Technical Note

Constraints and recommendation for countrywide extension of artificial insemination in buffalo, goat and sheep

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Abstract

Background: The workshop aimed to identify the constraints and propose solutions to expand artificial insemination in buffaloes, sheep and goats across the country.

Methods: A day-long workshop was jointly organized by the Coastal Vet Society Bangladesh (CVS-BD) and Grameen Jano Unnayan Sangstha (GJUS) at the Bangladesh Development Society conference hall in Barishal district, Bangladesh. Approximately 100 stakeholders from various sectors participated in the workshop.

Results: The workshop revealed several constraints hindering the adoption of artificial insemination in buffaloes, sheep, and goats. These included the absence of breeding policies and recording systems, limited knowledge about high-yielding breeds, shortage of quality feed, fodder, and pasture land, insufficient technical skills among reproduction and production personnel, inadequate breeding infrastructure and facilities, lack of coordination among farmers, researchers, and public and private organizations, and limited availability of proven sires. To address these constraints, the following recommendations were proposed: Strengthen breeding policies and infrastructure, upgrade native breeds with high-yielding varieties, implement assisted reproductive technologies, promote the benefits of buffalo milk and meat, provide technical training to improve manpower, enhance national and international collaboration, encourage private investment, and ensure alternative feed supply.

Conclusion The workshop concluded that a collaborative effort between public and private sectors is essential to expand artificial insemination programs in buffaloes, sheep, and goats nationwide.

Keywords: Buffalo, sheep, goats, AI, constraints

Introduction

The buffalo is one of the economically important species not only in Bangladesh also in the world. But the popularity of buffalo rearing is not much higher than that of cattle. Although Bangladesh has about 1.49 millions buffalo (DLS, 2022) those are found in the Bramhaputra-Jamuna flood plain of central Bangladesh and Ganges-Meghna flood–plain of southern Bangladesh. Buffaloes are mainly raised under an extensive system in the coastal and hilly areas where large scale pasture land and enough green forage are available (Faruque *et al*., 1990). Anestrous and heat detection in buffalo cows are the major problem of buffalo reproduction in Bangladesh. Estrus synchronization is already proven as a useful technique in cattle practice as it allows the use of fixed time AI or improved heat detection efficiency as well as eliminates the problems of heat detection in dairy cattle. Moreover, buffaloes have low reproductive performance compared to bovine due to weak estrus symptoms, seasonal anestrous, long post-partum anoestrus period, delayed age of puberty and low conception rates, which limit the productivity of this species worldwide (Qureshi *et al*., 2007). However, traditional methods for breeding have been yielded little achievements due to insufficient pedigree information and long generational interval. In addition, traditional breeding program needs long time to achieve noticeable genetic improvement. Artificial insemination (AI) is the single most important reproductive biotechnology, which has revolutionized animal breeding (Warriach *et al*., 2008). Buffalo farming has made remarkable progress in productivity mainly because of controlled breeding with artificial insemination that has proved its worth in breed improvement and breeding managements across the livestock species. But still efficiency of AI is below standard. It is reported that field AI conception rate is 29% and is affected by many factors including those related to farm, animal, semen, nutrition, hormonal stage and

AI technique (Anzar *et al*., 2003). The early diagnosis of cyclicity and pregnancy can also improve the efficiency of AI services. Taken into consideration the present situation, the current project focuses on to identify the constraints that affect the success of artificial insemination services under field condition.

Sub-tropical weather in Bangladesh is favorable for sheep farming. The few numbers of non-descriptive breed, called indigenous sheep are sparsely distributed throughout the country. However, the productivity of these sheep is low due to poor genetic merit, poor nutrition as well as management, seasonal fluctuations in feed resources and diseases (Alam *et al*. 2006; Mukasa-Mugerwa *et al*., 2002). They are slow in body growth and small in body size. Therefore rearing of sheep is unable to ensure food security and a better living standard to the sheep farmers at the present time.

In our country, sheep and goat are mainly kept by the poor farmers and reared extensive system without any supplementation. Under nutrition results in the loss of body weight and body condition, delays the onset of puberty, increases the post-partum onset of estrus, interferes with normal ovarian cyclicity by decreasing gonadotropin secretion and increases infertility. Nutrition during gestation not only affects maternal body weight gain, body condition, and reproductive performance, but also affects prenatal and postnatal offspring growth and development. Estrus detection in indigenous ewes is very difficult because of their weak estrus signs (Rahim *et al*., 2021).

Goat farming as small scale is popular in Bangladesh. It is reared integrally with other farming system (Paul *et al*., 2021). The goat is reared as traditional system at the coastal region of Bangladesh. Rural women are taking care goat beside their house hold works. Black Bengal is only pure breed of Bangladesh. Most of the goats (90%) reared are Black Bengal, reputed for their prolificacy, fertility, early sexual maturity, adaptability to hot humid conditions and superior

quality meat and skin (Amin *et al*., 2001). However the haphazard breeding system seriously abolishes our indigenous breed. The indigenous non descriptive breed is suitable and disease resistant of our climatic condition. The breed at the coastal region has found some dissimilarity from other parts of Bangladesh i.e. salinity tolerant, grazing in low land with water, not feel scared during grazing under raining (Paul *et al*., 2021). The objectives of this workshop were to know about the present scenario of artificial insemination (AI) of buffalo and also to know how the challenges will be overcome by using the existing facilities.

Materials and methods

On 25 November, 2023 a day long workshop was organized jointly by the Coastal Vet Society Bangladesh (CVS-BD) and Grameen Jano Unnayan Sangstha (GJUS) at Bangladesh Development Society conference hall in Barishal district. A total of 100 stakeholders in different aspect were joined in this workshop. The workshop was entitled with "Present scenario of buffalo, sheep and goat artificial insemination: perspective Bangladesh".

Participants

The participants of the workshop was included farmers (buffalo, sheep and goat farmer), AI technicians from both government and private sectors, NGO and developmental veterinarian and workers and employees, Government officers (District Livestock Officer, Deputy Director AI, Upazila Livestock Officers, Veterinary Surgeons), Government project related officers (Livestock Extension Officers), University Professors, Post-graduate and undergraduate students, veterinarian and employees from Pharmaceuticals companies.

Group study and data synthesis

The group study was conducted to find out the constraints and its way of overcome the challenges. Total six groups were formed for those three species and two groups for each species. In those two species

group, one group discussed and enlisted on constraints of artificial insemination and another group on recommendation to way forwards the artificial insemination program. Each group was encompassed with different stakeholders. After compilation the data from each group, it was presented among the total participants and integrated the audience opinion to achieve the final data.

Results and discussion

Constraints of AI in buffalo in Bangladesh

The following constants were found out from the workshop for AI in buffalo.

Inaccurate estrus detection

Buffalo cows do not shows estrus signs as like a cow. Therefore farmer could not detect the estrous buffalo in proper time.

Time of insemination

The detection of estrous of buffalo cows is very important because of insemination time is depend on it. Proper time detection for AI is the major constraints of AI in buffalo.

Bathan practice for buffalo management

Most of the buffaloes are reared as *Bathan* (free range areas for grazing) practice. Therefore the nutritional status, disease condition, physical status others status could not monitor. Therefore most of the animals are suffering for nutritional deficiency diseases and fail to conceive after AI. The estrous signs are also undetectable due to this practice.

Seasonality of breeding

Buffaloes are short day breeder and their breeding season is winter (November to February in Bangladesh). During this period there is the scarcity of green grasses in the *bathan*. The health condition is deteriorates gradually and become unable to shows estrous signs and could not perform AI.

Control of buffalo during AI

The buffalo are little wild or feral in nature as it is reared in free range system. Therefore it is very difficult to catch and control during AI.

Anatomical structure of buffalo hind quarter

The pelvic girdle of buffalo is little bending downward. Therefore, skilled AI technician is needed

for AI in buffalo cows.

Communication system

The road communication in the coastal region is not well due to lake and river. Therefore, AI technician cannot research in the farm on time and finally in proper time of AI as well as conception failure is occurred.

Farm supporting staff factors

The worker who is working in the *bathan* or farm, aren't interested to take the responsibility to detect and send information to AI technician. Therefore the buffalo cows are not detected on estrous and AI is not performed.

Calf mortality

The buffalo calf mortality is high in the coastal region due to lack of knowledge about good management system pregnant cows, nutritional deficiency, inbreeding, absence of buffalo shed etc. This problem is common for natural breeding and artificial breeding system however; there is a rumor among farmers that AI calf has high chances of mortality.

Inadequate AI point

The number of buffalo AI point in the coastal region is few and somewhere is absent. Therefore it is markedly hamper the AI program.

Lack of awareness

Farmers are not aware for conducting AI in their buffaloes. It is due to few ideas about breeding system.

Lack of semen

The frozen semen is not available in countrywide.

Lack of publicity

The publicity for AI in buffalo and its importance is not conduct at mass media or print media. There is some publicity is conducted by NGOs and projects.

Recommendations and ways to extent the AI in Buffalo

Building awareness among farmers

Government, NGOs and private company should taking steps to conduct awareness program for AI in buffalo among the buffalo farmers to influence and disseminates the merit of the technology.

Household approach of buffalo farming

As the buffalo is reared in *bathan* practice and few in household approaches, therefore, it is needed to encourage the farmer for rearing in household. If it is practiced then the feeding, nutritional supplements, vaccination, deworming and others can easily supply to animals. It is also important for heat detection by observing the estrous sings.

Establishment of AI point

It is necessary to establish more AI point in different buffalo populated areas of Bangladesh to disseminate the technology at farmer door steps.

Improvement of the skill of AI technician

As the anatomical structure of buffalo hind quarter is different from cattle therefore the follow up training program is needed to organize for increase the skill of AI technicians.

Awareness program

It is needed to create awareness among farmers about the negative effects of natural service and inbreeding, benefits for record keeping of the animal's data.

Build up island (killa) for low lying area

It is necessary to build up *killa* in the coastal low lying areas. The AI point should be established in each *killa*. The existing *bathan* of buffalo may convert into modern farm through providing subsidy or project.

Supply of heat detection device

The supply heat detection device among the AI technicians and farmers with feasible price may helpful for heat detection and AI services. The device may also supply by creating buffalo hub.

Train up the farmers

Frequently training program is needed to arrange for farmers regarding the time claimed technologies.

Digital tagging of buffalo

The digital tag may use for buffalo record keeping. Government may supply the tag among farmers.

Publicity

The huge publicity of buffalo rearing through mass media, electronic and print media is needed. The booklet or leaflet for nutrition requirement of buffalo in different ages may supply to the farmers.

Others

Vaccination and deworming campaign is essential at regular interval to the buffalo populated areas. The teaser bull may introduce in the *bathan* for heat detection. The intensive or monthly allowance for AI technicians is needed to provide in handsome level. Preparation of silage is to preserve the roughage for dry period (winter season).

Constraints of AI in sheep and goat in Bangladesh

The farmers are not aware to take AI services. The AI technicians are not interested to AI sheep and goat due to low price and income. The AI technicians are not having proper skill and technique to conduct AI. The goat semen is not available and sheep semen is not produced in both government and private sector. The conception rate for AI in goat is low. Therefore it is needed more research for adapting it.

Recommendations and ways to extent the AI in sheep and goat

It is needed to produce semen from proven male and make it available countrywide. The government and private sector may play an important role to produce semen and marketing. The model farm may establish for showing the rural women as for motivational visit and encourage them. The vaccination and deworming program may accelerate countrywide against infectious diseases. The training program at household stage may conduct to increase their interest for genetic up gradation. The women AI technicians may develop at every union to provide the service. More research activity may conduct for increasing the semen quality and pregnancy rate of sheep and goat. The government may make breeding policy for AI in sheep and goat. The huge publicity through mass media, electronic and print media is needed.

The buffalo productions systems are widely vary similar to other developing countries, in concurrence with climate, soil and socio economic opportunities in Bangladesh (Saadullah, 2012). Few studies reported the constraints of buffalo, sheep and goat reproduction. They also found that poor productivity of the native buffaloes as a result of poor genetic potential, few input services for the buffalo farmers, inadequate public awareness, insufficiency of feeds and fodder, seasonality behavior of cyclicity were the main contain of buffalo rearing in Bangladesh (Saadullah, 2012; Hamid *et al*., 2016; Nath, 2021). The good breeding policy to improve genotype of these indigenous buffaloes, sheep and goat through appropriate and continuous research is needed. It is also recommended to make available of AI facilities in the villages with supporting the farmers.

Conclusions

It is concluded that the prospect of buffalo, sheep and goat breeding in Bangladesh is economically important. Therefore, it is needed to take proper initiative through public and private partnership or collaboration to extent the AI countrywide.

Acknowledgement

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