

BRAC Programme support enterprises (PSE)

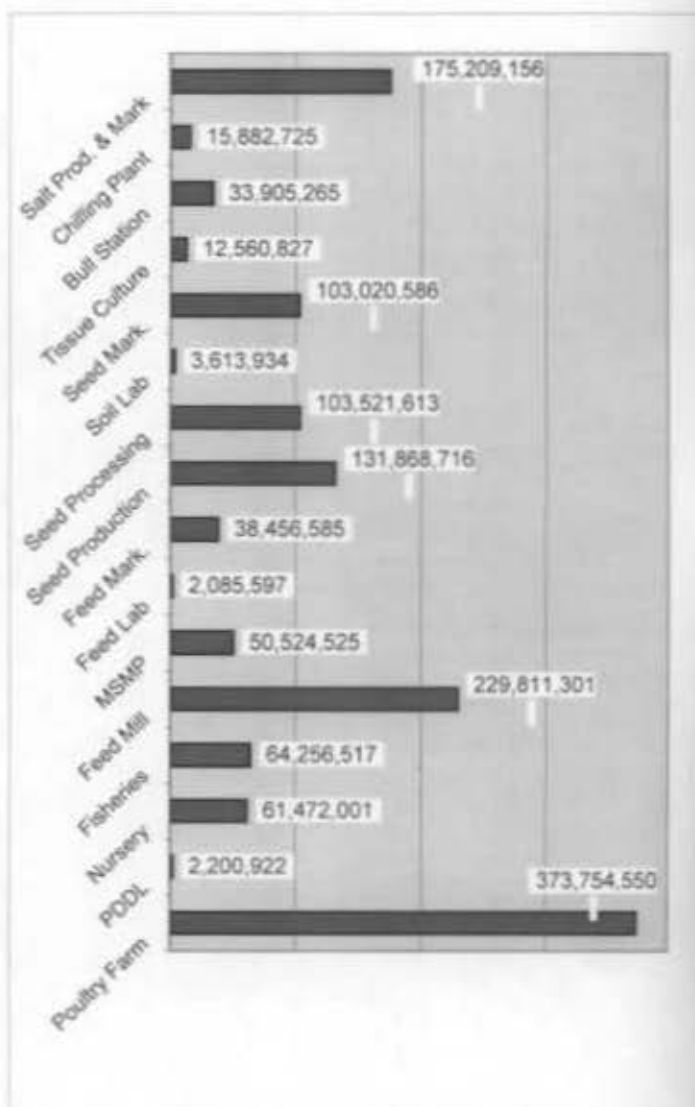
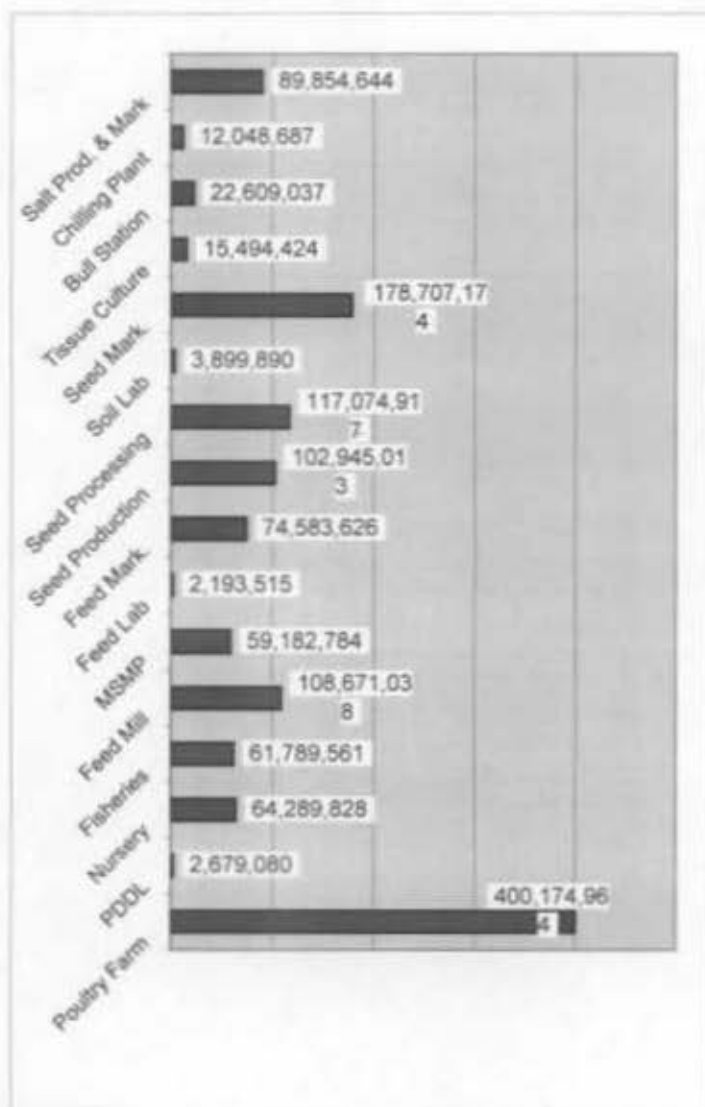
BRAC's programme support enterprises (PSE) provide essential inputs to its group members/programme participants in an effort to further strengthen and ensure the maximum return to expand their enterprises. Since supply of inputs for different enterprises by the local industries and/or government are not of sufficient quantity/good quality, BRAC has established a number of support enterprises to supply these inputs. Timely supply of good quality inputs is a major factor that affects enterprise returns and their contribution towards poverty alleviation. BRAC's support enterprises link rural producers with growing urban markets by providing needed goods and services. For example, PSE include poultry farms for the production of day old chicks; feed mills for producing poultry and livestock feed; prawn hatcheries for post larvae production; seed production centres for the vegetable programme etc. As of June 2003, BRAC has fourteen programme support enterprises as mentioned below.



Figure 1: Components of Programme Support Enterprise

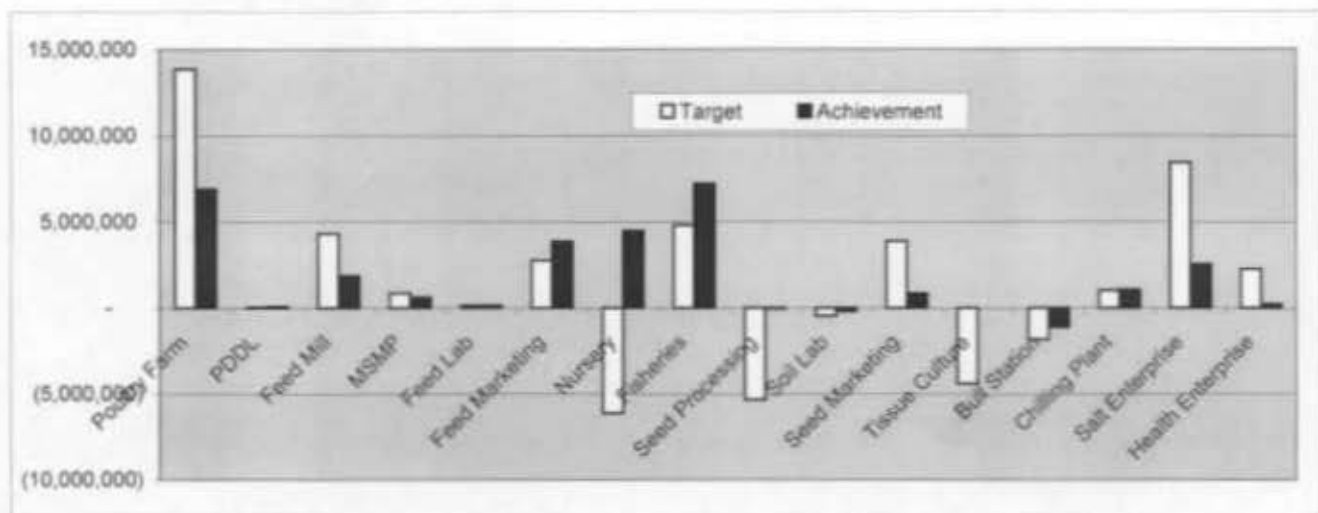
Till December 2002 BRAC invested Taka 1,407,417,969 in establishing and expanding different programme of programme support enterprises. This investment amount became Taka 1,466,868,997 in June 2003. Annex-3 gives detail enterprise wise investment information. The following graphs show programme wise investment position up to December 2002 and at the end of June 2003.

Graph 2: Investment Position of PSE, Dec. '03 **Graph 3: Investment Position of PSE, Dec. '04**



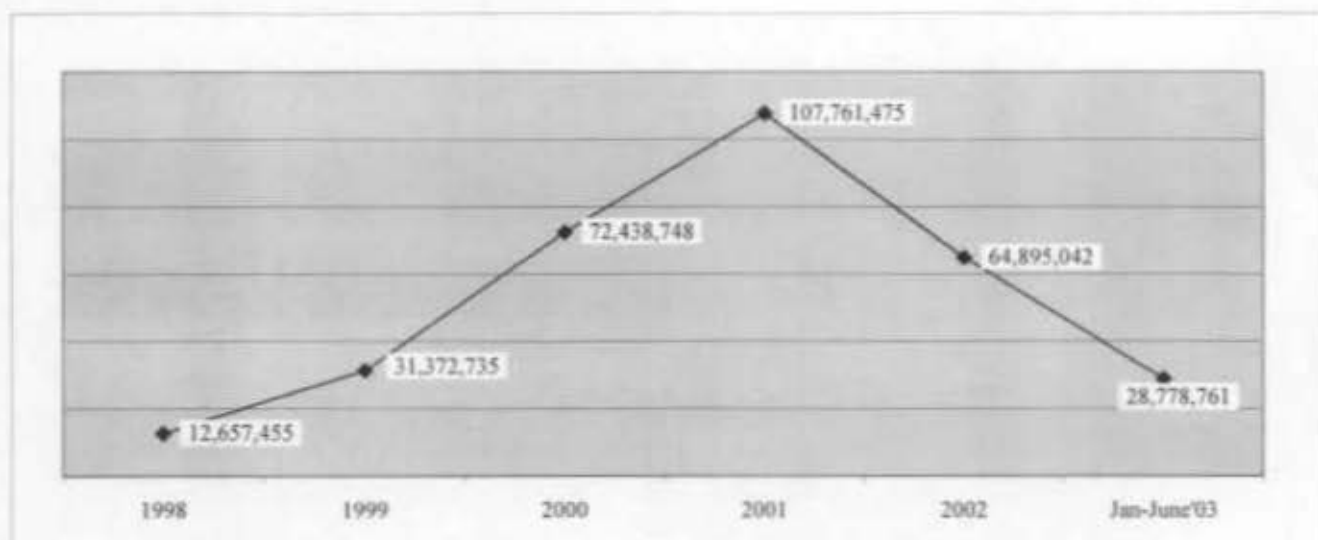
Up to June 2003 PSE earned total profit of Taka 28,458,295; profit target was 24,254,987; so, achievement is more than target Tk. 4,203,308 (*Annex -I* gives the details). The following graph shows programme wise target vs. achievement.

Graph 4: Profit January-June 2003 (Target vs. Achievement)



By the end of December 2002, a total profit of taka 64.90 million has been earned by PSE. Whereas in the year 1998, there was a net profit of taka 12.66 million with six enterprises. Total profit of PSE in the year 1999, 2000 and Jan-June 2003 are 31.37 million, 72.44 million and 28.78 million respectively. Annex- 5 gives the profit trend of PSE. The following graph shows the profit trend of PSE.

Graph 5: Profit Trend of PSE 1998-June 2003



1. Poultry Farm:

Background and objective:

The poultry extension programme is one of the core interventions of BRAC employment and income generating activities. As of June 2003, BRAC has 1.39 million poultry rearers all around Bangladesh of which about 26,832 are chick rearers. To increase the availability of quality chicks at a competitive price and provide

supports to the poultry extension programme, BRAC has established four poultry farms and hatcheries in different locations of the country.

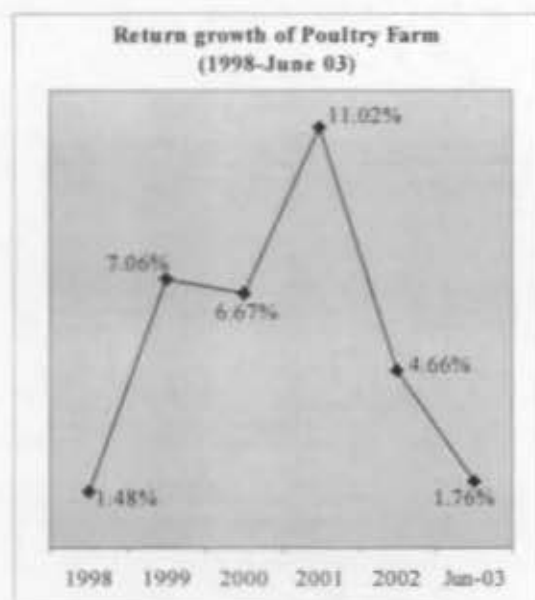
Strategy/process:

At present, an annual input of 15 million day-old chicks is required for BRAC poultry rearing activities only. BRAC's four poultry farms situated in Magura, Sherpur (Bogra), Rajbari, and Savar, together produce about 0.61 million day-old chicks/month bringing total annual production to 7.31 million. Through a mix of BRAC, government and private hatcheries, the poultry programme supplies more than one million day-old improved breed chicks each month to BRAC organised chick rearers. A gap still exists in the day-old chick demand-supply chain. To meet up this demand, especially in the grater Sylhet and Chittagong region BRAC has established two more poultry farms in Sreemongol and Mirarsorai. Poultry farm Merersorai and Sreemongol have started production from the end of 2002 and producing yearly 2.51million and 2.62million Day-old chicks respectively. The price of BRAC produced day-old chick is lower than that of the comparable quality of day-old chicks produced in other commercial farms. BRAC tries its best to keep the cost low so rural/poor people are encourages to buy day-old chicks and earn a regular income from poultry rearing activity.

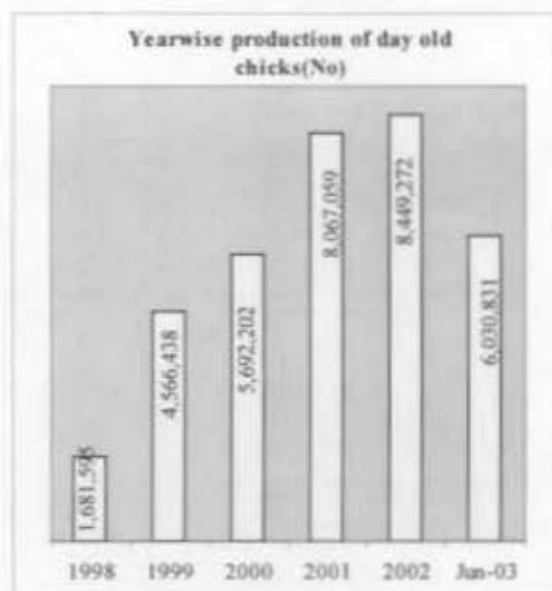
Table 1: Target and achievement: BRAC poultry farm

	Target 2003	Achievement Jan-June 2003	Return on investment January-June 2003 is 2.00%
Day old chicks (in number)	12.43 million	6.03 million	
Profit (in Taka)	23,144,816	6,929,110	

Graph 6: Return growth of poultry farm (1998-June 2003)



Graph 7: Year wise production of Day-old chicks (1998-June 2003)



National Contribution:

In Bangladesh there is about 36 hatcheries for layer production and 84 for broiler and the production as a whole is about 6.4 million layer (day old chicks) and 160 million broiler (day old chicks). In current year BRAC is producing total 12.43 million day-old chicks. The production of BRAC Poultry farm was about 8% of the national production.

Constraints and future plan:

From its experience in running large-scale poultry farms BRAC understood that proper planning for replacement of parent stock and bio-security is essential to ensure maximum production. Beside this, skilled and experienced staff is crucial for the development of the poultry sector.

To meet up the increasing demand of broiler chicks, BRAC has started commercial marketing of day-old chicks all over the country. Through the dealers the day old chicks are being marketed. According to demand BRAC will expand the marketing project.

2. Bull Station (An enterprise of artificial insemination programme of BRAC):

Background and objective:

Since 1988 BRAC is operating the artificial insemination (AI) programme as an important tool of its livestock programme. During that early period BRAC trained 133 AI technicians with assistance from Central Cattle Breeding Station (CCBS) of the Government Republic of Bangladesh. These technicians used to collect liquid semen from the government's livestock breeding station and inseminate the cows in the rural areas with special concentration to the interior locations, which were not covered by the government service. Soon, BRAC started facing the following problems:

- Since longer period was required for the AI technician to transport the liquid semen to the remote place it affected the quality of the semen because semen can be preserved in refrigerator for 48 hours only.
- Because of frequent power failure/fluctuations quality of semen preserved in the refrigerator went down faster.
- Irregular semen supply caused increased drop out rate of trained AI technicians.

To overcome these constraints, BRAC decided to establish its own bull station to produce frozen semen. BRAC wishes to develop the existing AI technicians by introducing them with modern technology for better performance. They can use frozen semen produced in BRAC's bull station for sound artificial insemination operation in the rural areas. The advantages of frozen semen production centre are:

- No electricity is required for preserving frozen semen, only liquid nitrogen is needed at lower price.
- This can be preserved for a longer period and the technician can use it when necessary.
- BRAC owned bull station would ensure regular semen supply to the AI technicians.

BRAC's AI activity was appraised by ATDP in the meeting of concerned persons of DLS and other organizations. It arranged a consultant from the USA to give suggestion on the existing programme. Unfortunately, his suggestions were not compatible with the government's breeding policy for development of cattle head. Therefore, BRAC invited Dr. S.B. Gokhale, Vice-president of Bharatiy Agro Industries Foundation (BAIF), a geneticist as a consultant. He produced a project proposal for BRAC, which was accepted by the concerned govt. as well as non-govt personnel and requested to BRAC for implementation in the rural area. A number of BRAC staff visited the BAIF, India to observe its activities on artificial insemination. At present BRAC is following the BAIF's strategy in implementing its AI project. BRAC also has a number of qualified local experts- Dr. Md. Shamsuddin- Associate Professor and Dr. A.K. Fazlul Haq Bhuiyan - Professor of Bangladesh agricultural University, Mr. Talukdar Saiful Islam - (Ex) Project Director of Directorate of Livestock Services, involved in the

project. In addition, a number of BRAC programme staff received training from overseas, and the experts of Minitube Company in Germany trained some technical staffs.

The objectives of BRAC AI programme are:

- To develop the dairy cattle breed for increased milk production.
- To take AI service at the door of the client for intense coverage.
- To create employment of the rural unemployed people.
- To preserve indigenous cattle breed by preserving germplasm.

Strategy/Process:

The programme implements at three levels:

a. Laboratory/Bull station

- Semen collection from bull
- Process of collected semen to make it frozen semen
- Semen preservation in the cargo containers
- Distribute produced semen to the AI technicians at different locations of the country
- Fodder production for healthy bull

b. Sale of semen to AI technicians

- Two/three post-boxes are placed in different places of an AI technician's operational area. The owners of the heated cows drop a note in the post-boxes. On receiving this, the technician provides service. An AI technician sales the frozen semen with a marginal profit. At present 126 AI technicians are working with BRAC around the country.

c. Bull production/process for bull station

- Selection of bull mother from milk-pocket area
- Import 100% pure progeny tested Holstein Friesian and Shahiwal from abroad
- Inseminate the selected bull mother by imported semen
- The male off-spring is selected by a routine test
- Selected bull calf is grown up by the farmer for one year and then collected for the bull station

Table 2: Target and achievement: BRAC artificial insemination

	Target 2003	Achievement January-June 2003
Straw (in number)	97,500	35,271
Profit/(Loss) (in Taka)	(2,714,262)	(1,125,910)

National contribution:

In Bangladesh there are about 6 million breedable cows. Each year the government's service covers only 1.6 million cows (about 25% of able cows). At present BRAC covers more than 0.1 million fresh cows, which will increase to 0.5 million in near future. The *deshi* cows gives 1.5 litres of milk a day on an average. But after cross breeding, the progeny will give at least 6-7 litres a day.

Constraints and future plan:

More motivation is needed for people in the rural area to avail AI service for better livestock breed, milk production and sufficient production of meat. The main constraint in the AI programme faced is availability of liquid nitrogen at low price. Sometimes low quality of inputs such as chemicals; straws etc. are supplied from the local sources affect the programme performance. Additional support is needed for maintenance of machineries in the laboratory at the field level. Moreover, regular fund is needed for sound operation and implementation of the AI programme. Besides these government support is needed for the smooth operation and extension of the programme in the rural area.

In future BRAC is going to extend additional 500 AI technicians all over the country, and number of AI will be increased to 500,000. Following the national breeding policy, production will be 50% HF and 50% SW pure bull & cow within next two years. BRAC is going to improve the service quality.

3. Feed mill:

Background and objective:

The success of poultry programme significantly depends on the availability of balanced feed. There is an annual need for at least 100,000 MT of poultry feed for BRAC poultry rearers only. Even few years back there were only four commercial poultry feed producers in the country with the total production capacity of below 50,000 MT/yearly. These producers were selling feed only in the urban areas and mostly in the Dhaka city.

In the early days of its poultry-livestock programme BRAC used to develop feed sellers by providing training to sell feed to the poultry and livestock rearers in the locality. Soon it was observed that it is difficult to maintain the quality of a balanced feed in all around the country by using locally available ingredients. In this way feed quality varied from place to place, and also the feed produced locally was not able to meet the demand of rural poultry rearers. This problem became crucial with the adoption of high yield variety (HYV) birds and the expansion of BRAC's poultry rearing activities. The demand for balanced feed increased enormously. In response to this demand, BRAC established three feed mills in Manikgonj, Nilphamari and Sreepur (Gazipur) with the production capacity of 4,200(MT)/each/year to provide its poultry rearers with quality-balanced feed.

Strategy/process:

A poultry feed mill is mainly a combination of milling and mixing machines. Ingredients like maize, wheat, oil cake, Soya, full fat etc are grinded to granules by a set of hammers and cake, oyster-shell, etc are crushed into powder. The mixing machine mixes together a few other components like rice polish, soya bean, cake, and protein concentrate, feed additives etc. After mixing the product is ready for packaging as mashed feed or can be steamed and pressed into pellets before packaging as palletised feed. Warehouse or silos are essential to store the feed produced in bulk. In modern feed mills, the ingredients are palletised. For this type of mill a broiler and machinery is necessary to cool the pellets before packaging. Feed produced in machine has longer self-life and safer.

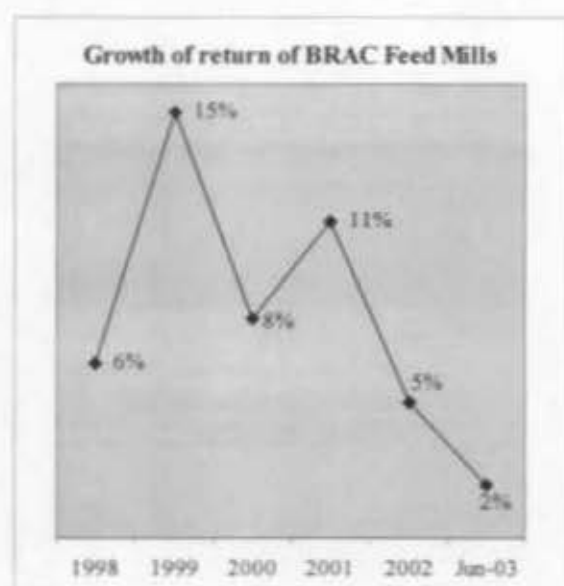
The first two BRAC feed mills were set up in 1996, one at Manikgonj and the other at Nilphamari. The annual production capacity of these mills is 6,000 tons and 6,000 tons respectively. The feed price at BRAC feed mills is slightly lower than the market price. Produced in modern machinery, BRAC deliver

quality poultry-livestock feed to the rearers through its network. Experienced management and staff operate these mills. In April 2000, BRAC established its largest feed mill in Sreepur, Gazipur with the capacity to produce 30,000(MT)/year. In addition to poultry feed this mill is capable of producing cattle feed. The total production capacity of these three feed mills altogether is 3,500 tons/monthly.

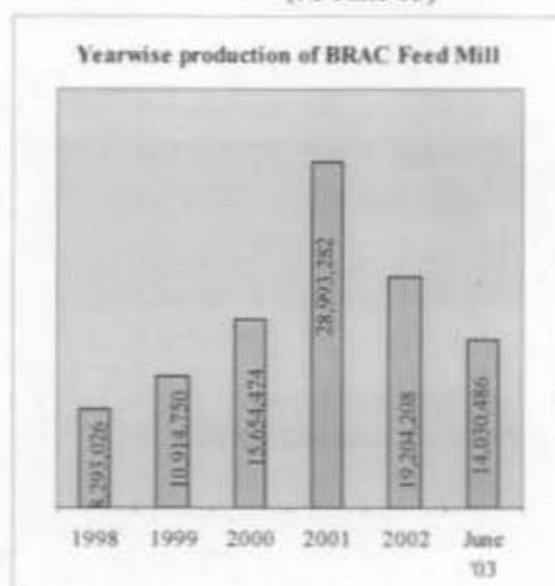
Table 3: Target and achievement: BRAC feed mill

	Target 2003	Achievement January-June 2003	Return on investment January-June 2003 is 2%
Feed (Kg)	35,300,000	14,030,486	
Profit (in Taka)	13,007,999	1,857,522	

Graph 8: Growth of return of feed mill (98-June 03)



Graph 9: Year wise production of feed mill (98-June 03)



National contribution:

There are several feed producers in Bangladesh with a total production of approximately 1,200,000 tons. These feeds are sold or distributed mostly in Dhaka and few other cities. BRAC established 3 feed mills with a capacity of 42,000 tons feed each year, which is distributed to the whole country. Price of BRAC feeds are also lower than the market price. BRAC feeds maintain the calorie and nutrition standard. As a result the farmers get the direct benefit.

Constraints and future plan:

During last few years BRAC observed that social/political restlessness often contributes in the instability in the price level of raw materials, which ultimately affects the price of the finished good - the feed. Strikes (hartal) and other political instability often badly affect the production and distribution. Keeping

the quality high is very important in the competitive market otherwise there is always the chance of losing the market.

Due to high demand of quality poultry-livestock feed, BRAC has the plan to set up another feed mill. To ensure sound production BRAC is going to encourage maize production, which is a raw material for poultry feed.

4. Feed analysis laboratory

In Bangladesh, poultry sector plays an important role in poverty alleviation, employment and income generation for the rural people, especially the distress-vulnerable women. This sector has the potential of becoming a viable commercial venture. With the adoption of high yielding variety (HYV) birds and expansion of poultry-livestock rearing activities the demand for balanced feed is increasing. Feed represents the major cost of production of poultry-egg (65-75%). Performance of balanced feed has a great effect in profitability. The principal function of the feed ingredients is to provide the poultry rearers with effective diet for their birds which meet the nutrient requirements of the particular of bird. To fulfil this demand the feed producers/sellers will have to better knowledge in the nutrient factors in feed ingredients as well as understanding of nutritional value of outputs like egg, meat etc. This is one area that needs attention.

As mentioned in the earlier in the 80's the feed producers used to produce poultry-livestock feed from locally available ingredients. But at present, commercial feed producers import the feed ingredients. But, most of the producers do not have appropriate knowledge in the nutrient factors of these ingredients. Most of the information available is based on the USA or European context, which is very much different from Bangladesh. This often results in slow growth of broiler and less egg production. Complete feed formulation need to be based on accurate composition rather than depending on book value. In response to this situation BRAC has established three feed mills in Manikganj, Nilphamari, and Sreepur (Gazipur). In addition to this, in 1999 BRAC has set up one Feed Analysis Laboratory in Gazipur. Though the government's Directorate of Livestock and Services laboratory but this provides feed analysis service is not enough compared to current demand.

The objectives for setting a feed analysis laboratory are:

- Analysis and detect quality of feed ingredients
- Determine the quality of produced feed in terms of percentage of crude protein, fibre, fat, moisture content, etc.

Strategy/process:

At present proximate analysis (DM, CP, EE, CE, ASH) are regularly done in the BRAC feed analysis laboratory. There is one veterinarian and one lab assistant is responsible for the laboratory. In some cases feed mill and/or programme organisers collect feed samples from the field through the area office and send the samples to the feed analysis laboratory. But, those who are not BRAC beneficiaries send their feed samples directly to the laboratory. In both cases the analysis is done within a week and report is sent to the respective field office/customer. With the data available from the analysis the farmer and/or feed mill can easily select/choose ingredients for their product.

Table 4: Target and achievement: BRAC feed analytical laboratory

	Target 2003	Achievement January-June 2003	Return on investment January-June 2003 is 6.04%
Tests (No)	5,160	2,324	
Profit (in Taka)	364,417	140,463	

National contribution:

Feed analysis services are available through the Government Directorate of Livestock & Science Laboratory but the service is not able to meet the total demand. BRAC Feed Analysis Lab provides analytical services to farmers and feed producers. Up to June 2003 the lab made 2,324 tests. BRAC feed analysis lab is providing its assistance to the continuous expansion of poultry industry in Bangladesh.

Constraints and future plan:

Both the quantity and quality of feed are crucial for preparing poultry-livestock feed. Any disorder results in low quality feed with low ingredients, chemicals, etc. To facilitate the feed analysis process modern machinery, constant electric supply, are necessary.

In near future BRAC feed analysis laboratory will detect mineral CQ and P, amino acid content in the feed. BRAC expects with extended facilities the farmers and other commercial feed producers will be benefited from BRAC's laboratory.

5. Fish and prawn hatchery:

Background and objective:

BRAC's fisheries programme, which includes aquaculture extension, is one of the most profitable income generating activities. The main activities of aquaculture extension include fingerling production and table size fish production. As of June 2003, there are 158,775 fish farmers, and 7,470 nursery operators. The decline in the supply of fish from open water fisheries sources coupled with the increasing demand and rate of population, results in increased dependency on aquaculture and aquaculture based fisheries. Thus there is a need for quality seed for successful aquaculture development. Moreover, Freshwater prawn aquaculture is a recent phenomenon in Bangladesh. With the growth of prawn aquaculture the demand for juvenile prawn is also increasing. The supply of wild post-larvae/juvenile prawn from coastal water is gradually decreasing. With expansion of prawn aquaculture demand for hatchery produced post-larvae (PL) and its nursing to juvenile stage is becoming an attractive way of income earning. Commercial freshwater prawn hatchery and nursery activities are also getting popular. At present the Department of Fisheries of the government owns 113 fish and 5 freshwater prawn hatcheries, and there are 783 fish and 28 prawn hatcheries under private ownership. During 2001-2002, the cumulative production of these hatcheries (govt. and private) was 276,481 Kg fish spawn.

In 1988 BRAC established its first fish hatchery in Gazipur. Over the years it has established eight more hatcheries in different corners of Bangladesh. At present three hatcheries in Gazipur, Bogra and Pabna produce both fish spawn and prawn PL. The annual production capacity of each of these hatcheries is 700-1000 Kg fish spawn and 1.3 million post larvae (PL). Four hatcheries in Jessore, Faridpur, Comilla and Barisal produce only prawn PL. The annual production capacity of each of these four hatcheries is between 1.3 to 2 million PL. BRAC has established another fish hatchery in Sreemongol and prawn hatchery in Bagerhat with an annual production capacity of 2,000 Kg fish spawn and 5 million of PL respectively. These hatcheries have started operation from year 2002. Each hatchery has a network of

nursery operators in the adjacent districts. BRAC hatcheries market prawn PL and fish spawn mostly to the nursery operators of its aquaculture extension programme and a portion to private nursery owners. Total production capacity of BRAC hatcheries is 4500 kg spawn, and about 15 million post larvae (PL).

The objectives of BRAC fish and prawn hatcheries are:

- To ensure distribution of environmentally safe and improved quality fish spawn and prawn PL to the rural people.
- To make prawn nursing and culture activities popular among the rural people to enhance their income level.

Strategy/process:

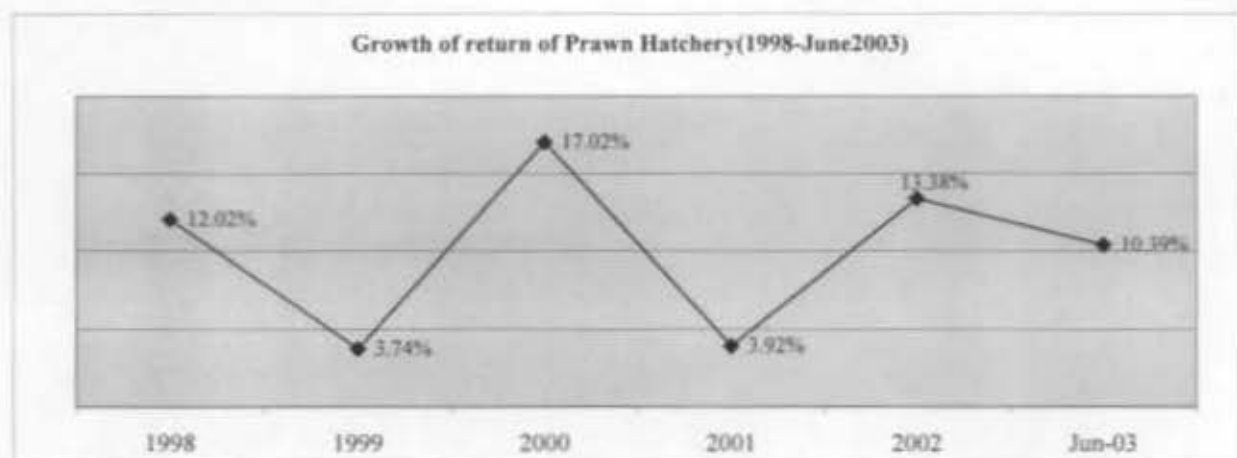
For artificial propagation, in each fish hatchery, several sets of sexually matured spawners of cultured fish species, mainly carps are selected from brood stock ponds. Sets of breeders are kept in separate concrete tanks prior to hormone injection. After the injection female and male fishes are kept together in circular spawning arenas or suitable concrete tanks with continuous flow of fresh clean water. The male fish take part in spawning immediately after the female fish start ovulation. This brings natural fertilisation of eggs for most of the carp fishes. For artificial fertilisation of eggs the spawners should be stripped immediately when they become ready for ovulation or spawning. The hatching of egg is generally completed within 20-30 hours. After 4/5 days when the spawns start swimming they are given first feeding and sale out to the nursery operators to stock in nursery ponds.

In prawn hatchery, the larvae hatched from the prawn egg need about 12ppt. of saline water for survival. After 5/6 weeks they metamorphosed to the post larvae (PL) stage and can easily adjust in the freshwater. Since it is expensive to transfer a large quantity of seawater to mainland, highly concentrated brine water (200-240ppt.) from the coastal salt-bed is taken to the inland prawn hatcheries and diluted when used. A biological filter is developed in the prawn larvae-rearing tank for re-circulation and recycles the saline water. For hatchery operation, egg bearing adult prawns are collected from river or pond and stocked in the hatching tank. When the eggs hatch out the larvae are transferred to the 12 ppt brakish water in larvae rearing tank. After 35 to 45 days the larvae become PL and are transferred to freshwater tank for acclimatisation. Just after 6-12 hours of acclimatisation the PL are ready to be sold to the prawn nursery operators.

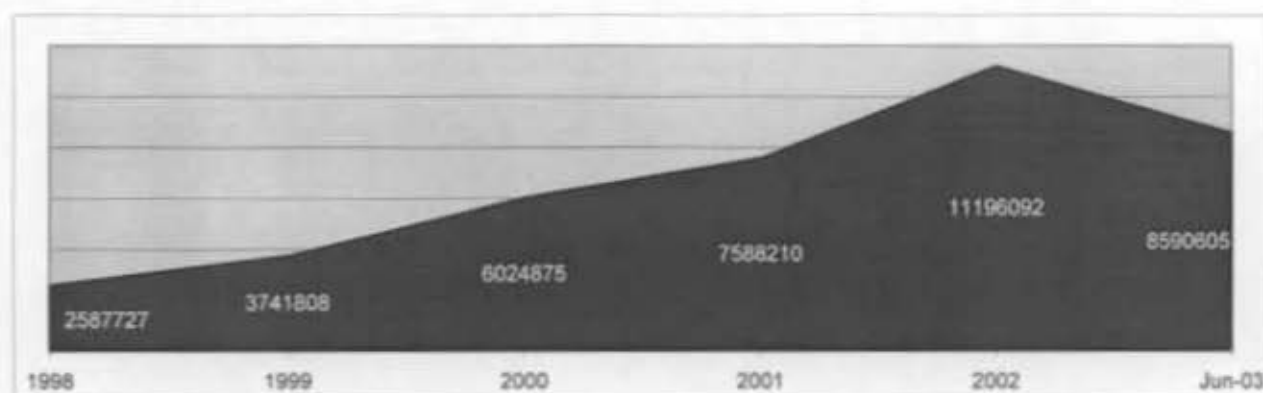
Table 5: Target and achievement: fish and prawn hatchery

	Target 2003	Achievement January-June 2003	Return on investment January-June 2003 is 10.39%.
<i>Production</i>			
- PL (in number)	14,500,000	8,590,605	
- Fish spawn (in Kg)	4,400	2,852	
-Fish/prawn (in Kg)	250,125	53,351	
Profit (in Taka)	10,054,406	7,211,466	

Graph 10: Growth of return of prawn hatchery (98-June 03)



Graph 11: PL Production of Fish & Prawn Hatchery (1998-June'03)



National contribution:

In June 2003, BRAC fish and prawn hatcheries produced about 2,852 Kg fish spawn and 8.59 million prawns PL. Even though compared to the national production level fish production is low but BRAC is now concentrating on quality. On the other hand, BRAC prawn hatcheries contributed about 65% of prawn PL over the national production.

Constraints and future plan:

Supply of quality brood stock is crucial for fish spawn and prawn PL production. There should be brood improvement centre for supplying quality brood fish and berried prawn early to the hatcheries. Price and supply of artemia (main live food for prawn PL that is imported) fluctuates each year. This has tremendous impact on prawn hatchery production. BRAC should explore possibilities of substitute feed.

BRAC's understanding is that only four fish hatcheries situated in four different corner of the country is not sufficient to cover all the geographical area where BRAC has its fisheries programme. BRAC has

started preliminary task for brood fish improvement programme in Srimongol and planning to initiate a programme for freshwater prawns in Bagerhat.

6. BRAC Nursery:

Background and objective:

Plantation is a severe problem in Bangladesh, which not only affects the children but also the adults. The main reasons are poverty and lack of knowledge. In Bangladesh, both the timber and fruit trees are inadequate to meet the demand. It has only 6-7% of its total area under tree coverage. Over exploitation of cultivable lands has declined the wood and fruits production. The availability of fruit is about 35gm per head per day, which is just half of the daily requirement. At present only 13.97 kg fruits are available per head per annum. In 1950 the figure was 30 kg. In order to meet the increasing demand for good quality seedlings BRAC initiated a nursery programme in 1995-1996. In the early years fruit plants like mango, litchi and lemon were the main items. Over the years BRAC has established 24 nurseries producing seedlings of almost all kinds/types of fruit, timber and ornamental plants available in Bangladesh. These nurseries are located in different parts of the country so that seedlings can be easily distributed even in the remote areas. BRAC has also set up six green houses (inside the nurseries) to produce plants throughout the year.

BRAC nurseries started with the objective to produce good quality grafted fruit and timber seedlings and make these seedlings available to the rural people. The programme also motivates and helps the poor people in planting trees for good economic return from selling products i.e. different types of fruits and timber.

Strategy/process:

In a nursery seedlings or other propagating units are produced and nourished for plantation. Generally, fruit seedlings are produced through asexual propagation and timber seedlings are produced through seed origin. For asexual propagation the following methods are applied:

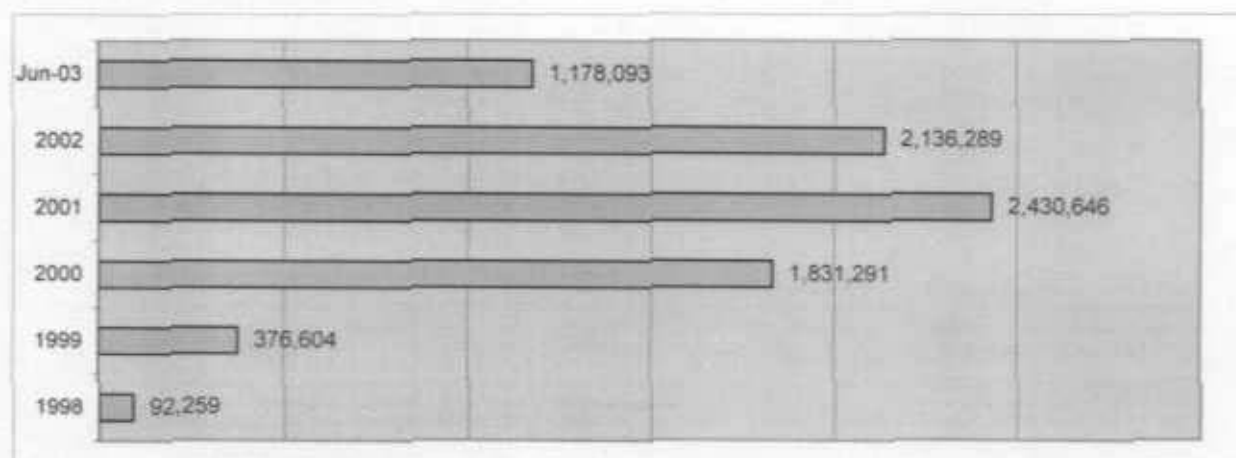
- a) Grafting
- b) Budding
- c) Air layering
- d) Cuttings

Scions and cuttings are collected from government horticulture centres (Chapainawabganj and Meherpur) and other sources located in the country. BRAC has also established "Mother tree preservation centre" in Manikganj, Magura, Nilphamari, Thakurgaon and Dinajpur districts. These centres are used for variety screening, experimentation, demonstration and further propagation of multiplication. BRAC took the initiative to observe the performance and propagation by planting different varieties of species. BRAC also established a number of fruit orchard by organising local people to increase the fruit production.

Table 6: Target and achievement: BRAC nursery

	Target 2003	Achievement January-June 2003	Return on investment January-June 2003 is 6%
Seedling (in number)	1,907,186	1,178,093	
Profit (in Taka)	6,001,061	4,480,775	

Graph 12: Year wise seedling production of nursery (98-June 03)



National contribution:

About 3.5 million productive mango trees are available in Bangladesh. In addition, BRAC has distributed 1.78 million mango seedlings during last few years. It should be mention that BRAC has made popular Amrapalli mango plant in this country and distributed about 1.40 million seedlings so far.

Constraints and future plan:

General people often lack the scientific/modern technical knowledge of plantation techniques required for different species. Rural people needs to be motivated to plant trees, especially those species which are not common to them. Compared to other support enterprises the initial investment is high in the nursery programme. Also, selected seedling of one's choice is not always available. In the rural areas security of orchard and product is very limited. Moreover, natural calamities affect the production. BRAC is giving emphasis on improved quality of sapling as well as new varieties to be supplied to the people. Two nurseries will be established in Chittagong and Sylhet in near future. The programme has created enthusiasm among the people and the demand for quality seedlings is increasing day by day.

7. Tissue culture laboratory:

Background and objective:

The shortage of high quality seed/seedlings and tubers is one of the major constraints in increasing the productivity of agriculture sector in Bangladesh. Only 5% of seed available to farmers is produced under controlled condition to ensure high quality. Majority use seed produced by indigenous methods without having any connection to modern technology. Therefore, seeds produced in this way hardly ensure high

yield and disease free varieties. In Bangladesh a large part of the demand for high yield variety is met through imports, and a vast market exists for cheap, high quality, locally adaptable seeds/seedlings and tubers.

BRAC's objective behind establishing a tissue culture laboratory is to capture a substantial portion of the seed and tuber market and empower the poor farmers by increasing their productivity and income.

Strategy/process:

Plant tissue culture is the method of rapid plant propagation under controlled disease free condition. Initially, a group of cells are taken from a donor plant, surface sterilized and placed in an artificial medium containing all the prerequisites for plant growth. In the controlled environment of a laboratory growth of the culture is directed towards the production of a large number of true to the type shoots which can either be rooted in vitro in sterile medium or established in rooting plugs and potting mixture inside a green house. In 1997 BRAC set-up a small tissue culture laboratory in Dhaka to test the potential of this method in increase the quality of agricultural inputs through the use of disease free tubers and seedlings. Two years of experimentation and observation have shown that the tissue culture is quite promising. Based on the success of the tissue culture lab and the continued national demand for high quality, disease free potato tubers and banana plantlets, BRAC has set up a new tissue culture facility at Gazipur. The laboratory is staffed by qualified professionals and equipped with high-tech machineries. This facility has a laboratory with a total area of 5,000 sft, four green houses- (3,000 sft/each), automatic shading, fogging and irrigation systems and movable benches for plantlet hardening. The laboratory has three US class growth rooms. Each room can accommodate 20,000 culture bottles at a time. The media kitchen facility can prepare 2,000 bottles a day. Beside potato and banana other protocols such as bamboo, ornamental plants of different varieties are at the development stage.

BRAC expects this lab to have qualitative and quantitative improvement in the country's agricultural sector and work towards ensuring food-security. The lab will contribute in poverty alleviation by promoting productivity and employment generation.

National contribution:

Following the increasing demand for high quality, disease free potato tubers and banana plantlets, BRAC Tissue Culture Laboratory is going to produce 15kg micro potato tubers in the year 2003.

Constraints and future plan:

Tissue culture programme faced some problems like-

- Shortage of skilled manpower.
- Shortage of books and journals.
- Insufficient permanent land for planting micro-tubers and plantlets, and
- Lack of cold storage facilities for minituber, pre-foundation and foundation seed potato.

In spite of these shortcomings, tissue culture lab has some planning for the future.

Plannings of the programme are:

- To increase the production of micro-tuber 100-120 kg to produce 10,000 MT certified potato seeds in each year.
- To produce 5,00,000 banana plantlets and 2,00,000 ornamental plantlets annually.
- To develop micro-propagation of bamboo and medicinal plants.
- To establish a "Gene Plasma Centre" for collecting live plants.

- Development of Polymerise Chain Reaction (PCR) based molecular marker technique and genetic engineering in the near future.
- DNA finger printing of different species of horticultural and other crops.

8. Seed production:

Background and objectives:

The shortage of high quality seed is one of the major constraints in increasing the productivity of agriculture product in Bangladesh. Only 4.5% of the seed available to the farmers is produced in controlled condition to ensure high quality. A major portion of these seeds is produced without using any modern technology to ensure high yield and disease free varieties. BRAC used to purchase seeds from different private companies at home and abroad and supplied to the farmers at the rural areas. But, problem like poor packaging, low quality, high price and distribution problems started to arise. Therefore, in 1996 BRAC started producing high quality seed with an aim to provide these seeds to the farmers. So far the programme has produced a wide variety of certified high quality seed. In this process, BRAC's first production was hybrid vegetable seed in 1996 followed by and hybrid maize seeds in 1997 and rice, onion, seeds in 1998, pulse and oil crop seed in 1999, and hybrid rice seed in 2000.

The objectives of seed production programme are:

- Provide high quality seed to BRAC farmers and small/marginal farmers.
- Increase agricultural productivity for enhancing national economy.

Strategy/process:

Based on the annual survey on the needs of the group members and small marginal farmers obtains breeder seeds from the Bangladesh Rice Research Institute (BRRI), Bangladesh Institute of Nuclear Agriculture (BINA), Bangladesh Agricultural Research Institute (BARI), and Bangladesh Agricultural Development Corporation (BADC). These breed seeds are multiplied at BRAC's seed production centres. At present BRAC has eight seed production centres. These processed seeds are called foundation seeds. The foundation seed is developed by a number of trained seed technologists. The foundation seed is distributed to the contact seed growers and after harvest farmers take the seeds to the nearest seed production centre. Some sample of seeds is sending to any of BRAC's two seed processing centres in Sherpur, Bogra and Sreepur, Gazipur for the laboratory test of germination. When these seeds are qualified then tested seeds are purchased from the contact growers and send to the processing unit for clearing, drying and for final grading. The entire quantity of cleaned and processed seeds are procured in the two seed processing centres and distributed to the farmers.

In addition to the seed production centres, BRAC maintains a research and development farm that is used as a research station for developing and testing new varieties as well as experimenting with new techniques to increase the quality of crops. Hybrid seeds from various international seed companies are tested for adaptability and disease factors. If these seeds are found to be satisfactory they become a part of the seed production programme and is supplied to the farmers.

Table 7: Target and achievement: seed production center

	Target October '02- September '03	Achievement January-June 2003
Seeds (in MT)	3,172	1,529
Profit/(Loss) (in Taka)	8,596,878	(126,109)

National contribution:

Annual supply of Seed Production Centres are 1200-1400 MT HYV rice seed, 250 MT hybrid rice, 250 MT vegetable and 3000 MT potato commercial seeds. Out of this, in year 2000, BRAC supplied 1,722 MT HYV rice seed, 350 MT hybrid maize seed, and 335 MT vegetable seeds through its own seed production programme.

Constraints and future plan:

BRAC has completed necessary arrangements where rice and vegetable seeds will be produced in collaboration with Hejia Industry Group Company and Hefei Fengle Seed Company of China. Beside this, to increase and enhance training and technical support at the grass root level BRAC has taken step to build strong linkage with Department of Agriculture Extension and others related department of the government. BRAC has experienced that production of high value crops can encourage the participants if they are provided with necessary support and inputs and information on market price and outlets. BRAC has established a hybrid rice seed production centre in Bhaluka (Mymensing) with the capacity of 30MT/season and planning to increase its capacity.

In a year BRAC will establish a germplasm centre to ensure seed preservation. A laboratory will be set up to identify unknown diseases and to take appropriate action. BRAC is going to produce hybrid rice and vegetable seeds in next few years. To ensure seed quality BRAC will renovate its infrastructure facility and develop its staff through national and international exposures.

9. Soil testing:

Background and objectives:

In Bangladesh soil is predominantly alluvial. Of the total land areas of 13 million hector some 9.6 million hector is cultivable. Rice is the main crop accounts for some 75% of the cropped area. Introduction of HYV crops, development of irrigation facilities and the use of mineral fertiliser helped in raising crop production. However, the productivity of land in the country is declining fast because of disproportionate use of fertiliser, increased use of chemical fertiliser, poor fertiliser management, declining level of organic matter in the soil and problem in the supply and quality of various micronutrients such as S, Zn, B. The deficiencies of these components limit the effect of application of N, P, and K fertilisers.

In Bangladesh for improving and maintaining soil level one crucial aspect is fertiliser management and usages. For this a system is needed to link the result of soil testing and discuss with the farmers about soil fertility management.

The objectives of soil testing are

- To adopt better fertiliser management and practice of the farmers.
- To make the farmers aware of the need for balanced fertility management and crop-relation.

- To introduce improved soil testing methods.
- Reducing the risk of environmental pollution from excessive use of fertiliser and pesticide.

Strategy/process:

At present only a limited number of institutes and organisations are offering soil-testing facilities. Soil Resource Development Institute (SRDI) is the largest one to provide this service. Soil Science Department of BRRJ, Bangladesh Agricultural University and Dhaka University also have limited capacities. Among the development organisations, BRAC is the only one to establish a soil-testing laboratory at Gazipur. One soil fertility specialist and laboratory assistant is responsible for soil analysis. But the soil samples are collected by BRAC's agronomist/programme organisers at the filed level and sent to Gazipur laboratory. Within a week these samples are analysed and report is sent the respective farmer through BRAC area office. With soil analysis data for a particular plot, a farmer can easily select appropriate amount of fertiliser for the target yield of a particular crop.

From January-June 2003, the BRAC's soil testing laboratory analysed 518 number of soil samples. Compared with SRDI soil laboratory BRAC's performance is good. The most important thing is that BRAC is covering the areas that are not covered by the government services.

Table 8: Target and achievement: soil analysis laboratory

	Target 2003	Achievement January-June 2003
Test (in number)	4,900	518

National contribution:

Still there is no available data how much soil sample has been analysed in Bangladesh, and SRDI is the only govt. institute who analyse soil sample. In the year 2000 the SRDI has planed to analyse 25,000 samples. On the other hand, BRAC analysed 1,034.

Constraints and future plan:

There are 16 types of soil tests in BRAC Soil analytical laboratory. The nutrient status of plant by testing leaves will be introduced within a short period of time. At present, BRAC gives the emphasis fully on chemical analysis, but have a plan to analyse soil feature and structure through different types of testing. Besides these BRAC has a plan to start the fertiliser analysis. Most of our farmers are not aware of the use of fertiliser, because of such they do not get the maximum output. BRAC took the programme to make aware of the quality of soil, choose appropriate fertiliser and its proper utilisation by the farmers.

10. Seed processing:

Background and objectives:

BRAC has started seed production from 1996 and the amount of seed production is increasing day by day. At the beginning of seed production BRAC processed its own seed from BADC processing centre. BRAC faced two problems while processing seed from BADC:

- Seed processing from BADC was not timely because BADC processed BRAC seeds after processing their own seeds.
- Transport and processing cost was high.

For these reasons BRAC established processing centres at Bogra and Sreepur (Gazipur).

The objectives of BRAC seed processing are:

- To ensure quality seeds.
- To ensure timely seed processing.
- To minimize processing cost.
- To strengthen seed wing of BRAC.
- To create employment opportunity, especially for women.

Strategy/Process

BRAC produce foundation seeds in their own farm and certified seeds are produce in contact growers land through the close supervision of BRAC seed technologists. After purchase the certified seeds in seed production centre these sample of seeds are then send to the BRAC two seed-processing centre for the laboratory test of germination, moisture contents, purity test etc. After this processing centres collect all qualified seed for storing and processing. As per need of the processing centre they are drying, grading, processing, hand cleaning etc. has been done for final packing. Before packaging they check again germination and moisture contents of the seeds and maintain all information & documents. Before package proper authority will approve seeds. The package seeds are then ready for marketing. As per allocation of the marketing programme then these seeds are taken distribute to their marketing centres.

National level contribution

In Bangladesh BADC is the only sector processed the seed. In private sector BRAC is the only institute to process any type of seed.

Table 9: Target and achievement: seed processing centres

	Target 2003	Achievement January-June 2003
Processed seed (in MT)	2,097	132
Profit (in Taka)	2,531,516	(31,317)

Constraints and future plan:

Many farmers who were concerned about BRAC's dependency on private company for seed supply started showing interest and satisfaction with BRAC seed. At present BRAC is producing and supplying quality seeds to the farmers timely which is building their reliability on BRAC. Increased income of the contact growers by seed production is encouraging the general farmers to do the same.

BRAC is going to produce hybrid rice and vegetable seeds in next few years. To ensure seed quality BRAC will renovate its infrastructure facility and develop its staff through national and international exposures.

11. Seed Marketing

In 1996-97 the programme has been started with the distribution of seeds produced by BRAC Seed Production Programme. At that time seeds are distributed or sold by the extension programme of Rural development programme. At the year 2000, the programme has started its commercial selling through 20 depots. Through these 20 depots in different parts of Bangladesh the programme distributes different types of seeds to the farmers. BRAC has set up another 30 depots in different parts of Bangladesh in 2003, so that the rural farmers can avail seeds with minimum cost and effort. The depots provide the high quality seeds from BRAC's Seed Production Programme as well as the exotic seeds purchased from the foreign seed companies to assist in increasing agricultural production and rural employment generation. In each depot, a sales officer coordinates the seed dealers to sell the seeds on time. Dealers sell the seed to whole-sellers and the retailers get seeds from the whole-sellers. Almost 100 varieties of high yield seeds are sold with this programme. Ensuring quality is the main concentration of this programme. Germination test is one of the criteria of maintaining/checking the quality. The programme is also regularly broadcasting radio talks, TV commercials, advertisements through billboards, signboards, posters, calendars, wall paintings etc. to promote the high quality seeds in the name of 'Sufala Seed'. Total investment of the programme up to June 2003, is Tk.175million. Net profit of the programme January-June 2003 is Tk.84million.

12. Salt Production & Marketing

Background/Objectives:

BRAC has rent a salt industry in January 2000 at Cox'sbazar with the capacity of 300MT/month as experimental basis. From the market survey, it has been revealed that there is a high demand of iodized salt. Based on the demand, BRAC has established its own iodized salt processing plant at Islampur, Cox'sbazar in 2001-2002. When the plant was established it was able to produce 900-1000MT/month iodized salt. In the year 2003, another two industries has been rent. The programme is producing about 2000MT salt per month.

Main objectives of the programme are-

- To address the health needs of the population
- To meet up the demand of refined iodized salt
- Generate more employment opportunities.

Strategy/Process:

Raw salt the main ingredient of iodized salt was produced by BRAC at first stage. It was costly to produce raw salt rather purchasing. Considering the situation the programme started to by the same. Raw salt are washed and crushed with automatic machine. Mixing of iodine is another process. After washing, crushing and mixing of iodine, finished salt are packed manually and transferred to 50 depots. 50 depots at different corner of Bangladesh market these packet salts. In each depot, a sales officer coordinates the salt dealers to sell the salt on time. Price of salt is determined comparing the market price.

Constraints and Future Plan:

Seasonal availability and upward price trend of raw salt is the main constraint of the programme. It has been seen that there is a large gap between demand and supply of iodized salt. Much of the salt that is available in the market are not properly iodized and due to the unhygienic processes through which they

are made are not ideally suited for human consumption. Considering the demand BRAC is going to establish a refining iodized salt plant. It will be the first and the largest salt refining plant of Bangladesh.

BRAC Refining Iodized Salt plant will be set up at Kanchan, Rugganj, Narayanganj. Production capacity of the plant is expecting 48,545 Mt iodized salt per year. Estimated fixed investment of the plant is about 57.2 million and working capital is 72.74 million. Total investment therefore comes to 129.93 million. Construction and erection work of the plant is expected to start by the end of September 2003. The plant is expecting to start its operation from October 2004. Total Process i.e. washing, crushing, mixing of iodine and packing will be with machine in a hygienic method. The plant will contribute the whole nation by providing refined hygienic salt.

13. Poultry disease diagnosis lab

Background and objectives:

To increase the availability of quality chicks BRAC has established six poultry farms around the country. To support BRAC poultry programme participants and other poultry rearers with services to detect various poultry disease and their treatment BRAC set up one Poultry Disease Diagnostic Lab in June 1999. This laboratory was established with an objective to support poultry farmers in diagnosis, treatment and eradication of poultry diseases.

Strategy/Process:

The laboratory employs two veterinarians and keeps collaboration with experts both from home and abroad. It introduces new tests to serve people better. The laboratory provides the following services:

- ELISA and HA-HI test to detect titter level
- Germ culture from bird, water and feed to detect specific bacteria and fungus that cause diseases.
- Drug sensitivity test to assists in selection of appropriate treatment.
- Rapid Serum Plate Agglutination Test (RSPAT) to confirm Salmonellosis and Mycoplasmosis.
- Post-mortem facilities.
- Presence of Aflatoxin in feed is detected.

Table 10: Target and achievement: poultry disease diagnosis laboratory

	Target 2003	Achievement January-June 2003	Return on investment January-June 2003 is 3.44%
Tests (in number)			
ELISA	386	294	
PM	2,174	1,023	
Culture	625	699	
CS	150	47	
RSPAT	1,925	2,353	
AFLATOXIN	350	73	
Others	185	29	
Profit (in Taka)	137,902	96,120	

National Level Contribution:

There is a few number of diagnostic centre for poultry disease diagnosis. BRAC Poultry Disease Diagnosis Laboratory works as a milestone in private sector. 60% of total Poultry farms in Bangladesh are situated in Gazipur and surrounding areas. The lab helps them not only in disease diagnosis but also provide consultancy about poultry management and disease control.

Constraints and future plan:

- It is difficult to manage the wastage of the laboratory.
- Most of the equipments of the laboratory are imported and expensive, so testing costs become higher than local market.
- Used chemicals are also expensive and imported.
- General people are not much aware about the diagnosis of poultry disease.

14. Maize Store and Marketing Project

With the highest yield potentiality maize is the third serial crop in Bangladesh after paddy and wheat. Maize can be cultivated throughout the year and be accommodated with other crops. It has versatile uses: human foods, animal feed and fodder, fuel for domestic use and raw materials for different industries. Although maize has limited use as human consumption in Bangladesh, its demand for making poultry-dairy feed is increasing remarkably. The total yearly demand for maize is about 1,050,000 MT. As in the private sector poultry farms are increasing in Bangladesh, the demand for maize, as poultry feed is also increasing gradually. BRAC initiated maize cultivation activities in 1992 in Rajshahi.

At the initial stage BRAC assured the marketing of production by purchasing maize grain at reasonable price. The rate is fixed through a cost analysis of maize grain production. The objective is to provide supports to the maize growers, so that the opportunity for higher price for them can be created. The growers can sell their product in the open market if they get higher price than BRAC or they can also sell it to BRAC. This entirely depends on the farmer's option. BRAC sales the maize grain to the BRAC poultry feed mills for quality production of poultry feed. BRAC promotes maize cultivation mainly as poultry feed in rural area. BRAC has installed these poultry feed mill where maize grain is used and sold to poultry rearers. The estimated need for maize grain for BRAC poultry programme is about 20,000-25,000 MT.

Table 11: Target and achievement: maize production and sales centre

	Target 2003	Achievement January-June 2003
Profit (in Taka)	2,032,234	589,615

Constraints and future plan:

Despite its potential maize faces several constraints, which impede expansion of its production at farm level. Some of these include:

- Technology transfer mechanism
- Availability of good quality seeds
- Post harvest technology
- The maize marketing system

- Price policy
- Acceptance of maize as human food in Bangladesh.
- Lack of linkage between producers and govt. marketing system.

To increase maize production in Bangladesh a strategy needs to be undertaken to integrate production, marketing, processing, and consumption and utilisation system.

- Policy decision
- Production process
- Extension approach
- Hybrid seed
- Storage facilities
- Credit
- Price support
- Procurement policy
- Maize based industry
- Technology transfer media

15. Feed Marketing

Successful poultry programme depends on the availability of balanced feed. Considering the needs of balanced feed BRAC established two feed mills one in Manikganj and another in Nilphamari in 1996. production capacity of these two mills is together 12000MT/per year. In 2000 BRAC established another mill with 30,000MT/year at Sreepur, Gazipur. In the same year the commercial marketing of balanced poultry feed also started. There were 20 depots in different region for selling feeds through dealers. A sales officer in each depot coordinates the total marketing system. In the early 2003 BRAC increased another 30 depots in different districts to distribute the poultry feeds. Through this programme about 20 types of poultry feeds are selling. TV commercials, advertisements through billboards, posters, calendars etc. are the method used to promote the sale of high quality feed in the name of "Surma Poultry Feed". Total investment of the programme up to June 2003 is taka 83 million. The programme earned (January-June 2003) net profit of taka 3.83 million.

17. Potato Seeds Production And Sales

Although potato is cultivated in Bangladesh as vegetables Bangladesh Agriculture Development Corporation (BADC) accounting for only 5% of the total demand only produces its certified seeds. The average yield of potato in Bangladesh is only 11.4 tones per hectare due to degeneration diseases of potato and using farmer's saved seeds. While BRAC is well known in producing disease free plant propagules through tissue culture, the potato seed multiplication programme has started in 1998-1999 to help the farmers in increasing their potato yield and consequently the farm income. Through this programme, farmers will have access to get the disease free high yield potential seeds of potato to cultivate not only for local consumption but also for international market. During the year of 2002-2003, it has multiplied 2849 MT of high quality seed potato where the source seeds were micro tubers from BRAC tissue culture.

18. Chilling plant

Background and objectives:

Bangladesh produces only 13.58% of milk of the total demand. The country has to import milk which cost about 300 crore taka each year. To meet the increasing demand of milk BRAC's Rural Development Programme started a livestock programme in 1984. This programme soon observed that even though the

programme contributed in increasing milk production but the livestock rearers were not getting fair price. Moreover, middlemen often exploit the situation. Therefore, to ensure a fair price of milk for rural producers BRAC in 1998 established a dairy plant. Under this project seventeen chilling plants were set up in different milk pockets of the country. Six of these chilling plants are operated in supervision of BRAC Development Programme (BDP). BRAC provides loan to the rearer of the milk producer organisation to buy cows and they get veterinary service, and de-worming and cattle vaccine free of cost. They also get grass seed at a very low price to cultivate grass for their cows.

The objectives of establishing plant are to:

- Develop dairy sector
- Increase milk production in the rural areas
- Ensure proper milk marketing
- Meet up the nutritional status of the rural poor.

Strategy/process

In 2000, based on a survey result, BDP established six chilling plants in Shibgonj (Bogra), Kalai, Pachbibi (Joypurhat), Birampur, Birgonj, and Bochagonj (Dinajpur). The capacity of milk collection and processing is 2,000 litre/day. The capacity of the Pachbibi chilling plant has been increased to 4,000 litre/day from April 2001. Each of the chilling plant has 25 milk producer organisations with 40 members in each organisation. Each of the organisations has one milk collector. All the rearers bring their milk to the milk collection point at 10-11 in the morning and at 4-5 in the afternoon. The milk collector collects this milk and brings to the chilling plant. In the chilling plant fat test is done and then price is paid to the milk producers accordingly. Milk is then processed in the chilling plant and sends to BRAC dairy plant in Gazipur. BRAC dairy development is working to achieve some specific objective as follows:

- Ensure veterinary service to cow rearers
- Ensure de-worming and vaccination
- Providing loan to purchase cows
- Ensuring purchase of hi-breed verity cows
- In every fifteen days the milk producers are meeting to discuss and learn about modern dairy development
- Rearers are being advised on grass cultivation and Napier grass cutting is distributed to them at fee of cost. Besides, grass seed is supplied at half of the real price.
- Giving emphasis on the artificial insemination programme for breed development
- They are purchasing BRAC produced granule livestock feed.

Table 12: Target and achievement: Chilling plant

	Target 2003	Achievement January-June 2003	Return on investment January- June 2003 is 6%
Milk (in litre)	5,490,000	2,105,386	
Profit (in Taka)	2,511,658	1,066,902	

National contribution:

- BRAC dairy is meeting the overall demand of milk in the country by producing 45,000 -50,000 litre milk per day. Of this amount 12,000-15000 litre are supplied to BDP chilling plants (six nos.)
- It is helping to increase the nutritional status through producing milk.

- This is creating income and employment scope for the rural poor-destitute women and ultimately contributing in the economy of the country.

Constraints and future plan

Even though six chilling plants under BDP collect 12,000 -15,000 litres milk per day, but BDFP is not able to take this amount of milk. If the capacity of BDFP could be raised then more chilling plants could be established in northern Bangladesh.

List of Books and Reports given to Accounts Dept.

Sl.No	Particulars	Author/Organization
1.	Cost Study-Series 7 Reaching the Extreme Poor with Credit Service: The Income Generation for Vulnerable Group Development (IGVD) Programme of the Bangladesh Rural Advancement Committee (BRAC)	Dewan A. H. Alamgir
2.	Chara Ropon o Poroborti Porichorja BRAC Krishi o Shamajic Bonayon Shomprosharon Kormochuchi- July 2001	Guide Book
3.	BRAC Progress Report on Poultry and Livestock Programme (RDP,IGVD & SLDP) Up to June 1994	Progress Report
4.	Poultry Programme	Report
5.	Khudro Krishokder Jonno Gobadiposhu Unnoyon Kormoshuchi (SLDP) Kormoshuchi Babosthapon Manual January-1994	Manual
6.	THIRD MISSION REPORT PHASE-IV SMALLHOLDER LIVESTOCK DEVELOPMENT PROJECT BANGLADESH Socio-Economic Impact Survey, January-1996	DARUDEC
7.	Proposal for BRAC Dairy Project, April-1995	Proposal
8.	Investigation on the Strategy and Impact of Artificial Insemination Programme and Performance of Crossbred Cattle in Bangladesh Animal Production Research Division Bangladesh Livestock Research Institute, Savar Dhaka-1341	Dr.M.A. Majid Mrs. T.N. Nahar DR. K.M. Hossain Mr. A.I. Talukder
9.	BRAC's Poultry and Livestock Programme	Poultry Report
10.	POULTRY IMPROVEMENT IN RURAL AREAS OF DEVELOPMENT COUNTRIES: MATCHING TECHNICAL DEMANDS WITH SOCIAL FACTS K. Ter Horst, Project Manager of Netherlands Assisted Poultry Improvement Project. Department of Livestock Services (Poultry), Ministry of Livestock and Fisheries, Bangladesh	
11.	BRAC's Fisheries Programme	Report on Fisheries
12.	BRAC Agriculture Programme	Report on Agriculture
13.	Livestock as a tool in Poverty Alleviation Role of BRAC in Livestock Development in Bangladesh	Md. A. Saleque
14.	BRAC-RDP Sector Programme GuideLine	Guideline
15.	Suponno Mohila porichalito mudir dokan porichalona o babosthapon bishoiyok nirdeshika, July-1994	Manual
16.	Dustho Mohila eie briddhi shohayok kormochuchi (IGVD) Di-barshik Orogoti July'90-June'92	Progress Report
17.	PHASE ENDING REPORT INCOME GENERATION FOR VULNERABLE GROUP DEVELOPMENT 1994-1996	Report
18.	BRAC's Poultry Programme	Report on Poultry
19.	Income Generation for Vulnerable Group Development (IGVD) December 1991	
20.	1997 Financial Review BRAC RDP/RCP Programme Shorebank Advisory Services December 10, 1997	Brian Kelley Lynn Pikhitz