

**PROFILE ON
SNAKE FARM
FOR VENOM
PRODUCTION**

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EXECUTIVE SUMMARY

This profile envisages the establishment of a snake farm for the production of venom with a capacity of 100 gm per annum. The present demand for the proposed product is estimated at 5,500 kg per annum. The demand is expected to reach at 11, 434 kg by the year 2022. The plant will create employment opportunities for 27 persons. The total investment requirement is estimated at tk. 50 million, out of which Birr 1.35 million is required for plant and machinery. The project is financially viable with an internal rate of return (IRR) of 27 % and a net present value (NPV) of tk. 35 million, discounted at 8.5%.

First of all we should ensure that what are the potentialities we have in our country like Bangladesh. Because Bangladesh is a low lying and revering country with the large forest area which is a heaven of the snakes. Because of the natural condition of snakes breeding also too much high at this country. That's why collection of in toxic snakes from those areas is easy. Moreover a lot of People engage this particular job of collecting of snake for charming the people for their livelihood. But lot of people are now giving up their job because little income. As a result they become unemployed. We can give the job to those people who used nursing their snakes. For that their income will be increased.

PRODUCT DESCRIPTION AND APPLICATION

Venom is a poison of animal origin usually restricted to poisons that are administered by biting or stinging. The most familiar venomous animals are certain snakes and insects. Snake venous are complex mixture of enzymatic proteins and different toxins. Venom is extracted for the production of anti-venom serum, which in turn is effective in the treatment of ailments like cholera, small pox, typhoid, hepatitis and rabies. The anti- venom serum is also careful antidote to snake bite. Apart from the production of the anti-serum, the snake farm, serves other important functions as well. It plays a major vole in educating the public about snake and their ecology. Furthermore, snake meat is very nutritious, high in protein and minerals and good for the blood. A kilogram of snake meat can be sold from USD 16 to 29. Therefore, meat could be another product of the snake farm.

MARKET STUDY AND PLANT CAPACITY

1. Past Supply and Present Demand

Snake venom is highly modified saliva that is produced by special glands of certain species of snakes. The gland which secretes the zootoxin is a modification of the parotid salivary gland of other vertebrates, and is usually situated on each side of the head below and behind the eye, invested in a muscular sheath. It is provided with large alveoli in which the venom is stored before being conveyed by a duct to the base of the channeled or tubular fang through which it is ejected. Snake venom is a combination of many different proteins and enzymes. Many of these proteins are harmless to humans, but some are toxins. Worldwide, about 30,000 to 40,000 people die annually of snake bite. The only effective cure for serious snake bites is anti-venom serum made by immunizing horses with gradually increasing doses of raw snake venom than collecting the anti venom from the animal's blood.

Consequently, stocks of snake venom of the medically important species are always needed. As a result snake venom has high demand in the international market. The major suppliers of snake venom in the international market are China, India and Thailand. The only available data on import of snake venom is for European Union (EU) member countries. According to Euro stat (2004/2005) in 2004 a total of 2,789 Kg. of snake venom was imported by EU member countries. Germany was the leading importer; accounting for more than 20 percent of the total other leading importers were Netherlands (13%), France (12%), the UK (11%) and Spain (9%).

Assuming that EU countries account for half of the world total demand for the product, the total global demand is estimated at about 5,500 kg which is consider as the current global demand for snake venom.

Chart of exporting countries and their percentage:

<i>China</i>	<i>31%</i>
<i>India</i>	<i>25%</i>
<i>Thailand</i>	<i>12%</i>

Chart of importing countries and their percentage:

<i>Netherlands</i>	<i>13%</i>
<i>France</i>	<i>12%</i>
<i>U.K.</i>	<i>11%</i>

2. Projected Demand

Based on past trend it can be assumed that the market for snake venom grows at an annual average growth rate of 5%. Accordingly by taking the estimated present demand as a base and applying a 5% growth rate the projected demand for the product and estimated share of local product is shown in Table:

PROJECTED DEMAND (KG)

Projected Global

YEAR	DEMAND (K.G)
2008	5,775
2009	6,064
2010	6,367
2011	6,685
2012	7,020
2013	7,371
2014	7,739
2015	8,126
2016	8,532
2017	8,959
2018	9,407
2019	9,877
2020	10,371
2021	10,890
2022	11,434

3. Pricing and Distribution There is considerable price deference in snake venoms based on the species of the snake. The most common snake species venom current retile price is shown bellow

Name of the snake	Common name	Price/ gram/ USD
ASPIDELAPS SCUTATUS	<i>SHIELD NOSE SNAKE</i>	1 800.00
ATHERIS SUPERCILIARIS	<i>SWAMP VIPER</i>	2 000.00
BITES ARIETANS	<i>PUFF ADDER</i>	180.00
BITIS CAUDALIS	<i>HORNED ADDER</i>	1 500.00
BITIS GABONICA	<i>GABOON ADDER</i>	210.00
BITIS GABONICA RHINOCEROS	<i>WEST AFRICAN GABON ADDER</i>	210.00
CAUSES RHOMBEATUS	<i>NIGHT ADDER</i>	230.00
DENDROASPIS ANGUSTICEPS	<i>GREEN MAMBA</i>	510.00
DENDROASPIS POLYLEPIS	<i>BLACK MAMBA</i>	495.00
NAJA HAJE ANNULIFERA	<i>SNOUTED COBRA</i>	190.00

AS CAN BE SEEN FROM THE ABOVE LIST, THE PRICE OF SNAKE VENOM VARIES FROM USD 2000 TO USD 190 PER GM. ACCORDINGLY, FOR THE PURPOSE OF FINANCIAL ANALYSES A FARM GET PRICE OF USD 500 (**Tk 34500**) per gm is adopted.

B. PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Plant Capacity

The total annual production capacity of the snake farm is 100 gm viper's dry venom. It is assumed that 500 snakes can be reared in the project and a single viper will produce 0.2 gm dry venom.

2. Production Program

Table shows the production program of the proposed project. At the initial stage of production, the project may require some years to penetrate the market. Therefore, in the first and second year of production, the capacity utilization rate will be 70% and 90%, respectively. In the third year and then after, full capacity production shall be attained.

PRODUCTION PROGRAMME

S.No./YEAR	1	2	3-10
1 Snake venom (gm)	70	90	100
2 Capacity utilization rate (%)	70	90	100

RAW MATERIAL AND INPUTS (SNAKE HASBANDARY)

A. RAW MATERIAL

1. Milking and Feeding Snakes

One “milking “of a snake produces about 100 mg of liquid venom, which in turn produces about 10 mg of dry venom. Snakes can be “milked” on average about 20 times each season. Thus, a single viper will produce 2000 mg liquid or 0.2 gm dry venom.

Snake foods may contain mice, rats and chickens. The rodents should be clean and healthy. A snake may consume one or two mice at one feeding per week. It is advisable to breed rats in the snake farm. However, initially, the farm may feed the snakes with small chickens.

2. Snake Breeding

A breeder must know the sex of the snakes, for example, corn snakes become sexually mature between 18 and 24 months. Before this time it is very difficult to tell what sex they are because their reproductive organs have not developed enough to be noticeable. This is a very delicate procedure to only experienced people should perform such a task.

Before beginning to bread snakes they should be in optimal health and have good weight. The generally accepted method of breeding snakes involves a period of cooling called brumation which is similar to hibernation but the snakes still remain active to some extent. This involves first stopping feeding two weeks before the cooling period is to begin. This is to eliminate any remaining food still inside the snake, which could rot inside the snake during cooling and potentially kill it. After the two weeks are over, slowly decrease the temperature over several days until a temperature of about 55oF to 60oF is reached. Keep the snakes at this temperature for two to three months. Check on the snake’s health frequently, and change their water weekly. It any signs of respiratory infections are seen then warm the snake

up and treat the infection. Do not feed snakes during this time. At the end of the cooling period, slowly warm the snakes up to the normal maintenance temperatures and begin feeding. Feed the females as much as they will eat in order to fatten them up before breeding, but only feed small snakes first of all so they get used to feeding again.

3. Shedding

Humans shed their skin all the time, but snakes can not do this so they have to shed a layer of skin to grow and get rid of any external parasites that may be on them. So snakes generally shed every 4 to 8 weeks. About a week before they shed, snakes seem to go dull and their eyes will go cloudy. Give your snake plenty of water so the skin can separate. At this time do not feed your snakes as it can become stressful and your snake may not shed properly. About a day or two before shedding begins, snakes will become clear. This is because liquid has filled between the skins. After the snake has removed its shed then the normal feeding schedule can continue.

4. Mating

After the first or some times second shed, the female snake will be ready to mate. After introducing the female into the male's cage, the pair should be watched closely. If the female is ready for breeding she will produce pheromones from her skin which will attract the male. The male will start to chase the female and rub his chin along her back. Actual mating usually lasts about 20 minutes, but could last an hour or more. After the female has been mated, start again an accelerated feeding schedule. About six weeks after mating, the female will undergo a shed cycle. At this time you need to give her a nest box to lay her eggs in. About 10 days after shedding, the female will become very active as she searches for the best place to lay her eggs. She will usually settle down inside the nest box and lay her eggs, from 5 to 30 depending on the size of the female. After she lays her eggs, feed her smaller than normal prey item for the next couple of feedings. She will be weak from her pregnancy and small prey items will be easier for her to eat and digest.

5. Care for the Eggs and Babies

Unlike bird eggs, in snake eggs the developing embryo will attach to the top surface of the egg. Rotating the egg may cause the egg yolk to cover the embryo; leading the baby to its death by suffocations. Note the position of each egg as it lie in the nest box and maintain this position when transferring the eggs into the incubator. The eggs should be placed inside a container which should then be placed inside an incubator that will maintain temperature at 82oF and should have humidity. The eggs should hatch in 6 to 8 weeks but it can take more weeks. When the eggs start to hatch, the baby (neonate) snake will slit open the leathery egg by means of a temporary egg tooth located on the tip of their snouts. The babies will often remain inside the slit egg for a day or two with just their heads sticking out of the slit. Wait until the snake leaves its egg on its own. Set up each baby snake (neonate) into an enclosure. When it is feeding time (usually after their first shed) separate the baby snakes into separate boxes. Because if you don't they may possible eat each other. Snakes could first be caught from different areas initially and then they could be bred in the project breeding facilitated as described above. Table shows the annual small chicken requirement and cost of the snake feed.

ANNUAL SNAKE FEED REQUIREMENT AND COST

S.N O.	Raw Materials	Qty	Cost (,000 tk)
1	Small chicken (pcs)	26,000	1000
2	Latex membrane (m2)	10	15

B. UTILITIES

The principal utilities of the project are electricity and water. The annual utility requirement is indicated in Table

ANNUAL UTILITIES REQUIREMENT

Sr. No.	Utility	Unit	Qty	Cost ('000 tk)
1	Electricity	kWh	60,000	217
2	Water	M 3		210
Total				427

2. Propose Location

Because of Bangladesh is a country of low land with river and forest it will be easier to collect snakes from different areas. But we are just emphasizing the area near about the Sundarban or the side of hill tracts. Basically we eye on to Sundarban.

TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

Process Description

Milking of snakes is the collection of venom from live snakes. There are two methods of snake milking: manual and weak electric shock. The manual method involves a membrare (usually latex) being stretched over a glass or plastic receptacle. The snake is held behind its head, and the firmness of the grip usually brings its fangs to the fore. The snake is induced to bite through the thin latex

membrane covering the collecting vial. Pressure is applied to the venom glands and then the venom is collected in the vial.

In milking through electrical stimulation, the snake's mouth is held open over a collecting container. Another operator touches electrodes to the sides of the snake's head and a very weak electrical charge, about 2 to 5 watts, is applied for one or two seconds. The electrical stimulation causes the muscles around the venom glands to contract, forcing venom into the collection container.

The electrical stimulation requires two operators and more sophisticated equipment while the manual method requires only one operator and simple basic equipment. However, the electrical method may have other benefits. On average, nine out of ten snake breeders have been bitten, mainly on their hands. If a bite is around the neck or armpits or near the heart, 90% of the victims will die. Therefore, as many people have been bitten while milking snakes and ensuring that another person is present should be a basic safety requirement. After the venom has been collected, it is dried (freeze drying) in the vial, and then collected by workers wearing protective masks, to guard against inhalation.

3. Source of Technology

B. ENGINEERING

1. Machinery and Equipment

The list of machinery and equipment required for the production of snake venom and snake husbandry is indicated in Table 5.1.

The cost of machinery and equipment is estimated to be tk. 9,350,000.

LIST OF MACHINERY & EQUIPMENT

Sr. No.	Description	No.
<i>1</i>	<i>Snake sticks (stainless u/v hooks)</i>	5
<i>2</i>	<i>Snake fork /tongs</i>	5
<i>3</i>	<i>Snake bag</i>	6
<i>4</i>	<i>Water bowl dish</i>	300
<i>5</i>	<i>Hide box</i>	250
<i>6</i>	<i>Collecting vial</i>	10
<i>7</i>	<i>Plastic cages</i>	250
<i>8</i>	<i>Nest box</i>	150

2. Land, Building and Civil Works. The temperature in each snake cage should properly be controlled for optimum breeding and other husbandry activities. The snakes require secured cages, as they escape easily. The cages may have under tank-heating pad on one end of the tank to provide the snake with warm and cool selection. The snake also need hide box which should be place on the warm side of the cage. The water bowl must be large enough to soak in and stable enough to prevent tipping. The cage should be cleaned regularly. The feces and shed skins must be removed frequently. Therefore, the building in which the snake cages are kept, should be cleaned. The total land and building requirement of the envisaged project is, 5000 m² and 1000 m², respectively. The cost of building is estimated at tk1.5 million. The lease value of land is Tk 2800,000 at a rate of 7.5 tk. per m²/annum for 80 years.

VI. MANPOWER AND TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

The list and cost of manpower is indicated in Table 6.1 the total annual cost of labor is estimated at Tk 2711300.

MANPOWER REQUIREMENT AND LABOUR COST

<i>Sr. No.</i>	<i>Manpower</i>	<i>Req. No.</i>	<i>Monthl y Salary (tk)</i>	<i>Annual Salary (tk)</i>
<i>1</i>	<i>Farm manager</i>	<i>1</i>	<i>12,000</i>	<i>144,000</i>
<i>2</i>	<i>Accountant</i>	<i>1</i>	<i>12,000</i>	<i>144,000</i>
<i>3</i>	<i>Production head (trained snake handler)</i>	<i>1</i>	<i>10,00</i>	<i>120,000</i>
<i>4</i>	<i>Snake handlers</i>	<i>5</i>	<i>7,500</i>	<i>90,000</i>
<i>5</i>	<i>Assistant snake handlers</i>	<i>6</i>	<i>4,500</i>	<i>54,000</i>
<i>6</i>	<i>Laborers</i>	<i>10</i>	<i>4,000</i>	<i>48,000</i>
<i>7</i>	<i>Guards</i>	<i>3</i>	<i>1,200</i>	<i>14,400</i>
	<i>Sub- total</i>	<i>27</i>	<i>88,700</i>	<i>614,400</i>
	<i>Benefits (25% of BS)</i>		<i>22,175</i>	<i>153,600</i>
	<i>Total</i>		<i>110,875</i>	<i>768,000</i>

B. TRAINING REQUIREMENT

A snake farm is a new venture in SUNDARBAN. It requires trained manpower, especially trained snake breeder or handlers. Therefore, professional foreign breeder should be invited to train local labor force. The cost of training is thus estimated to be Tk 18, 75,000.

FINANCIAL ANALYSIS

The financial analysis of the snake venom project is based on the data presented in the previous chapters and the following assumptions:-

<i>Construction period</i> -----	<i>1 year</i>
<i>Source of finance</i> -----	<i>30 %</i>
<i>equity</i>	<i>70 % loan</i>
<i>Tax holidays</i> -----	<i>5 years</i>
<i>Bank interest</i> -----	<i>8%</i>
<i>Discount cash flow</i> -----	<i>8.5%</i>
<i>Accounts receivable</i> -----	<i>30 days</i>
<i>Raw material local</i> -----	<i>30days</i>
<i>Work in progress</i> -----	<i>2 days</i>
<i>Finished products</i> -----	<i>30 days</i>
<i>Cash in hand</i> -----	<i>5 days</i>
<i>Accounts payable</i> -----	<i>30 days</i>

A. TOTAL INITIAL INVESTMENT COST

Tk. 50 million, of which 57 per cent will be required in foreign currency.
The major breakdown of the total initial investment cost is shown in the following table

ANNUAL PRODUCTION COST AT FULL CAPACITY ('0000 Tk)

SR. NO.	COST ITEMS	TOTAL COST
1.	LAND LEASE VALUE	7%
2.	PLANT MACHINERY	35%
3.	WORKING CAPITAL	35%
4.	PRE-PRODUCTION COST	3%
5.	VEHICLE	8%
6.	OFFICE FURNITURE AND EQUIPMENT	2%
7.	BUILDING AND CIVIL WORK	10%
	TOTAL INITIAL INVESTMENT COST	100%(60000000)

Now the annual production cost table are shown below:

ITEMS	COST (%)
RAW MATERIALS AND INPUTS	70
ADVERTISING	22.80
MAINTENANCE AND REPAIR	1.12
LABOUR DIRECT	0.84
FACTORY OVERHEADS	0.28
ADMINISTRATION COSTS	0.56
TOTAL OPERATING COSTS	95.68
DEPRECIATION	2.94
COST OF FINANCE	1.38
TOTAL PRODUCTION COST	100(10000000)

FINANCIAL EVALUATION

According to the projected income statement, the project will start generating profit in the first year of operation. Important ratios such as profit to total sales, net profit to equity (Return on equity) and net profit plus interest on total investment (return on total investment) show an increasing trend during the life-time of the project.

The income statement and the other indicators of profitability show that the project is viable.

Break-even Analysis

The break-even point of the project including cost of finance when it starts to operate at full capacity (year 3) is estimated by using income statement projection.

$$\text{BE} = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable Cost}} = 63 \%$$

Pay Back Period

The investment cost and income statement projection are used to project the pay-back period. The project's initial investment will be fully recovered within 4 years.

Internal Rate of Return and Net Present Value

Based on the cash flow statement, the calculated IRR of the project is 27 % and the net present value at 8.5% discount rate is Tk 39.37 million.

ECONOMIC AND SOCIAL BENEFITS

The project can create employment for 27 persons. In addition to supply of the domestic needs, the project will generate Tk 21.25 million in terms of tax revenue.

Social and environmental responsibility:

- ✚ Creating new employment,
- ✚ Conservation of rare snake,
- ✚ Make ecological balance of environment.
- ✚ Educating the public about snake and their ecology.

As we know the major suppliers of snake venom in the international market are China, India and Thailand .There is gap between the supply and demand. So,we can do this business with low labor cost and we can collect the materials from the snake charmers with low cost. So this is great opportunity to do this business in Bangladesh.