of their ordeal.

Crocodiles suitable for processing, are completely sanitized so as to minimize any contamination to the meat prior to any cuts being made. The processing room is a sealed, controlled area and kept within a prescribed humidity and temperature. Visitors and staff are required to wear protective clothing including, hair nets, gloves and sterilized footwear. Before entering the processing room everyone has to walkthrough a shallow sterilizing solution, so as to ensure no contaminants or diseases are introduced inside the room. Before skinning, the animal has a plastic bag placed over its head so as to ensure no stomach contents are allowed to come into contact with the meat, skin, work benches or utensils. The crocodile is then placed on a stainless steel work bench.

It is essential that the skin be removed from the body without any damage from knife marks. A first-grade skin can be ruined with one careless cut from the skinner. The first incision is made along both sides of the animal's back, beside the larger skutes (raised sections of the skin). This pan of the skin is called the back strap, and is cut away first. With the blackstrap removed and then further cuts are then made along the back of each leg, and around the head, this now allows for the safe removal of the entire skin

After the skin has been completely removed it is flayed to remove any meat and fat prior to being salted. Flaying is carried out using high pressure water.

After flaying, the skin then has salt rubbed into it to remove .my moisture. The salting ensures the skin will stay in peak- condition until it is tanned.

After being salted, the skin is laid flat and left to dry. Tanning is a complex process, and not currently carried out on-site.

The salt water has one of the most sought after skins in the world, with only the wealthy being able to afford such high-class products. A hand bag made from estuarine crocodile, will retail for several thousand dollars, and so it is not only a purchase but an investment as well.

The meat is also in high demand, both domestically as well as internationally. The prime cuts of meat are portion-packed and frozen ready for the restaurant trade. The other cuts are value added into a wide variety of products, such as, Crocodile Spring Rolls, Crocodile Sausages and even Crocodile hamburgers.

Other by products, such as, heads and feet are sent to the taxidermist for further utilization. There is very little of the animal that is actually discarded. With such very little waste, it can be said that the Crocodile is one of the most usable animals.

5.0 Crocodile Farming in Bangladesh

Crocodile tanning has become a popular venture for business entrepreneurs around the world. In recent times governments of several countries like Thailand, Malaysia and Vietnam have taken initiative to improve their export earnings by patronizing crocodile farming as a potential industry. The business people of Bangladesh should also take the crocodile farming ventures seriously, as it has the potential of becoming a very profitable and growing industry for the country. The government has already taken initiative to develop the agriculture sector, production wise and contribution wise towards foreign currency earnings. As a result it can be seen that the export earnings from agriculture, fisheries and livestock sector have increased during, 2003-04 to 553,36 million (US\$) from 462.59 million (US\$) during 2002-03 (Export promotion Bureau 2005). To make crocodile farming an industry popular government has taken measures to provide loan facilities to those entrepreneurs to start this type of venture. As a result till date two companies have already taken initiative to start the farming by importing around twenty infant crocodiles from Malaysia (Board of Investment, Bangladesh August 2005).

There are lots of positive signs for crocodile farming in Bangladesh. As the weather of this country is suitable for the farming process, government is also providing support and there is a huge international demand for crocodile leather products, entrepreneurs should take the initiative. Their positive thinking will not only give them a chance to have a profitable concern but also provide Bangladesh a chance to develop the demandable crocodile farming industry and will also allow Bangladesh to create a place in world market as a country that can supply good quality crocodile leather.

5.1 Problems of Crocodile Farming and Leather Export

Export of crocodile skin is also beset with myriad problems. Some of the problems are specified below:

- Crocodile cultivation in Bangladesh is totally dependent on private sector.
- The Government has now not taken any initiatives to educate people of the potentiality of crocodile farming.
- The crocodile farmers, who have taken the initiative, still do not have the proper knowledge about the modern technologies used in other countries to produce or cultivate crocodiles. This phenomenon might result in loss of their ventures, which might decrease the attractiveness of this industry for future entrepreneurs.

- The existing production, funning and transport facilities available in Bangladesh are not suitable for earning foreign currency from this crocodile farming industry, because the ignorance of farming and he-hiding the crocodiles decreases the quality of the skins as it reaches the importers and lower quality hides are not acceptable by the importers as these materials are used for producing high profile and high priced fashionable products.
- Ignorance of the exporters about the process of preservation of the skin of crocodiles may result in cancellation of import orders and can develop bad reputation among the international buyers.

5.2 Recommendations for Improving the Crocodile Fanning Industry of Bangladesh:

The crocodile farming industry has a bright future because of the increasing demand and price of the crocodile leather worldwide. So the Government should play an important role to develop the crocodile fanning industry and crocodile skin marketing. It is true that for the interest of private-sector farmers and international consumers die Government must take every initiative to educate the people about the international prospects of crocodile farming and try to improve the farming and marketing system. For this reason in all countries of the world Government is working side by side with the private sector. The prime objective is to monitor the private sector, and facilitate their trade and commercial activities.

Following are some suggestions about the Government's roles and action to improve the crocodile farming, industry and export potentiality of crocodile skin from Bangladesh-

- Necessary steps should be taken to institutionally offer services like Farming, Grading, Standardizing, and Inspection etc. Importers, Exporters and most of the Consumers right can be established by formulating marketing policies. This should also protect the market from monopolists and those who work against public interest Join venture production firms between foreign and local partners should be encourage during the first five years and extra 'incentive should be provided to the foreign direct investment cases in developing the crocodile farming and leather tanning industrial sector in order to develop this sector to become a concrete sector for future and give a chance to our local entrepreneurs, business executives and business people to learn about this industry and the insights of farming from the foreign entrepreneurs and expatriate executives.
- Proper Government initiative should be taken in loan sanctioning and provide other infrastructure facilities that will help in developing organized farming and marketing system.
- To continue the production process and to improve the economic condition Government should come forward to ensure farmers are getting right price.
- Measures should be taken to increase the overall expansion of the distribution channel, exploring new use of products and discovering new markets. These types of activities will strengthen the Governments marketing structure.
- Researching for new ways of marketing that will develop perfect farming and marketing system. Government can initiate such elaborative measures that will inform the farmers marketers about modem farming and alternative marketing system i.e. market intelligence and market information,
- Creation of infrastructure facilities like sample farms, processing plants and one stop problem solution centers by giving encouragement and incentives to entrepreneurs.

6.0 Conclusion

Crocodile farming and crocodile leather export have become one of the most profitable industries for many countries -as the demand for products produced of crocodile leather are increasing every day. So to avail this opportunity, governments of many countries of Asia have taken initiative to develop this crocodile fanning industry in a large scale. The -weather and other climatic and geographical conditions are appropriate for this crocodile industry in Bangladesh. The local labor is cheap and very hard working and as the farming procedures are very easy to learn, so this industry can easily grow in Bangladesh if the government provides some initial assistance with loan facilities to interested entrepreneurs and educating mass people about the farming techniques and the demand of the industry in world market, -which is expanding every year and the price per unit, of the products in the international market are also growing every year. After independence during seventies Bangladesh was known around the world as a jute and tea producing country but as the ready garments industry was developing in late eighties, within five to six •years Bangladesh have established itself as one of the prominent readymade garments producing country of the world . Presently within twenty years, the garments industry sector is contributing 74.80% of the total export proceeds during 2003-04 as per export promotion bureau and industry ministry. As the crocodile farming and leather turning industry is also a very lucrative sector for export earning, government and private sector entrepreneurs should take initiative to develop this industry in Bangladesh, so that it can become one of die largest foreign currency earning sector within j very short time as this sector portrays this particular potential.