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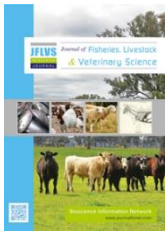

Farmer's challenges in adopting artificial insemination of cattle in Bangladesh

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ABSTRACT

Cattle are one of the indices of civilization, sources of wealth, health and prosperity for the nation. Cattle provide us food, cash as well as mechanical power. The production of cattle is low due to their poor genetic makeup, indigenous and large incidence of diseases. Artificial Insemination (AI) is the first generation reproductive biotechnology that has made a profound contribution to the genetic improvement as well as recognized breeding tool of the cattle. But the farmers in Bangladesh are yet to adopt it perfectly. For these, the principle objective of the study was to determine the extent of problems faced by the farmers in adopting AI of cattle. Problem confrontation was measured based on 18 different aspects of AI using four point scale where 3 indicates high problem, 2 medium, 1 low and 0 no problem at all. The study was conducted in Kishoreganj Sadar Upazila under Kishoreganj district. Data were collected from randomly selected 100 farmers out of 340 farmers using an interview schedule. The majority of the farmers (58%) had medium problems while 39% had high and only 3% had low problems in adopting artificial insemination. Among the problems, inseminator problem and heat stage were considered the most critical problems in the survey area.

Key Words: *Artificial Insemination, Biotechnology, Technology and Inseminator*

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I. Introduction

In Bangladesh, there are 22.9 million cattle (DLS, 2008). The contribution of livestock plays an important role in the national income. Cattle provide us food as well as power which plays a significant role in agricultural production. Statistics show that about 6.5% of national GDP is covered by the livestock sector, and its annual rate of productivity is 9%. About 20% of the population of Bangladesh earns their livelihood through work associated with raising cattle and poultry. Livestock resources

also play an important role in the sustenance of landless people (DLS, 2008). Development of livestock resources depends on several factors such as veterinary health services, veterinary support services, delivery systems of veterinary biological products, quality production inputs, veterinary extension services, and cooperation between private and public sectors dealing with various health problems of livestock, viz. diagnosis of diseases, their treatment, prevention and control. Other aspects vital to the development of livestock resources include improvement of livestock through genetic up gradation, artificial insemination (AI), transfer of technology, etc. Despite our large number of cattle populations, the production of milk is insufficient against our requirements (Grohn and Rajwala, 2000; Santos, 2007). The production of cattle is low because of their poor genetic makeup; about 90% of the total population is *Zebu* type which is non-descriptive and indigenous and large incidence of diseases always hampers their production (BLRI, 2007). No specialized breed has yet been developed in our country which could help to gear up the quality of cattle to ensure higher production of milk as well as meat. Reproductive inefficiency in turn, however, affects dairy herd profitability by decreasing milk yield, the number of replacement heifers produced and by increasing the culling rate. Maximizing both conception and service rate provides opportunities for management control of reproduction and profitability in the dairy herd.

Artificial Insemination (AI) is the first generation reproductive biotechnology that has made a profound contribution to the genetic improvement of the cattle. Failure of cows to become pregnant and the need for repeated AI are usually causing frustration and economic losses of the cattle farmers (Stevenson et al., 1990). Although AI is a widely recognized breeding tool but farmers in Bangladesh are not yet able to adopt it perfectly. This is due to facing some problems while practicing AI at farmers' level. Some of the problems are poor ability to adapt services, low pregnancy rate, poor communication, unable to select the desired breed and to practice AI inappropriate time etc. (Alam, 2005; Paul, 2008). Like many other developing countries, poor reproductive efficiency has been considered the major limiting factor in dairy farming. It is not possible to develop dairying without increasing the AI efficiency of cattle. Therefore, this research aims to investigate the extent of problems faced by the farmers in adopting AI of cattle.

II. Materials and Methods

Study area, sampling design and research instrument

The study was conducted in Gangail and KotSholakia villages of Kishoreganj Sadar Upazila under Kishoreganj district. The area was selected because a lot of farmers in the area adopt government and non-government Artificial Insemination (AI) for their cattle. In artificial insemination performance, 2010, Kishoreganj Upazila Livestock Hospital ranked the first position among livestock hospital in Bangladesh (DLS, 2010). In total there were 340 farmer families in Gangail and KotSholakia which were considered as population of the study. Thirty percent of the population (total 100 farmers) was randomly selected by using a Table of Random Numbers as a sample of the study and a sample frame was prepared alphabetically before taking the samples. A structured interview schedule was prepared to keep the objectives of the research. To prepare the interview schedule and secure in-depth information, focus group discussion (FGD) was also conducted.

Variables of the study and their measurement

Various socio-economic characteristics of the farmers like age, level of education, household size, Farm size, Farming Experience, Training experience, Extension media contact, Social mobility, Cattle strength, Knowledge on Adopting AI for Cattle, Annual family income from crop farming and others, Income from livestock and poultry were considered as the independent variables of the study. The dependent variable was problem confrontation of the farmers in adopting AI for cattle**.** Problems were measured by using the interview schedule. The farmers were asked to give their opinion on 6 selected aspects of problems including 18 questions which were identified through FGD with the farmers during pre-testing of the questionnaire. To determine the problems faced by the farmers, they were asked to give their opinions against a four-point scale such as 'high', 'medium', 'low' and 'not at all'. The weightage of the responses was given below

Responses	high	medium	low	not at all
Weightage	3	2	1	0

The total score of the faced problem by a respondent could be ranged from 0-54, when '0' indicates no problem and '54' indicate high problems. To ascertain the extent of the seriousness of problems, total score for each of the problems was computed. Problems were then ranked according to the total score. Total score = (high responses x their weightage) + (medium responses x their weightage) + (low responses x their weightage)

Data collection, processing and analysis

Data were collected by face-to-face interview method with respondents. At the end of data collection, the collected data were coded, compiled, tabulated and analyzed. The local units were converted into standard units. The qualitative data were transferred into quantitative data by appropriate scoring technique. The responses of the respondents that were recorded in the interview schedule were transferred into a master sheet for entering the data into the computer.

III. Results and Discussion

Independent variables/ Characteristics of the farmers

In the present study, twelve characteristics of the respondents were considered. The salient features of the characteristics of the farmers and their classification have been presented in Table 01.

Table 01. Salient features of the selected characteristics of the farmers

Characteristics (measurement unit)	Possible Range	Observed Range	Mean			SD
			Category		%	
Age (year)	Unknown	25-65	Young (<30) Middle (30-50) Old (>50)	15 64 21	42.14	9.57
Level of education	Unknown	0-14	Illiterate (0) Primary (1-5) Secondary (6-10) HSC (>10)	10 42 29 19	6.27	4.13
Household size (number of member)	Unknown	2-9	Small (<4) Medium (4-6) Large (>6)	52 31 17	4.68	1.65
Family income from crop farming and others (TK"000")	Unknown	0-250	Low (<60) Medium (60-150) High (>150)	9 61 30	122.4	51.19
Income from livestock and poultry (TK"000")	Unknown	5-323	Low (<60) Medium (60-150) High (>150)	24 65 11	97.4	63.03
Farm size (hectare)	Unknown	.03-6.8	Marginal (<0.2) Medium (0.2-1) Large (>1)	0 80 20	2.20	9.45
Farming experience (year)	Unknown	2-35	Low (<2) Medium (2-3) High (>3)	6 10 84	12.17	8.75
Training Experience (day)	0-10	0-8	Minimum (<2) Medium (2-5) Maximum (>5)	82 15 3	1.09	1.50
Extension media contact (scores)	0-48	5-31	Low contact (<16) Medium contact (16-32) High contact (>32)	48 52 0	18.03	5.51
Social mobility (scores)	0-18	3-16	Low contact (<6) Medium contact (6-12) High contact (>12)	98 1 1	7.19	2.79
Cattle strength (no)	Unknown	2-13	Small (<3) Medium (3-5) Large (>5)	14 54 32	5.29	3.02
Knowledge about Artificial Insemination (score)	0-26	2-24	Low (<6) Medium (6-12) High (>12)	1 26 73	15.51	4.44

According to data, the findings indicated that the highest proportion (64 percent) of the farmers in the study was in the middle aged category. Particularly the middle-aged farmers were well experienced and more acquainted with the livestock rearing. Almost similar findings were reported by (Akter, 2003; Hasan, 2006; Sharmin 2008).

Among the total respondent, it was observed that the majority of the farmers had primary education (42 percent). It is assumed that people having higher education are more progressive and innovative than those of illiterate and could perform better in adopting artificial insemination. Almost similar findings were observed by (Akter, 2003; Hasan, 2006; Sharmin, 2008). The majority (52 percent) of the cattle farmers had small sized families. Generally, high and medium household sized families seek a secondary way to meet up their extra burden of family cost due to large family size. Results from (Akter, 2003; Sharmin, 2010) were much close to the present study. The highest portion (61 percent) of the respondents had medium annual family income (61-150). The opportunities of the farmers' income sources were low due lack of education and skill. The income of the farmers was also lower due to having no and small area of land and had been trying to improve their living standard through utilization of their knowledge and on others'/own land to cope with poverty. The observation was nearby (Aktaruzzaman, 2006; Islam, 2004; Hossain, 2007; Mondal, 2007), where they found major portion of the rural farm families possessed medium income. Most of the farmers (80 percent) were in medium farm size category. It is assumed that the medium farmers due to the lack of capital try to invest their wealth in such kind of sources, which will return quick output. The finding was almost similar to (Islam, 2004; Aktaruzzaman, 2006; Hossain, 2007; Mondal, 2007). The Major portion of respondents (84 percent) had high farming experience. Higher farming experiences influence farmers to initiate any developing program to upgrade their cattle. Findings of (Sharmin, 2010) supported the present study. Most of the farmers (82 percent) had low training experience. The cattle farmers were unaware of various training courses offered by different organizations. (Islam, 2004) found that training experience was an important factor, which enhanced the level of knowledge and improve skills on various aspects of agricultural technologies. Forty-eight percent of the respondents had low contact in extension media. Media is a very effective source of receiving information about new and modern technologies on cattle rearing activities. Social mobility is also a very effective source of receiving information about new and modern technologies on cattle rearing activities. Discussions with others inspire farmers to involve in any developmental activities. The finding was almost nearby (Islam, 2004; Aktaruzzaman, 2006; Hossain, 2007; Mondal, 2007). The majority of respondents (54%) had medium cattle strength. It is assumed that farmers with fewer cattle strength discourage farmers to initiate any developing program to upgrade their cattle (Khan, 2008). Around 73% had high knowledge of cattle farming activities. The educational level of farmers in the study area was primary to secondary i.e. moderate level. This level of education brought the light of knowledge into them. Consequently, most of the respondents had a high level of knowledge of artificial insemination activities. The findings (Islam, 2004; Aktaruzzaman, 2006; Hossain, 2007; Mondal, 2007) were very close to the present study.

Problem Confrontation by the farmer

Six aspects of the AI were selected to measure the extent of problems in adopting it by the farmers. The findings are interpreted in the following subsections.

Overall problem of farmers in adopting AI: The extent of problems was assessed based on problem confrontation Table. The values could range from 0-54. The observed values ranged from 17-51 with an average of 33.16 and a standard deviation of 6.916. Based on their problem confrontation values the respondents were classified into three categories as shown in Table 02.

Table 02. Problem of farmers in adopting AI

Range		Respondents		Mean	SD
Possible 0-54	Observed 17-51	Categories	Respondent Percent (N=100)	33.16	6.916
		Low (up to 18)	3		
		Medium (19-36)	58		
		Maximum (>37)	39		

Data in Table 02 revealed that about 3 percent of the farmers had minimum problems, 58 percent had medium and 39 percent had maximum problems. AI is an effective practice for cattle up gradation. But farmers faced a lot of problem in practicing AI. Most of the farmers in study area are in middle age category and their literacy level is also very low. Farmers of middle age group are less innovative than young people. This is why their problem is medium.

The young farmers are more innovative and usually adopt new technology a bit earlier than other farmers of the social system. This finding is supported by (Sarker, 2001).

Extent of problem in adopting AI: As many as 18 problems in connection with Artificial Insemination of cattle were included in problem confrontation scale. Farmers gave their responses as high, medium, low, not at all for each problem included in problem confrontation scale based on their extent of problem in adopting artificial insemination.

Data furnished in Table 03 indicate that the 'Inseminator problem' ranked first, 'Heat stage' ranked second. Sequentially, 'Implementation stage' was third, 'Provision of AI service' was fourth, problem related to 'AI centre' ranked fifth and problem in 'Post implementation stage' was last in ranking order. For more clarification, ranking order of aspect of problems has been shown in Figure 01.

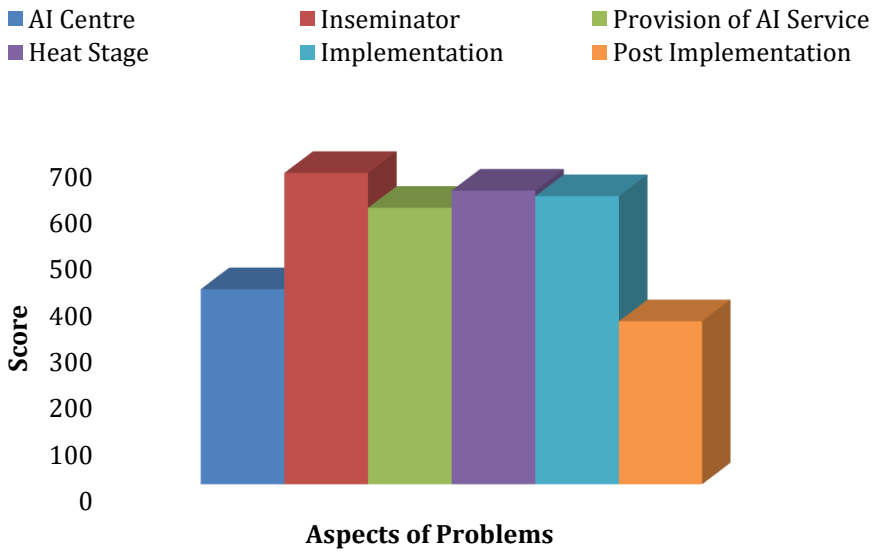

Figure 01. Aspect-wise problems in adopting Artificial Insemination

From the rank order, it is found that the aspect of problem 'inseminator' possessed the first position. The lateral problems like as 'lack of adequate number of artificial inseminator', 'lack of proper skill on AI' and 'lack of commitment to the service'. This is because a few numbers of AI worker involved in AI service in every village which cannot meet up the demand of farmers. Most of the AI workers have not enough sincerity about their job. As a result, problem during insemination occurs which discourage farmers to choose artificial insemination technology for their cattle. It was highly related finding with that of (Paul, 2008).

Aspect of problem 'heat stage' possessed the second position. It includes the problems like 'lack of farmers knowledge on detecting heat stage accurately', 'unable to identify silent heat', 'lack of proper knowledge on handling cattle during heat stage'. This is because most of the farmers in the study area had not enough practical knowledge. Moreover, they were involved in off-farm activities such as service, business and day laborer. So they cannot concentrate on their cattle and could not identify silent heat. The knowledge gap between artificial inseminators and farmers is another reason. Similar findings found by Paul (Paul, 2008).

'Implementation' possessed the third position in rank order which includes 'lack of practicing AI due to big payment', 'lack of artificial inseminator's co-operation with farmers' and 'lack of farmers awareness of AI'. Farmers prefer natural insemination than artificial insemination because of its cost.

Insemination service by nongovernment organization (like BRAC) demands a high price for each insemination. It is difficult to bear by the low and medium income farmers. Inseminators didn't co-operate with the farmers about technical support and information. Farmers are also responsible for this problem because their awareness of AI is insufficient. Similar findings found by (Santos, 2007).

Table 03. Problems faced by the farmers in adopting Artificial Inseminations

SI. No.	Aspects and Statement of the Problems	Extent of problem (per person)				TS	RO
		H	M	L	N		
	Inseminator					670	1
1	Lack of desired number of Artificial Inseminator	63	27	10	0	256	2
2	Lack of proper skill on AI	15	53	30	1	183	10
3	Lack of commitment to the service	47	35	18	0	231	3
	Heat Stage					632	2
4	Lack of farmer's knowledge on detecting heat stage accurately	19	53	25	3	170	12
5	Unable to identify silent heat	79	14	4	3	272	17
6	Lack of proper knowledge on handling cattle during heat stage	19	53	25	3	190	8
	Implementation					620	3
7	Lack of practicing AI due to a big payment	37	43	20	0	220	7
8	Lack of A Inseminator's cooperation with farmer	49	24	23	4	221	6
9	Lack of farmer's awareness of AI	24	39	26	11	179	11
	Provision of AI Service					595	4
10	Unavailability of service provides at crucial moment	44	41	14	1	227	5
11	Lack of doorstep service provision	45	40	11	4	229	4
12	Lack of delivering message to the inseminator at appropriate time	5	44	35	16	139	14
	AI Centre					420	5
13	Lack of sufficient number of AI centre	15	56	29	0	186	9
14	Lack of modern facilities in existing AI centre	4	61	35	0	172	12
15	Unavailability of semen compared to demand	1	10	39	50	62	17
	Post Implementation					**351**	**6**
16	Failure of conception	5	26	62	7	131	15
17	Lack of supplying concentrate feed due to high price	7	12	32	49	71	16
18	Abortion due to lack of knowledge and handling cattle just after AI	0	55	37	8	149	13

Note: H=High, M=Medium, L=Low, N=Not at all, TS=Total Score, M=Mean, RO=Rank Order

The provision of AI service ranked four. 'Unavailability of service provides at the crucial moment', 'lack of doorstep service provision' and 'lack of delivering message to the inseminator at appropriate time' are the problems under this aspect. Many of the respondents faced problems during provision of AI service. AI service at a crucial moment and doorstep service provision partially depends upon the availability of AI workers. Many of the respondents could not inseminate their cattle at the time because of the distance of AI centre; they could not reach the centre at the proper time. Moreover, because of minimal number of inseminator, delivery of messages to them by the farmers became tough. Similar findings were also reported by other researchers (Santos, 2007; Paul, 2008).

Artificial Insemination Centre (AI Centre) is in a number of the fifth position which belongings the lack of sufficient number of AI centre, lack of modern facilities in existing AI centre and unavailability of semen compared to demand and finally the sixth positioned factors is post implementation which includes failure of conception, Lack of supplying concentrate feed due to high price and abortion due to lack of knowledge and handling cattle just after AI.

IV. Conclusion

Based on the findings 'inseminator' ranked first, 'heat stage' ranked second, 'implementation' ranked third and 'provision of AI service' ranked fourth among the six aspects of problem. So, it may be concluded that problems under these four aspects stand as the root problems in the adoption of artificial insemination by the farmers. The findings of the study revealed that the majority of the respondents faced their problems with inseminator facilities. It may be recommended that the Department of Livestock Services and other organizations should take necessary steps such as recruitment of an adequate number of inseminator, arrangement of training of AI workers to develop their skills.

V. References

[1]. Akter, T. (2003). Participation of Women in Income Generating Activities (IGA) of SUS (unpublished master's thesis). Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

[2]. Aktaruzzaman, M. (2006). Functional Participation of Landless Women in Income Generating Activities (IGAs) Under Saip of DAE. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

[3]. Alam, M. G. S. (2005). National Livestock Policy and Action Plan, Veterinary Services and Animal Health, FAO Office, Dhanmandi, Dhaka, Bangladesh.

[4]. BLRI. (2007). Expansions and Activities. Bangladesh Livestock Research Institute, Government of the People's Republic of Bangladesh. Annual Report.

[5]. DLS. (2008). Annual Report. Department of Livestock Services, Government of the People's Republic of Bangladesh.

[6]. DLS. (2010). Annual Report. Department of Livestock Services, Government of the People's Republic of Bangladesh.

[7]. Grohn, P. and Rajwala, J.P. (2000). A flow cytometric method for rapid determination of sperm concentration and viability in mammalian and avian semen. Journal of Andrology, 25, 255-264. https://doi.org/10.1002/j.1939-4640.2004.tb02786.x

[8]. Hasan, K. (2006). Participation in Farming Activities by Conventional and Organic Farmers. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

[9]. Hasan, M. K. (2006). Participation in Farming Activities by Conventional and Organic Farmers. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

[10]. Hossain, M. S. (2007). Participation of Rural Women in Homestead Agriculture. Department of Agricultural Extension Education. Bangladesh Agricultural University, Mymensingh.

[11]. Islam, M. Z. (2004). Participation of Rural Women in Goat Rearing in Selected Area under Manikgonj District. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

[12]. Khan, M. R. K. (2008). Post Artificial Insemination conception rate in cattle at Bangladesh Agricultural University Veterinary Clinic. Department of Surgery and Obstetrics, Bangladesh Agricultural University, Mymensingh.

[13]. Mondal, M. A. A. (2007). Poverty Alleviation through Micro-credit of BRAC Women Beneficiaries. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

[14]. Paul, A. K. (2008). Factors that Limit First Service Pregnancy Rate in Cows at Char Management of Bangladesh. Department of Surgery and Obstetrics, Faculty of Veterinary Science, Bangladesh Agricultural University, Mymensingh.

[15]. Santos, M. J. (2007). Reproductive and Productive performance of indigenous cows. The Bangladesh Veterinarian, 18, 123-129.

[16]. Sarker, M. A. (2001). Farmers' Attitude towards Organic Homestead Gardening Programme of World Vision. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

[17]. Sharmin, J. (2010). Knowledge and Attitude of Farmers towards the Rearing of Red Chittagong Cattle in an Area of Mymensingh District. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

[18]. Sharmin, M. E. (2008). Need Assessment for Capacity Building of Rural Women in Participating Post-Harvest Activities of Brinjal Production. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
[19]. Stevenson, J. S., Call, E. P, Scoby, R. K. and Phatak, A. P. (1990). Double Insemination and Gonadotrophin releasing hormone treatment of repeat breeding dairy cattle. Journal of Dairy Science, 73, 1766-1722. https://doi.org/10.3168/jds.S0022-0302(90)78855-8

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