

Analytical Documentation of the Artificial Insemination Programme of BRAC

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ACRONYMS

AD	Assistant Director
AI	Artificial Insemination
AM	Area Manager
BAU	Bangladesh Agricultural University
BBS	Bangladesh Bureau of Statistics
CCA	Central Container Area
CR	Conception Rate
DD	Deputy Director
DLO	District Livestock Officer
DLS	Department of Livestock Service
DSS	Divisional Sector Specialist
FA	Field Assistant
GO	Government Organization
HO	Head Office
IAEA	International Agricultural Exchange Association
PO	Programme Organizer
PSE	Programme Support Enterprise
RM	Regional Manager
RSS	Regional Sector Specialist
SO	Scientific Officer
SSC	Secondary School Certificate
TM	Technical Manager
ULO	Upazila Livestock Officer
VO	Village Organization

ABSTRACT

This paper intends to have feedback of the stakeholders of BRAC artificial insemination (AI) programme that could be useful for the programme. The findings show that implementers have to compete with other service providers in discriminatory manner. Unfair price war, violation of bilateral deal and of existing breeding policy by the government have been identified as the major challenges of BRAC for transferring the AI technology to the beneficiaries. Organizational and academic recognition are the main drivers of the AI volunteers to work for BRAC as social entrepreneur to enhance their social and economic status. Despite having challenges, BRAC has been performing well compared to government and other service providers in the AI market due to high conception rate, skill AI workers, doorstep service, close monitoring, and strict management. However the extent of challenges of BRAC may be explored further all over the operating areas to take necessary measures by the programme for sustainability.

EXECUTIVE SUMMARY

Livestock, especially dairy cattle improvement, is a crying need for Bangladesh. Bangladesh is rich in livestock number but poor in productivity of dairy cattle in terms of milk and meat. Prevalence of poor quality species and non-descriptive cattle is the main cause of low productivity. Despite taking many initiatives i.e. central cattle breeding station, artificial insemination (AI) programme, etc. by the Department of Livestock Service (DLS) of the government of Bangladesh, no descriptive breed has been developed. DLS started artificial insemination for dairy cattle improvement in the 1960s. Up to 1996, BRAC worked in collaboration with DLS for a decade for artificial insemination. But this partnership discontinued due to mismanagement, non-cooperation of DLS, and lack of control over AI volunteers by BRAC.

With the lessons learned from the government, BRAC started its AI programme in 2000. Now it is working in 61 districts through 777 AI workers. The programme implementers may face some challenges in transferring the AI technology, especially in rural areas of Bangladesh. The objective of this study is to document the working process of BRAC AI programme and to find out the challenges or bottlenecks of transferring AI technology in the rural areas. Qualitative data on different aspects were collected during December 2005 to January 2006 from five districts namely Mymensingh, Comilla, Chittagong, Kushtia and Pabna. The AI workers and the beneficiaries were consulted from all districts except Chittagong while Regional Sector Specialists (RSS) of BRAC were interviewed/consulted from each district.

In consultation with the AI workers, who are the key implementers of the programme, and the primary stakeholders i.e. the beneficiaries a blend of feedback was found in terms of technology transfer and its ultimate results about the AI technology. The major challenges are the violation of bilateral deal by the government, discriminatory price between DLS and BRAC, and quality of calves to some extent. The minor challenges are unmet regional demand for different varieties of bull semen, commercial natural insemination farms and lack of awareness of the beneficiaries about the future potential of AI in rural areas.

Despite all these challenges BRAC survives in the AI market due to some favourable factors. These factors are high conception rate (i.e. 61.5%, DLS approved), doorstep AI service, and availability of AI workers, having frozen Black Bengal goat semen, skill AI workers, and strict management.

The policy demand of the AI workers comprise of improving semen quality especially blood level, supplying different varieties of bull semen, ensuring adequate hand gloves, increasing acceptability rate of repeat case, reducing price of semen to AI workers, repaying traveling allowance on time, providing credit and financial incentives, arranging cattle fairs, and reducing overlapping of the AI workers in a given area.

The AI workers unequivocally conceded that after joining BRAC, they got an organizational platform and academic recognition to work confidently in their locality. They are known as '*Gramma poshu chikithshok*' (rural veterinary doctor). Their social and economic status has been increased in the society over time.

The beneficiaries are mainly smallholders having 2-4 cattle and involved in agricultural occupation. The beneficiaries seek different varieties of bull semen depending on prevailing market demand for those products. For instance, demand for Holstein Frisian bull semen is high in Sirajganj and Pabna as milk pockets of Bangladesh whereas demand for Sahiwal bull semen is high in Kushtia and Narsingdi where beef fattening is a popular business.

The challenges and policy demand of AI workers need to be explored more all over the operating areas to see the severity of these issues to take necessary steps by the programme for sustainability in the AI market.

INTRODUCTION

Up to 1996, BRAC worked in collaboration with the Department of Livestock Service (DLS) of the government of Bangladesh for a decade on artificial insemination (AI) programme. But this partnership discontinued due to mismanagement, non-cooperation of DLS, and lack of control over AI volunteers by BRAC. With this experience, BRAC initiated AI programme through establishing a bull station in Mymensingh in 2000. Now it has a backward linkage for supplying frozen semen and a forward linkage for implementing the programme throughout the country. It works in all the districts of Bangladesh except the hill tracts. BRAC basically works in remote areas for providing doorstep service. The AI workers are mobilised from their respective areas. BRAC and DLS are the key players in the AI market who target all customers whereas Milk Vita targets only their cooperative members. BRAC launched Black Bengal goat semen in December 2005, which is a breakthrough for development of non-descriptive domestic goat in Bangladesh. The objective of this study is to document the working process of BRAC AI programme and find out the challenges of transferring this technology to the potential beneficiaries and finally to formulate future research agenda based on findings. Table 1 shows some features of BRAC AI programme.

Table 1. Features of BRAC AI programme

Year of establishment of bull station	2000
Number of production center	01
Number of bulls kept for semen production	20
Form of semen used for AI	Frozen
Annual capacity of semen production (in lac doses)	5-6
Annual production of semen doses (in lac)	2
Annual demand for semen doses (in lac)	2
Utilization of production capacity	30%
Price of semen dose (Tk/service)	100
Number of cow inseminated during 2001-05	527,578
Number of calf born during 2001-05	345,642
Conception rate (DLS approved)	61.5%
Number of families served during 2001-05 (estimated in lac)	2
Number of AI workers/volunteers received training	940
Number of AI workers/volunteers working	777
Number of regional sector specialist	22
Number of <i>upazila</i> covered	410
Number of district covered	61
Total number of BRAC area offices operating AI programme	464

Source: Primary data from BRAC head office, December 2005

METHODOLOGY

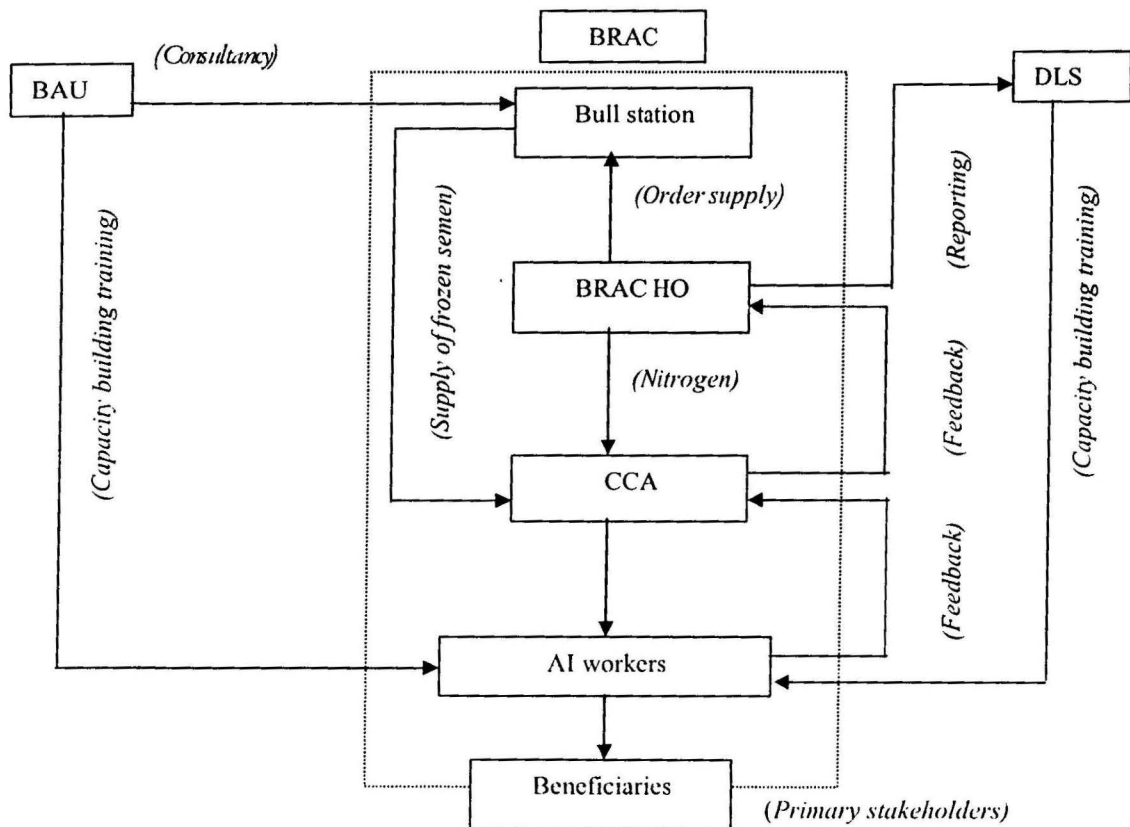
Stakeholder analysis method was followed to collect the qualitative information on BRAC AI programme. The stakeholders, directly or indirectly involved with the BRAC AI programme, were identified first. Then they were categorized into four groups i.e. Bangladesh Agricultural University (BAU), Department of Livestock Service (DLS), BRAC, and the beneficiaries. BRAC includes Technical Manager (TM), Regional Sector Specialists (RSS), and AI workers who work at top level, mid level and field level respectively. Respondents from each of these categories were consulted about their involvement with the BRAC AI programme as well as their feedback on AI technology. The study areas were Mymensingh, Comilla, Kushtia, Pabna, and Chittagong districts. These areas were chosen to have information from both milk pockets and dry areas of Bangladesh. However, one BAU professor, one DLS official, one Technical Manager who is the head of BRAC AI programme and five Regional Sector Specialists (RSS) were interviewed. Twelve AI workers and 14 beneficiaries were also consulted to gather information. The activities (i.e. distribution of logistics, semen straws, financial transaction, etc.) of a RSS were also observed at central container area. Finally, primary data were transcribed, processed and consolidated to write a report on BRAC AI programme. Information was collected during mid December 2005 to early January 2006.

WORKING PROCESS

LINKAGES AMONG STAKEHOLDERS

Professors and technicians of Bangladesh Agricultural University (BAU) provide consultancy to BRAC for capacity building training to AI workers. BAU professors also give training on marketing and extension activities to the RSS and AI workers. Within BRAC, the Technical Manager (TM) from BRAC head office keeps liaison with the bull station as a backward linkage and the RSS as a forward linkage. Frozen semen straws are distributed from the bull station to the central container area using BRAC's own transport with the consent of TM. Liquid nitrogen is distributed from BRAC head office to different area offices. An uninterrupted semen and nitrogen supply is necessary to provide AI service to the beneficiaries smoothly by the AI workers. The AI workers collect semen straws from the central container area (CCA) situated near the highway every fortnight. They collect nitrogen from nearby BRAC area office. The AI workers provide services to the beneficiaries. RSS receives monthly performance reports from each AI worker with weekly breakdown and consolidate those reports to submit it to the head office. Thus, TM collects all regional reports and further consolidates those to submit it to DLS if needed. Linkages between different stakeholders are shown in Fig. 1. DLS officials, especially from Mymensingh region, provide training to the AI

Figure 1. Linkages among the stakeholders



workers. BRAC needs permission of five-member government committee comprised of the District Livestock Officer (DLO), Assistant Director (AD), Upazila Livestock Officer (ULO) of the government, and the Regional Manager (RM) and Area Manager (AM) of BRAC in order to launch a new AI point.

COMPARISON BETWEEN BRAC AND DLS AI PROGRAMME

Deputy Director (AI) is the head of the artificial insemination wing of DLS. Assistant Director (AD), Scientific Officer (SO) and Field Assistant (AI) work at district AI center while Upazila Livestock Officer (ULO) and FA (AI) work at *upazila* or sub-centre. Field Assistant along with AI volunteers work at union or village levels. On the other hand, BRAC has only three-tier administration where Technical Manager (TM) is the head of AI programme working at BRAC HIO. Two Divisional Sector Specialists (DSS) also work at BRAC HO who are responsible for six divisions. One RSS is responsible for 2-3 districts and supervises 45-50 AI workers. The AI workers, who are the implementers of the programme, are at the bottom of the administration. They work at the union and village levels. BRAC administration is simpler compared to DLS (Fig. 2). The government uses both liquid and frozen semen while BRAC uses only frozen semen for providing AI service. The government has 90 semen production centers at district level whereas BRAC has only one bull station for semen production. A comparison between BRAC and DLS AI programme is presented in Table 2.

Figure 2. Administrative framework of BRAC and DLS

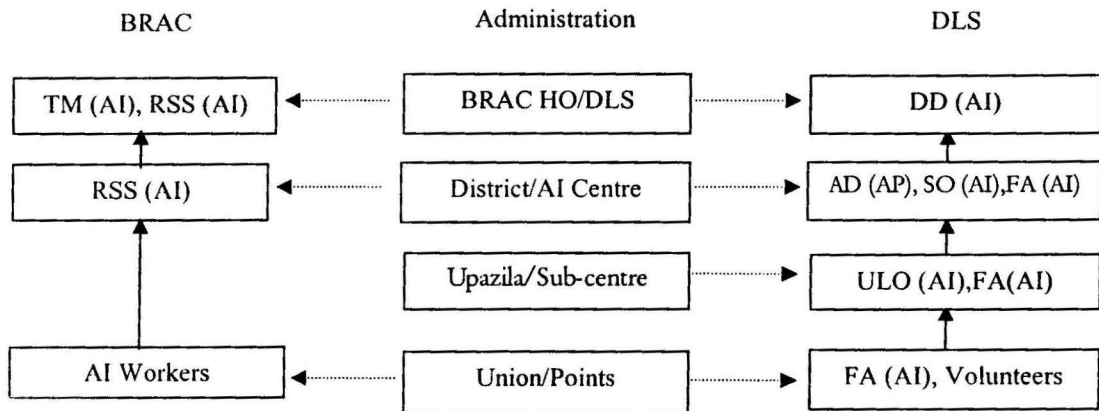


Table 2. Comparison between BRAC and DLS AI programme

Variables	BRAC	DLS
Launched AI programme	2000	1969
No. of production center (frozen)	1	29
No. of production center (liquid)	0	61
AI coverage area (%)	75	25
Service approach	Doorstep	Doorstep, Centre based
Working area	8 km away from the government centre/sub-centre	Mostly district and <i>upazila sadar</i>
Service implementer	AI volunteers	Field Assistant (FA), AI volunteers
Financial incentives	Commission	Salary (FA), commission (Volunteer)
Volunteers purchase semen at price (Tk./dose)	70	15-30
Volunteers sell semen to beneficiaries at price (Tk./dose)	100	80-100
Volunteers purchase semen for repeat case at price (Tk./dose)	60	Free of cost
Volunteers sell semen for repeat case at price (Tk./dose)	90	40-50
Form of goat semen used	Frozen Black Bengal	Uses natural method
Conception rate (%)	61.5 (DLS approved)	46.5 (IAEA report)
Service provide (approx.)	2 lac/year	16 lac/year
Form of semen used	100% deep frozen	60% deep frozen 40% liquid semen

Source: Primary data from BRAC head office and Department of Livestock Office.

STAGES OF PROGRAMME ACTIVITIES

BRAC follows some steps to implement AI programme. These steps are mobilization of potential AI workers, providing them with capacity building training, handing over capital items or equipments, orientation and promotion, and finally delivering necessary variable inputs to the AI workers for providing AI service to the beneficiaries in the rural areas.

Primary selection

There are some preconditions for selecting AI workers. These are a) Potential AI workers should be mobilised from their respective operating areas. They should be willing to provide service 8 km away from the government AI center or sub-center; b) They must be SSC graduate, interested in this work, intelligent and have sound health; c) They should be 30-35 years old; d) They are not involved with any other business except AI. Based on these criteria BRAC Area Manager (AM) and village organization (VO) members primarily select the potential workers to be trained. Previous experience and training on animal husbandry are treated as extra qualifications for primary selection. High motivation levels and social acceptability are preferred, as they will have to work eventually in their respective communities. After primary selection potential AI workers are sent to Bangladesh Agricultural

University (BAU) for a month-long training on AI. Primary screening is very important to minimise drop out. At present the dropout rate is 17%.

Provide capacity building training

AI workers receive a month-long training from BAU. Professors and technicians of BAU play a key role to develop a strong understanding of AI for the workers. A total of 38 resource persons including five government officials from DLS provide a month-long intensive training to the potential AI workers. BAU also arranges practical classes for the participants.

BRAC gives a nominal honorarium i.e. Tk 300-400 per hour to the resource persons. BAU spontaneously welcomes this initiative of BRAC for livestock development through AI. It should be mentioned that BRAC made a deal with BAU in 2003 for organizing such training course. Professors of the Faculty of Animal Husbandry and Veterinary Science have keen interest in this regard and they spontaneously organize training programme with BRAC's financial support. A training course accommodates 60-70 AI workers. Nine hundred forty AI workers received training from BAU so far. AI workers attend a test organized by BAU at the end of each training course. The Vice-Chancellor of BAU distributes certificates among the successful trainees.

Handing over capital items

BRAC invests approximately one lac taka for each new AI worker including training cost. An AI worker is supposed to receive seven capital items from BRAC namely liquid nitrogen container, which is usually kept at BRAC area office, cryocan (handy small flux) for semen preservation, AI gun for inserting semen into the vagina, forceps, scissors, thermometer, and a register for keeping AI records. The AI workers return all these materials before leaving BRAC. The AI workers have to sign a bond with BRAC for security reason. Liquid nitrogen container, cryocan and AI gun are the major investment that costs Tk. 50,000, Tk.15,000 and Tk. 2,000 per piece respectively. Semen straws are preserved in the liquid nitrogen container at minus 196 °C.

Orientation and promotion

After receiving training and capital items the AI workers return to their respective areas for providing AI services. The BRAC RSS introduces each AI worker with local elites and potential beneficiaries in the presence of the local chairman so that the new workers can work smoothly. This orientation programme helps develop awareness of the potential beneficiaries about the AI technology.

BRAC undertakes some promotional activities to inform the potential beneficiaries about the AI service product. It uses banners, signboards, posters, leaflets, and *miking* around village markets or crowded places. '*Dhol petano*' (beating drum) is another tool for publicity to attract potential customers in the rural areas. Posters, leaflets and letterboxes are not the most effective promotional tools as most of the beneficiaries, especially smallholder cattle farmers, are illiterate. "I never found a letter in the AI letterbox," said Yasin Pervez Rabi, AI worker, Mymensingh Sadar. But *miking* and beating drum are effective tools for publicity. BRAC bears all expenses of promotional activities.

Delivering variable and fixed inputs

Variable inputs are hand gloves, AI sheath, AI card along with semen straws. Each of these inputs is necessary for providing AI service. On the other hand, liquid nitrogen is a fixed input. Same amount of nitrogen is needed for preserving semen straws, irrespective of the numbers.

For example two liters of nitrogen are required for preserving one to one hundred semen straws. RSS distributes these variable inputs every fortnight from the central container area (CCA). BRAC currently has 28 CCAs located near the highways. AI cards are used to keep records i.e. name and address of the beneficiary, profile of the cow to be inseminated, profile of sire, date insemination, result of pregnancy test and tentative date of delivery. Every beneficiary is supposed to receive an AI card after receiving AI service. The AI card also carries some important information on post insemination care of cow, symptoms of repeat heat, and saving calves during critical birth.

RSS distributes semen straws every fortnight among the AI workers. A new AI worker is supposed to receive 25 semen straws along with other necessary inputs for the first month while the old AI workers are supplied semen straws depending on their performance or demand.

SERVICE DELIVERY PROCESS OF AI WORKERS

Contact with the beneficiaries

AI workers are supposed to visit every potential beneficiary, milk market, BRAC School, and VO meeting for informing them about the benefits of artificial insemination. Some AI workers use cell phones, which is an easy and effective way of communication with the customers. They also have visiting cards to distribute among the beneficiaries. AI workers also engage in informal teashop discussions with the potential beneficiaries about advantages of AI over natural method. The AI workers keep liaison with potential customers when they attend other calls.

Working arena of AI workers

An AI worker provides service 8 km away from government AI centre and sub-centre. AI workers usually operate from the centre (near market) of their commanding area, i.e. a 10 km circle. BRAC AI workers provide doorstep services while farmers bring their cows to AI centres, sub-centres to take government AI services. The AI workers use bicycles or motorbikes to travel to distant places for providing service. Most AI workers invest on motorbikes to travel distant places quickly.

Heat detection and service delivery

The AI workers detect heat properly before insemination of a cow. They have to observe some symptoms of cows to be inseminated i.e. normal shouting, smooth mucus secretion, time of shouting, etc. A cow is inseminated after 12-18 hours of heat detection. Because an ovum needs 12 hours to come out from ovary to uterus and lives 6 hours while a spermatozoid lives 28 hours. So, the AI workers are very careful about heat detection; otherwise they lose their goodwill if misconception happens. The AI workers take two or three key information from the beneficiaries about heat of cow to be inseminated over mobile. The beneficiaries are given an AI card after inseminating their cows.

Service charge

BRAC AI worker charge Tk.100 per service. If misconception happens, beneficiaries buy repeat service at Tk. 90. The AI workers purchase semen from BRAC at Tk. 70 for the first service and at Tk. 60 for the repeat service. So their commission is Tk. 30 for providing each service.

Acceptable repeat service

BRAC accepts 10% repeat cases per month, i.e. if a worker performs 100 AIs per month he is supposed to submit no more than 10 repeat case in a certain month.

Report submission

Each AI worker has to submit monthly performance report with weekly breakdown to the RSS. They have to maintain a daily register called AI register. The information to be recorded in the register are name of beneficiary, breed, age and color of cow/heifer, number of calf, yield of milk, date and time of heat, name of bull semen, date of pregnancy diagnosis, result of pregnancy diagnosis (+/-), date of delivery, and description of the calf born.

DUTIES AND RESPONSIBILITIES OF RSS

Regional Sector Specialists (RSS) are the mid level or district level staff of BRAC who maintain links between the head office and the field workers. Twenty-two RSSs are working in 61 AI operating districts. One RSS is responsible for two to three districts and supervises 45-55 AI workers. Key responsibilities of RSS are briefly discussed below:

Developing AI workers

One of the key tasks of the RSS is to develop AI workers through motivation and counseling. RSS is responsible for solving all sorts of problems of AI workers as quickly as possible. He introduces the AI workers with BRAC staff, VO members, and elite people to facilitate smooth operations in the community. RSS is supposed to visit each AI worker every one and half month which is hardly possible.

Receive and distribute semen and nitrogen

RSS should be present at the central container area (CCA) to receive semen and nitrogen. He is also responsible for distributing semen and nitrogen among the AI workers. RSS has to collect repayment money from AI workers every month and send it to head office through demand draft on the same day or next day. Programme Organizer (PO accounts) and Area Manager (*unnati*) of respective CCA cooperate in this regard. The AI workers are informed in advance about the time and date of semen distribution from CCA.

Maintaining register

RSS has to maintain different types of registers. These are stock register payable register, sales register, and receivable register for each AI worker at each CCA. Thus, RSS prepares a monthly report based on individual performance and sends it to the head office.

Workshop and target plan

RSS arranges meetings and workshops to have feedbacks from AI workers yearly or half yearly. RSS makes an annual target plan in consultation with the AI workers in an annual workshop.

Cattle feed selling

Side by side, RSSs have to sell *Surma* cattle feed – a BRAC brand. Sometimes they have monthly sale targets along with their AI responsibility.

Keeping liaison with DLS

RSS is supposed to keep liaison with district level DLS officials i.e. Assistant Director (AI), Scientific Officer (AI) and *upazila* level DLS officials i.e. Upazila Livestock Officer (ULO) for opening a new AI centre. There is government committee comprised of District Livestock Officer (DLO), Assistant Director (AP), Upazila Livestock Officer (ULO) of the government, and Area Manager (AM) and Regional Manager (RM) of BRAC, who approve a new AI centre for BRAC.

DUTIES AND RESPONSIBILITIES OF TECHNICAL MANAGER AND DISTRICT SECTOR SPECIALIST

Major decisions, keeping liaison with different organizations, procuring capital items, etc. are responsibilities of the Technical Manager (TM) and Divisional Sector Specialists (DSS) who work at the head office. Major tasks of TM and DSS are presented below:

Procuring capital inputs

TM procures liquid nitrogen container, semen preservation container and small cryocan from USA and India through importers. Liquid nitrogen is collected from domestic markets i. e. from Beximco or BOC Bangladesh Limited. BRAC has a backward linkage with the bull station for supplying frozen semen straw. Other necessary inputs i.e. AI sheath, hand gloves, AI gun are collected from domestic markets.

Ensuring supply of semen and nitrogen

TM distributes semen straws among 28 CCAs according to monthly schedule by using BRAC's own transport. Nitrogen is distributed in all area offices so that AI workers can replenish their small semen container (1.5-2 liter flux) from the area office. This is because semen cannot be preserved without liquid nitrogen at minus 196°C and this is why the AI workers have to refill their cryocan every three days.

Keeping liaison with DLS and BAU

The TM and DSS maintain contacts with BAU for training and consultancy. The TM also keeps liaison with DLS and informs them about monthly performance of BRAC. DLS and BRAC work for achieving a common goal of domestic dairy cattle improvement.

Preparing monthly report

DSS further consolidates the regional monthly data to get a picture of programme performance. This report is helpful to predict yearly consumption of semen doses. A monthly report is supposed to be given to the DLS.

Requisition of AI workers

The TM is also responsible for deciding if an AI worker needs to be deployed somewhere else due to uncovered areas or poor performance of some workers.

Attending workshops

Senior staff from BRAC head office attends annual or half yearly workshops with RSS and AI workers to get feedback and exchange opinions. Technical Manager (AI) gives some solutions to technical problems.

Keeping liaison with bull station

Keeping liaison with the bull station is important to ensure uninterrupted production and supply of semen straw. TM keeps liaison with the bull station. Processed and frozen bull semen straws are distributed among CCAs with permission and/or demand of TM.

ANALYTICAL DISCUSSION

This section tries to find out the bottlenecks of transferring AI technology and its potential from BRAC perspective. All statements are supported by individual consultation and focus group discussions with the stakeholders. It also tries to explore the key indicators of programme strength and policy demands of AI workers. Finally, socioeconomic status and livelihood of AI workers and beneficiaries are discussed accordingly.

CHALLENGES OF BRAC AI WORKERS

Violation of bilateral deal

The government is supposed to work in urban and peri urban areas according to a bilateral oral deal with BRAC. The conventional deal has been relaxed recently for which the government AI workers, especially volunteers, come out beyond their area even when they have been spread in remote areas, which is not equally applicable for BRAC AI workers. BRAC AI workers are instructed not to enter into the government areas to provide AI service. But the government workers enter into BRAC areas with cheaper product, which is threat for BRAC AI workers. The government can recover production costs as they use both liquid and frozen semen, which are produced, at district AI centers. Thus, BRAC AI workers lag behind of the government in discriminatory competition (Box 1).

Box 1. Violation of bilateral deal and discriminatory price war

DLS and BRAC are supposed to work in the urban and remote areas accordingly as per bilateral deal. But, in early 2005 DLS expanded its AI service into the rural areas for which BRAC workers fell behind in competition, as the government sells AI service product at a lower price.

DLS volunteers purchase bull semen from district AI centres at Tk. 15-30 depending on the form of semen i.e. liquid or frozen. On the other hand, BRAC volunteers purchase frozen semen from CCA at Tk. 70. DLS provides subsidy for the beneficiaries unlike BRAC. As such, the government AI workers can sell their product at Tk. 50-80 to the beneficiaries while BRAC has to sell at Tk. 100 per service. Thus, BRAC AI workers lag behind in competition.

The government Field Assistants (FA) get salaries whereas BRAC workers get only commission at the rate of Tk. 30 for each service. Lack of close monitoring and proper record keeping allows the FAs and volunteers to earn more money by showing fake reports to the authority. The government workers always compete with BRAC workers by adopting unfair means. For instance the government workers keep liaison with local mobile shops for providing reliable information about customers. The informer gets Tk. 20 for each case. The government AI workers have to achieve annual targets by any means, which might be the driving force for these actions.

Quality of calves born through BRAC AI service is not significantly different or exceptional from that of the calves born through government AI service. As such, the beneficiaries do not always want to purchase AI service from BRAC at a higher price. Besides, the government repeat-service is free whereas BRAC charges Tk. 90 for every repeat case. Thus, BRAC AI workers are facing an unfair competition with DLS workers.

- *Rabiul Islam, RSS (AI), Kusthia*

Government vs. BRAC price war

The government provides both home service and centre service. In addition, there is scope for serving false or liquid semen. On the other hand, BRAC has to charge higher price due to serving only frozen semen. BRAC cannot serve liquid semen, as it has no district level semen production centre like the government. Liquid semen survives only three days in the refrigerator, which is not cost effective. Low purchase price allows the government AI volunteers to sell AI service at lower price, which is reverse in case of BRAC (Box 1). The government subsidy does not reach the poor people, as they have to buy AI service at higher price, especially when the beneficiaries take home service. "The government AI volunteers split 'one semen dose' bought at Tk. 15 into 'three doses' and sell at Tk. 50 each that has a high chance of misconception," said AQM Shafiqur Rouf, TM, Programme Support Enterprise, BRAC.

Price of repeat case

Collecting price of repeat service is another bothersome job for BRAC AI workers. BRAC charges Tk. 90 for repeat case whereas the government gives repeat service free of cost, sometimes at half of first service (Box 2).

Box 2. Price of repeat case cannot be collected easily

Mr. Millon has to compete with four government AI workers within his 10 km commanding area. Presently he sells 50-70 AI services per month due to the government intervention. He could sell 80-150 AI services per month before DLS intervention. His repeat rate is 20-25% per month. But BRAC accepts only 10% repeat case per month. The beneficiaries are supposed to pay Tk. 90 for every repeat case; but he cannot collect no more than Tk. 50 for providing repeat service. But since he has to repay Tk. 60 for each repeat case, he loses Tk. 10. In addition BRAC does not pay conveyance to the AI workers. So, he has to collect money by showing fuel cost of motorbike and money receipt of semen purchase. It is not cost effective to provide repeat service at low price. Side by side all the government workers have motorbike and they provide repeat service free of cost.

- Asfaq Mahmud Milon, Kushtia Sadar, Kushtia

Quality of calf

Sometimes the beneficiaries find no difference between natural and artificial insemination calves. They know the symptoms of local and exotic species very well. It might be due to quality of bull and/or poor quality of indigenous cow (Box 3). BRAC uses bull semen having 50% exotic blood all over rural areas. So, it takes time to upgrade a certain species by BRAC semen. The government is supposed to use bull semen having 50% exotic blood in the rural areas and having 75-100% exotic blood in the urban, semi-urban and milk pocket (Anonymous 2001). But the government volunteers sometimes use 100% exotic blood irrespective of rural and urban areas at the same price, which is unethical and not cost effective for the rural poor people in the long run. Calves born with higher percentage of exotic blood consume more feed but give less return, especially in the rural area, as they are used for dual-purpose i.e. draught power and milk production. "It is not feasible to provide AI service with more than 50% exotic blood in the rural areas especially to poor smallholders cattle farmers," AQM Shafiqur Rouf, TM, PSE, BRAC reported.

Regional demand

Demand for bull semen is not the same all over Bangladesh. For instance II. Frisian is very popular in milk pocket areas i.e. Sirajganj and Pabna while demand for Sahiwal is very high in beef fattening areas i.e. Narsingdi and Kushtia. Sometimes the beneficiaries seek Pakistani

Jersey, Sindhi, Nepali breed, Indian and Australian breed at current price. But currently BRAC is widely supplying only two varieties i.e. Sahiwal and II. Frisian. So, AI workers cannot always meet beneficiaries' demands. Proshika, Grameen Bank and Milk Vita provide AI service around Sirajganj district, as it is a milk pocket of Bangladesh. Milk Vita provides services to their cooperative members at Sirajganj only.

Box 3. Success of AI programme depends on two indexes

Cattle population of Bangladesh is around 30 million. The government cannot cover this huge number of cattle population by artificial insemination due to its poor network throughout the country as well as poor management. BRAC can implement any development programme countrywide due to its strong network and management.

Two indices are essential for fruitful AI programme – conception rate and quality of bull for producing semen. Conception rate depends on the skill and experience of AI workers. BRAC has skilled manpower and its conception rate is pretty good unlike DLS.

BRAC is using semen of tested or superior bull so far. So it should take steps to generate proven bull for semen collection, which is a long-term process. BRAC can establish 'nucleus herd' in six divisional cities where chilling facilities are available.

- Prof. Md. Ruhul Amin, Dept. of Animal Breeding and Genetics, BAU, Mymensingh

Commercial natural insemination farm

Commercial natural insemination farm is another minor impediment of transferring AI technology in the rural areas (Box 4). Natural breeding is dangerous for its potential of disease transfer. It also degrades the quality of future generations.

Box 4. Natural insemination farm hampers AI programme

Rabi has been working in BRAC AI programme for a long time. His main headache is the commercial natural insemination farm established next to his AI point. He finds one or two cows per day for insemination. Poor farmers are very price sensitive. They can take natural service at Tk. 40-50 while BRAC charges Tk. 100 for the same. In addition, repeat service is free of cost in natural method whereas BRAC charges Tk. 90 for the same. Some farmers are skeptical and they do not believe in artificial insemination. They say "AI korale gavir moza mite na" (Cow is not satisfied by AI).

- Yasin Pervez Rabi, Sambhuganj, Mymensingh

Lack of awareness of beneficiaries

Some potential beneficiaries do not bother about upgrading local species by artificial insemination. It might be due to lack of understanding and awareness about AI technology and its future potential. For example smallholders of cattle farmers of Rauzan, Sathkania and Lohagara of Chittagong district are not interested to take AI service. They usually rear cattle for beef fattening aiming to sell during Eid-ul-Azha. Red Chittagong species is suitable for Chittagong region. BRAC tries to preserve this species by inseminating cows with Red Chittagong bull semen. This species consumes less but yields more milk. "But DLS has no Red Chittagong bull semen. They deliver AI service by Sahiwal bull semen in Chittagong region, which is not feasible this region," Uttam Kumar Datta, RSS, Chittagong said.

FAVOURABLE FACTORS OF BRAC AI PROGRAMME

Despite all these challenges, how do BRAC AI workers survive in the AI market? What are the secrets of overcoming some of the challenges by AI workers even when BRAC charges higher prices for first and repeat service compared to other competitors? AI workers are the backbone

of the BRAC AI programme in this regard. The following section presents the strengths of the BRAC AI programme.

High conception rate

Conception rate (CR) varies depending on the skill of AI workers and health condition of the cows inseminated. BRAC conception rate is 61.5% (DLS approved), which is much higher than the government CR i.e. 46.5% (IAEA approved). Recent monitoring report of BRAC shows that CR is more than 70% to some extent, which is even higher than the European standard (i.e. 65-70%). High conception rate makes the beneficiaries confident about BRAC product. It saves time, labour and money of the beneficiaries (Box 5).

Box 5. Higher conception rate saves both time and money of the beneficiaries

We have to pay Tk. 100 for taking AI service from BRAC. But we have to spend Tk. 150 (including Tk. 50 for repeat service) when we receive AI service from the government. Because the government workers are not skilled, it causes misconception. In addition, a cow needs one and half month to become heated again. Thus, farmers lose Tk. 150 and one and half month time let alone their invested labour by using the government service. With this experience the beneficiaries are now using AI service from BRAC even at a higher price.

- Solaiman Biswas, Farmer, Bittipara, Kushtia Sadar, Kushtia

Availability of workers and doorstep service

BRAC workers are available when needed unlike the government workers. The government workers do not want to attend distant calls. They charge extra, Tk. 200-250 for distant call. On the other hand, BRAC provides doorstep service and charges single price whatever the distances while the government provides centre-based service with some exception. For instance the government expands AI service in the remote areas of Kushtia, Meherpur, and Chuadanga.

Skill of AI workers

BRAC has skilled manpower for providing AI service. AI workers apply their knowledge and experience in practice very well. High conception rate mainly depends on the individual skill. Most AI workers have goodwill for their outstanding performance in their respective localities.

Organizational credibility

BRAC is widely known for its microfinance programme among rural poor people. So, the beneficiaries trust BRAC AI service product too.

Strict management

A tight management is another key indicator of programme strength. It has three-tier management i.e. head office, regional office and field office where TM, RSS and AI volunteers work respectively. One DSS is responsible for three divisions, one RSS is responsible for two to three districts and one AI volunteer is responsible for providing AI service in two to three villages. So, a tight administrative framework allows quick circulation of information from top level to grassroots level. Close monitoring and supervision of the activities of AI volunteers by RSS ensures transparent. The TM supervises and coordinates the activities of bull station, DSS, and RSS.

POLICY DEMAND OF AI WORKERS

Improving semen quality

Conception rate is satisfactory, but calves born by AI service are not much different from natural calves. The beneficiaries are not always satisfied with calves they get by using AI services (Box 6). It is a threat for the AI workers to survive in the AI market as well as retain their goodwill. Therefore, they urged BRAC to improve semen quality, especially blood level. The government AI volunteers use bull semen having 75-100% exotic blood in the rural areas while BRAC AI workers use 50% exotic blood. "BRAC sudu amader bhala beej sorborah korle sorkari kormira dum kom nileo amader sathe perbe na (The government workers cannot compete with us if BRAC supplies bull semen having high blood level)," an AI worker of Kushtia said. By contrast, there is a government embargo on import of bull semen for BRAC as it provides services all over Bangladesh. Milk Vita can import bull semen as it provides AI service to their cooperative members only.

Box 6. Feedback of beneficiaries about AI

Farukh Ahamed, Abdul Barek and Anil Chandra Das are BRAC AI workers who come from different social backgrounds. They have been working for BRAC since 2000. Initially they faced problems but now AI is widely known to the smallholder cattle farmers. They perform 20-200 AI per month depending on their experience, skill and popularity in the community. They sometimes get feedback from the beneficiaries about the results of AI in terms of calf quality. For instance, AI calves need extra care unlike natural calves. AI calves do not want to eat grass even at three months after birth, which is never seen in natural calves. Sometimes the beneficiaries get fearful when they see thick umbilical cord of newborn AI calf. In addition, placenta of uterus does not release even after 12 hours of birth that causes further conception of the mother cows.

-FGD at Matlab North/Changerchar, Chandpur

Rafiqul Ismal, Abdul Hannan, Mozammel Hoq, Nurul Islam Khan and Kalai Bepari are smallholder cattle farmers. They have 2-4 cattle each. Their main occupation is agriculture. More than 80% of smallholder cattle farmers in their village adopted AI service. They used AI service several times from BRAC. Their experience is "AI-e aree bachur er jhut hoina, tai dekte bhala legane" (Prominent rump is not revealed in male AI calves like natural calves).

- FGD at Matlab North/Changerchar, Chandpur

Supplying more variety of bull semen

BRAC widely uses two varieties of bull semen for providing AI service namely Sahiwal and Holstein Frisian. Recently BRAC has added Red Chittagong and Pabna breed. Red Chittagong is only for providing AI service in Chittagong region. But beneficiaries seek Pakistani Jersey, Sindhi, Nepali breed, Indian and Australian breed at current price. So, BRAC should think of supplying these kinds of varieties to fulfill the beneficiaries' demand for those varieties.

Ensuring adequate hand gloves

Adequate hand gloves are a crying need of all AI workers. They have to use one poor quality hand glove (i.e. Tk 2 per piece) for providing two services while the government volunteers use one good quality glove (Tk. 5 per piece) for providing one service. It is an issue of prestige for BRAC AI workers, as they reported. In addition, using one glove for more than one service is unhygienic due to having a chance of transmission of diseases from one cow to another during insemination. The beneficiaries also show a bad notion in this regard. Sometimes BRAC workers buy hand gloves from the government volunteers at cheap rate. However, AI workers requested to supply at least one glove even at existing quality for providing one service.

Increasing acceptance of repeat case

BRAC currently accepts 10% of repeat cases per month from AI workers. "If so, BRAC conception rate would be 90% but it is clearly defined in Talukder Saiful Islam's manual that maximum CR is 70%", said Mozaffar Ahamed, Kashinathpur, Pabna. But AI workers find 20-25% repeat cases in practice. "If we allow acceptance rate more than 10% of repeat case per month there is a possibility of corruption among AI workers by showing fake document," said AQM Shafiqur Rouf, TM, PSE, BRAC.

Cutting down purchase price of semen

AI workers get no salary from BRAC unlike the government Field Assistant (FA). Their only income source is Tk. 30 commission for providing each service. BRAC sells semen to AI workers at the rate of Tk. 70 for the first service and at Tk. 60 for repeat service. AI workers further sell semen straw at Tk. 100 for the first service and at Tk. 90 for the repeat service to the beneficiaries. So, their commission is Tk. 30 for each service irrespective of first or repeat service. Each AI worker performs 25-200 AI per month depending on their skill and popularity in their localities. If BRAC sells semen at Tk. 50 and Tk. 40 for first service and repeat service respectively their commission would increase from Tk. 30 to Tk. 50.

Paying traveling allowance in time

BRAC is supposed to provide traveling allowance to AI workers when they buy at least 50 semen straws from the central container area (CCA). AI workers have to collect TA from their nearest BRAC area office. Sometimes they cannot collect TA in time, as the accountant is always busy. That is why they have to come again to collect their TA bill, which is bothersome and not always cost effective.

Providing credit facilities

BRAC may provide credit to the AI workers to buy bicycle and motorcycle. It will facilitate their work, especially in the remote areas. Credit may also encourage them to do business associated with their current profession (i.e. dispensary of veterinary drugs) that could be a supplementary income source for them. BRAC recently provides interest-free loan of Tk. 3,000 repayable in 10 monthly installments to buy cell phone or bicycle.

Financial incentives

Currently an AI worker has to provide 200 AI service per month to get financial incentives (i.e. prize, cattle feed dealership), which is very difficult for him. "BRAC may arrange proportionate financial incentives for the AI workers based on their performance. For example AI workers, who perform 50-100 AI, will get 1% of their monthly cash payment. Similarly, 2% and 3% will be received for performing 101-150 and 151-200 AI per month," Uttam Kumar Datta, RSS of Chittagong suggested.

Arranging cattle fair

"An AI worker is supposed to mobilize 150-200 calves born through BRAC AI service to organize a cattle fair in his commanding area," said Rabiul Islam, RSS, Kustia. But most AI workers are not informed of this important announcement, for which cattle fair has not been organized. The government arranges cattle fairs at district level while BRAC arranges at union level where poor smallholders can participate easily. This kind of fair may encourage the potential customers to adopt AI technology and at the same time BRAC can select superior bull

for semen production. So, BRAC should revitalise the cattle fair programme at union level by increasing current budget allocation i.e. Tk. 1,000 for an annual cattle fair.

Reducing overlapping of AI workers

Sometimes overlapping of the AI workers in a given area interrupts their regular activities and reduces monthly income due to lack of customers (Box 7). “BRAC policy is to boost competition among the AI workers in a particular area, employment generation, and minimise dropout risk,” said Md. Moshiar Rahman, RSS, Comilla. Current drop out rate is 17%.

Box 7. Overlapping of AI workers decreases monthly income

Md. Shamim Chowdhury joined BRAC AI programme in 2003. He is known as a '*Gamma pashu chikithshok*' (rural veterinary doctor). By being involved in the AI programme he diversified his income source. In 2005 he could provide 80-90 AI services per month. But now the number of his customers has declined due to recruitment of new AI workers in the same area. Presently he provides 50 AI service per month. His monthly income has declined from Tk. 2,400 to Tk. 1,500 as he gets Tk. 30 commission for providing each AI. He feels that overlapping of workers wastes nitrogen, which is a loss of BRAC. Two AI workers use double the quantity of nitrogen for providing the same number of service to the beneficiaries of a given area. BRAC also has to invest Tk. one lac for an additional AI worker, which is expensive.

-Md. Shamim Chowdhury, Niz Baneshawr, Amratali, Comilla Sadar, Comilla

Media promotion for AI

BRAC may consider advertising on television like *Surma* cattle feed for wider dissemination and growing credibility among the potential beneficiaries about the AI service product of BRAC. Recently BRAC has taken an initiative of showing audio-visual documentary films on artificial insemination to popularize AI in the rural areas.

SOCIOECONOMIC STATUS AND LIVELIHOOD OF AI WORKERS

All AI workers consulted are at least SSC graduate and their age range is 25-40 years. Most of the AI workers have 5-10 years prior experience on animal husbandry and training from Youth Development Training Centre. Most AI workers joined BRAC in 2003 due to large expansion of AI service all over Bangladesh on that time. Many AI workers come from educated families also. The AI workers are very aware about the academic future of their children for which they send their children to the best schools in their villages. A profile of AI workers is presented in Box 8.

Most AI workers are the main breadwinners of their family. Many AI workers acknowledge their affiliation with BRAC as they have got an organizational base, which enhances their social status. Most AI workers are self-reliant after joining BRAC AI programme. They also have got an academic recognition from BAU, which is a dream for them. In addition, BRAC has invested a lot (i.e. Tk. one lac) on them, which they could have never afforded. Sometimes they purchase motorbikes to compete with the government AI workers. Since all the government Field Assistants (FA) have motorbikes. “Motorcycle chara krisokra dum dite chaina (Potential beneficiaries do not pay attention to us if we do not have motorcycles),” said Ziaur Rahman, Kushtia Sadar, Kushtia.

Most AI workers have agricultural land from where they get food security for six to nine months. In short, AI workers do not come from vulnerable poor families. “If AI workers came from vulnerable poor families, they could not succeed financially with some exceptions,” said Ajoy Boshak, Shajadpur, Sirajganj.

Box 8. Profile of AI workers at a glance

Education	: At least SSC graduate
Age	: 25-40 year
Social status	: Known as <i>Grammya poshu chikithsok</i> (rural veterinary doctor)
AI service delivery	: 25-200 per month
Monthly income portfolios	: AI service, animal treatment, dispensary and agriculture
No. of dependent	: 3-5

The AI workers who joined earlier are performing well in their respective areas. All AI workers consulted have taken AI service as their profession. They provide 25-200 AI service per month depending on demand, individual popularity in their respective areas, sincerity and skill. Many AI workers work as rural veterinary doctors along with providing AI service. They solve many problems related to reproductive health care of cow. Their monthly income from AI service is 50-60% of their total income. AI service also has an indirect effect on animal treatment. Once AI workers are widely known for AI activities, they are often called for animal treatment and consultation. However, their monthly income varies from Tk. 3,000-10,000. Some AI workers have dispensaries for selling veterinary medicine.

FEEDBACK OF BENEFICIARIES

Agriculture is the main occupation of the beneficiaries consulted. Some are Madrasa teachers, rural quacks, service holders and small traders. Most beneficiaries have two to four cattle each. Therefore, AI service users are basically smallholder cattle farmers. Density of dairy cattle per household is comparatively high in Sirajganj compared to any other district. In Pabna, Sirajganj and Kushtia, most smallholders have crossbred cows and they rear cattle for different purposes. For example, beneficiaries of Pabna and Sirajganj rear cattle only for milk while beneficiaries of Kushtia rear cattle for beef fattening. Sometimes they ask for different varieties of bull semen i.e. Nepali, Indian, Pakistani, and Australian for AI.

More than 60% of smallholders are currently using AI service for dairy cattle improvement, which is encouraging. Though poor farmers are price sensitive they take AI service from BRAC due to its high conception rate, doorstep service, and availability of AI workers. A missed conception wastes both their time and money. It is clear to the beneficiaries that the government service is not cost effective because they have to bring their cows to the government AI centre. Considering transportation cost, it is better to take home service from BRAC at reasonable price. This is why, most beneficiaries welcome BRAC AI service.

The beneficiaries seek better quality of semen at the same price for having quality calves. In case of milk production, there was a mixed reaction; some beneficiaries said that milk production increased after adopting AI while some reacted negatively. AI has no impact on milk production by second generation. None of the beneficiaries keep AI cards, as it has no value to them. This is a setback for future research potentials to see the impact of AI in the long run as well as for pedigree analysis of calves born through BRAC AI service. The beneficiaries face some complexities in calves born from AI. For example AI calves do not want to graze even after three months of birth. Calves do not always carry the symptoms of bull character.

FUTURE RESEARCH AGENDA

Obviously BRAC AI programme is a continuous process for dairy cattle development. However, this study identified some challenges of the programme that need to be explored all over the operating areas. Thus, programme may take necessary measures depending on the severity of the problems for sustainability. The proposed future research agenda are presented below:

To explore the extent of violating BRAC-DLS bilateral deal

DLS is supposed to work in urban areas whereas BRAC is supposed to provide AI service in remote areas. But the government volunteers do not follow this bilateral deal and they enter remote areas where BRAC already has developed a market. In contrast, BRAC does not have access into the government areas to provide AI services. Sometimes BRAC and DLS blame each other. Therefore, a survey may be carried out to see the level of these problems all over the country.

To examine the impact of AI

It is observed that the beneficiaries seek improved quality calves suggesting that they are not satisfied with calf quality. Five to seven years are required to obtain 100% exotic blood by a domestic species. The experts from BAU may conduct research on genetic improvement and traits of calves born by BRAC AI service after a certain point.

To explore the extent of policy demands of AI workers

It will be wise to explore and fulfill the policy demand of the AI volunteers especially for logistic support to provide AI service smoothly. Without satisfaction of AI workers the programme may not sustain in the long run.

What factors influence the annual sale of semen?

No significant relationship was observed between the total volume of annual sale of semen and infrastructure indicators. The number of large farm households, adult literacy rate, and household owning no land are negatively related with the annual sale of semen, which is not surprising (Table 3). Literate people might involve themselves with business or service rather than livestock rearing. So, they do not need to buy AI service. Similarly, large farm households might involve themselves with crop production rather than dairy cattle development and beef fattening. So, they do not have to buy AI service though there is strong relationship between the number of livestock and the number of large farm households (Table 4). Large farmers might use livestock for using as draught power in their agricultural field. The households having no land having lower chance of buying AI service (Table 3). However, number of cattle population is significantly associated with all infrastructural indicators, except adult literacy rate, and length of regional highway (Table 4). Therefore, other factors (internal or external) that may influence the annual sale of AI service need to be explored for strengthening the AI programme in future.

Table 3. Pearson correlations of infrastructural indicators with annual sale of AI service

Indicator	Correlation coefficients
Number of household	0.157
Number of cattle and buffalo	0.196
Total farm households	0.302
Non farm households	0.004
Farm households	0.282
Number of small farm households	0.304
Number of medium farm households	0.123
Number of large farm households	-0.204
Adult literacy rate	-0.089
Length of national highway (km)	0.160
Length of regional highway (km)	0.081
Length of feeder road (km)	0.026
Number of agricultural labour households	0.296
Number of HHs with no own land	-0.073

Note. Data from 28 districts where BRAC semen distribution centres situated.

Table 4. Pearson correlations of infrastructural indicators with number of cattle and buffalo

Indicator	Correlation coefficients
Number of household	0.512**
Households having goat and sheep	0.739**
Number of goat and sheep	0.856**
HHs reporting pawls and ducks	0.848**
No. of pawls and ducks	0.404**
Total no. farm households	0.919**
No. of non farm households	0.746**
No. of farm households	0.897**
Number of small farm households	0.837**
Number of medium farm households	0.910**
Number of large farm households	0.604**
Adult literacy rate	-0.130
Length of national highway (km)	0.421**
Length of regional highway (km)	0.202
Length of feeder road (km)	0.422**
Number of agricultural labour households	0.774**

Note. *, ** signifies 5% and 1% level of significant respectively. Data from 64 districts.

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