

Role of artificial insemination towards the food security in Bangladesh

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Abstract

The food security is a very important global issue including developing countries. For human balanced diet, Food and Agricultural Organization (FAO) recommended 250 ml milk and 120 gm meat per capita per day. Current production of milk and meat in Bangladesh is about 3.463 million MT and 2.332 million MT per year, respectively where the actual requirement is about 13.687million MT and 8.760 million MT per year. The cattle population in Bangladesh holding the 11th position in the world with low production of milk and meat. Artificial insemination (AI) has been started 50 years ago to upgrade the local cattle. At present, there are 22 Districts AI centre, 454 AI sub-centre and 2509 AI points in our country. Currently, Friesian, Sahiwal, Friesian × Local, Red Chittagong and Local bulls are used for AI. Government has taken initiative to increase the meat and milk production through many projects viz. AI programme and embryo transfer, progeny testing project and beef breed development programme. Moreover, few NGO like BRAC, Milk vita, PRAN etc also launched AI activities. The main target of AI is to upgrade the local stock and increase production of milk, meat and quality calf to meet up the protein demand. There are many constraints of AI programme in Bangladesh. So, this study has been undertaken to critically evaluate the present situation and future prospect of milk and meat production by AI programme for enhancing food security of Bangladesh.

Keywords: Artificial insemination (AI), Cattle, Food security, Bangladesh

Introduction

Food security means not only production of sufficient food. According to FAO food security exists when all people, at all time, have access to sufficient, safe and nutritious food to meet the direct needs and food preferences for an active and healthy life. Animal protein such as milk and meat is a very vital part of food security. The issue of food security is now not only the concern of southern Asian countries but also the matter of the world. Every man has fundamental right to get safety and nutritious food as per WFC at Rome, 1996. The food security position of Bangladesh is 81st out of 105 countries in the Global food security index-2012 published by the Economist Intelligence Unit of Britain. Whatever, Bangladesh is the lowest position in food security among the southern Asian countries. The nutritious food contains especially animal protein such as milk, meat and egg. FAO recommendation per capita at least 250 ml milk and 120 gm meat per day are required for human balanced diet.

Ways to ensure food security in Bangladesh?

There is a large number of cattle, buffalo, goat, sheep, chicken and ducks population but their production is very low due to poor genetic potentials of local breed. Artificial insemination (AI) is a basic tool for rapid genetic improvement of local cattle.

Artificial Insemination (AI)

Artificial insemination (AI) is a process by which semen are collected from the bull and then introduced into the female reproductive tract for the purpose of conception after processing.

History of AI Bangladesh

In 1969, 1st project started for Cattle breeding station with cooperation of Germany. In 1973, 125 Friesian and Jersey bull and cows imported at CCBS. Twenty one (21) breeding centres has been opened for chilled semen production in 1975-76 and semen supplied among 463 upazillas for AI over the country. In 1991, frozen semen was imported from Japan, America and Canada. In 1994, Deep frozen semen laboratory has been set

up at Central AI Laboratory, Savar, Dhaka. In 1998-99, Deep frozen semen production laboratory at Cattle improvement and Dairy farm, Rajbari, Rajshahi has been also established. In Bangladesh the tropical breeds, Red Sindhi, Sahiwal and Haryana were introduced in 1937 and the temperate breeds Holstein-Friesian and Jersey were introduced in 1974 (Ali, 1985). Australian Friesian Sahiwal (AFS) were introduced from Australia in 1983. Frozen semen of Australia-Friesian from Germany, New Zealand and Kenya was introduced in 1987 and frozen semen of different genotypes like Holstein Friesian and Jersey from Australia, New Zealand, France and USA was introduced from 1990 (Bhuiyan, 1997). The first breeding policy was adopted from 1982; however, the result of breeding programme was not satisfactory and was revised in late 1999. The main change was the extension of use of the semen of improved germplasm of indigenous cattle and again the cattle breeding policy was revised in 2007. Through the Central Cattle Breeding Station (CCBS) the cattle breeding policy are adopting. Due to increased demand, the commercial farmers raising mainly Holstein and its crossbreds (Khan *et.al.*, 2005). Although the cattle breeding policy is adopting but due to indiscriminate use of breeds, low adaptability of temperate breeds and their crossbred (Khan, 2009), the production potentials of dairy cows was not increased in satisfactory level. Current milk and meat production is about 2.26 and 0.45 million metric tones per year, respectively; but the national demand is more than 3 folds (FAO, 2005). Therefore, it is very clear that a great shortage of domestic production of milk and meat. This deficit could be overcome through proper and efficient planning of the whole cattle industry which requires harmonic and consistent breeding policy. So, this topic to be evaluates the present situation and future prospect of milk and meat production through Artificial insemination Programme for food security of Bangladesh.

The objectives of national AI programme

i. Economic benefits from sustainable utilization of AI ii. Ensure long term food security of the nation iii. Increase economic production of animal protein iv. Maintain and conserve animal resource for the present and future generations v. Enhance scientific and technological knowledge vi. Educational and

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socio-cultural values of domestic animal diversity **vii.** Application of animal biotechnology in line with ethical and religious needs.

Table 1. Governmental activities of AI in Bangladesh

AI breeding Station	: 02
District AI centre	: 22
AI Sub center/Point	: 3200
Breeding Bull	: 172
Frozen semen production cost per dose	: \$1.6
Chilled semen production cost per dose	: \$1.3
Liquid nitrogen cost per year	: \$ 221951
Breeds of cattle used	: Friesian, Sahiwal, Jersey, Brahman, Red Chittagong and Local
Breed able cow	: 7000000
AI coverage	: 51%
Conception Rate	: 48-52%

Source: DLS, 2013

AI Delivery System in Bangladesh

The governmental bull station and BRAC provides AI service through production of chilled semen and frozen semen. There are many ways of extension of this AI service such as through Upazila Veterinary hospital, Union parishad. Besides this, many NGO and AI technician are providing door to door AI service.

Price of breeding service

Governmental rate of frozen bull semen is TK. 30/ dose and chilled semen is Tk.15/dose and both are highly subsidized. On the other hand BRAC bull frozen semen is TK.120/dose and Private natural service TK. 300/- (Bull)/heat of cow.

Table 2. Semen production, achievement of Artificial Insemination (AI) and progenies production in Bangladesh.

Fiscal year	Total semen production (Lakh)	Artificial insemination (lakh)	Crossbred progeny production (Lakh)
2007-2008	23.11	18.11	6.10
2008-2009	25.10	19.99	6.29
2009-2010	26.10	22.71	6.83
2010-2011	29.66	28.44	7.53
2011-2012	34.36	26.89	7.96

Source: Bhuiya, M. H 2013, DLS.

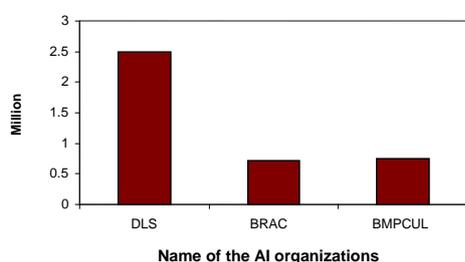


Figure 1. Number of AI done by different organization in Bangladesh

On-going Programme by GoB:

Artificial Insemination (AI) and Embryo Transfer (ET) Project

Objectives:

i. To generate high productive animals **ii.** To increase the number of quality breeding bulls as well as quantity of semen **iii.** Familiarize and encourage AI activities at grass root level **iv.**

Practice embryo transfer technology in the nucleus herd at CCBS **v.** To establish a nucleus herd at CCBDF, Savar, Dhaka. **vi.** To Trained up artificial inseminators (volunteers) here are (1000 artificial inseminators (volunteers) has already trained and another 1000 is on training). **vii.** To cover the entire country with AI services and to produce MOET calves **viii.** To increase the semen production from 25 lakh dose to 40 lakh doses **ix.** Artificial Insemination Laboratory has been established at Rajbari, Rajshahi.

Breed upgradation through progeny testing Project

Objective: a. Superior proven bull production **b.** Identification of high yielding cows and heifers **c.** Increase genetically potential breed **d.** Increase production of milk and meat.

Beef breed development programme

Objectives: a. To develop a meat type cattle (Local x Brahman) for increasing meat production **b.** Semen quality of male progeny will be evaluated in Central AI Lab. For beef breed development purpose, a total 1400 doses of Brahman breed bull semen has been imported from America.

AI Activity by Non-government Organizations

The Bangladesh Rural Advancement Committee (BRAC) providing cattle AI service since 1985 through establishment of own bull station. The organization has gone on production of frozen semen from November, 2000. The annual production is 5,00,000 doses of straw. They are providing the AI service via their 1279 trained AI technicians. The AI technicians giving the service to the farmers through 89 nationwide AI services point. Besides this the technicians are also providing door to door service.

AI Programme of Dairy Cooperative

Bangladesh Milk Producers' Cooperative Union Ltd. (Milk Vita) has own bull centre. Different exotic cattle AnGRs (Sahiwal, Holstein Friesian, Jersey) are exist there. After production of semen, they are providing the AI service to the farmers from door to door.

Priorities of National Animal breeding Development

i. Improvement of quality of animals; **ii.** Characterization, conservation & improvement of dairy cattle **iii.** Genetic improvement of smallholder livestock using ONBS with integration of MOET **iv.** Evaluation of exotic cattle & their crosses with native **v.** genetic ranking of animals to be used in AI services **vi.** Development of high yielding variety (HYV) in local environmental.

Constraints of AI Programme in Bangladesh:

i. Lack of genetically potential breed and good quality semen **ii.** Inefficient and unskilled management **iii.** Environment, shortage of animal food **iv.** Lack of consciousness about AI to the farmer **v.** Heat detection failure **vi.** improper timing of AI **vii.** Diseases related to female reproductive tract **viii.** Lack of skilled AI technicians **ix.** Inconsistent breeding policy of government **x.** Insufficient research and extension work on AI under existing system of DLS **xi.** Poor maintenance of physical facility and lab equipments **xii.** Manpower produced are less in number.

Recommendations for a successful AI programme:

i. Government should be maintained genetically potential AI bull and cow **ii.** To be ensure good quality semen **iii.** Should be

Improved management **iv**. Government should recruit sufficient skilled AI technicians **v**. Development of awareness about AI to the farmers **vi**. Must be Proper heat detection and ensure the timing of AI **vii**. Increase no. the local AI service stations **viii**. Encourage the public private partnership **ix**. Ensure a sustainable breeding policy by the Government **x**. Keep the cattle in balanced and ensure the sufficient green grass **xi**. Ensure a sustainable breeding policy the Government **xii**. To increase the Animal health care facilities **xiii**. Government should be strengthened of the extension service as well as the follow up of the AI **xiv**. Increase the marketing chain.

Conclusions

From above discussions, it is clear that if the AI service could be implemented with proper care through minimizing the existing constrains, the daily protein demand for strong, healthy nation could be meet up. Through proper AI programme, we could also ensure the food security and could reduce the expenditure related to baby food and animal protein.

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