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COLLECTION TECHNOLOGY OF WOOL FOR MARKETING

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ABSTRACT

This research was conducted to find out the performance of sheep-wool in Bangladesh. A complex multi-equation system model is established to represent the collection of wool from sheep using both Annual Selling and Simulation Matrix (SIMM) Model Technologies. The objective of this research was to determine wool production, effective wool collection and marketing from sheep farming. The number of sheep like 1, 10, 100, 1000 etc. is reared up by the small, medium large and commercial farmers. Results show sheep producer can sale all kids at the end of the year except selling female sheep and can collect 1, 10, 100, 1000kg wool from rearing 1, 10, 100, 1000 female sheep respectively. The shearing of wool twice and selling kids in a year can be a technology of wool collection. So if sheep-producers' target is only wool collection then needs establishing wool local market first. Therefore, at present raw and finished wool market needs to be established before starting wool production i.e. sheep farming.

Keywords: wool collection, sheep production, annual selling method, SIMM method

INTRODUCTION

In Bangladesh, at present the number of sheep population is 30.82 million (BBS, 2012) which are reared mainly for meat. Although sheep farming is a profitable program but the increases number of female sheep needs a large portion of land and money investment. It is not easy to invest more sheep for small farmers because of land costing and investment. Increase population and decrease land area at present is a great challenge of agriculture. Day by day the land area is occupied by residence, mill, factory, industry, garments etc. Fallow land, grazing land goes under crop cultivation to produce more crops for rising people. But practically, the collection of wool is possible only during rearing sheep. In the next future wool production will be increased because of rising sheep population for sheep farming, consequently farmers can generate additional income also by selling sheep-wool. About 32% are reared in 3 ecological zone, Barind, Jamuna and Coastal areas. Higher wool yield was obtained in coastal sheep in the summer. Though the wool was coarse and hairy, wool from coastal sheep had more bends per inch and was finer. Highest birth weight and wool production was in Coastal sheep but better reproductive performance was in Barind sheep (Hassan, etal., 2011). In India, khan et al., 2003 found that wool production was 1.3 kg/year in Tirahi breed of sheep. Singh and Bohra ,1996 reported that average wool yield was150g per shearing. Bose et al., 1999 showed that wool of Garole was extremely coarse, hairy and not very dense. Sharma et al., 1999 observed average annual adult wool yield from Garole sheep procured from Sundarban area was 179g and was for rough carpet use. Prasad, 1997 reported average annual production of wool per sheep was around 300g. On the other hand Pan and Sahoo 2003 and Pan et al., 2004 recorded the Garole could produce approximately 400g greasy fleece annually. In 2013, the average sheep in the U.S. produced 7.3 Ibs of grease wool (www.sheep 101). But in Bangladesh, farmers are not rearing sheep for wool. However, the Government of Bangladesh has given importance on sheep production to generate income and alleviate poverty of rural poor. So there is a great opportunity of wool collection in Bangladesh. Sheep were neglected in the past, therefore there is limited information regarding the potential of native sheep. Yasmin (2003) studied on the status of sheep production and marketing in Bangladesh, mentioned no wool market in

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Bangladesh. Still now there is no wool-market facility available. Due to absence of wool market, farmers are not getting facilities from wool. Not only that, farmers not well-known about wool and wool collection system also. Mainly in the case of small area of land, it needs to know effective wool collection technology. Research on sheep-wool is scanty but it is very essential to give importance on wool production, collection and marketing during rearing sheep. On this background the objective of this research was to determine wool production, effective wool collection and marketing of sheep farming.

MATERIALS AND METHODS

Model Specification

In this study, the system modeling being considered is both biological and economical requires Simulation Matrix (SIMM) model and Annual Selling method (Yasmin, 2010). The total number of sheep population depends on female breeding stock. If female sheep (3rd and 5th parity) give first birth in February then second birth is in August. If gives twice birth in a year, then at the end of the year, i.e. in December, all of the live sheep go for selling to market, commercial farm slaughter house and to businessmen and again rearing start in January with only one female sheep. That is why no need to extend the land, house and feed for more sheep. This process can be continued for year after year. After selling all sheep, only the female sheep can rear-up for second year production. After production, rearing is continued to end of the year and then sell to businessmen or to slaughter house. Activities of kid production and wool shearing can do twice in a year (Fig.1).

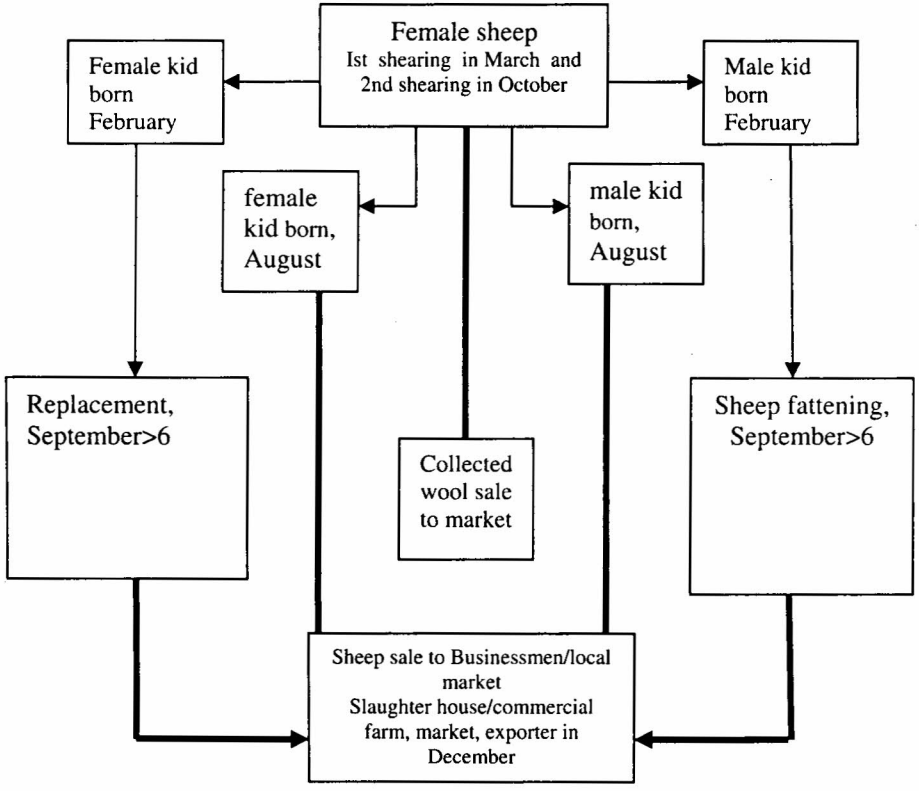

Fig.1. Annual sheep-wool collection technology

It offers an opportunity to a manager of an enterprise for testing management decision to increase profitability using collecting wool. After selling all sheep only the female sheep can remain for the next sheep production purpose. No need to utilize more land to rear up all sheep. The farmers can be benefited after selling not only kids but also wool.

Analytical Framework

Selection of Simulation Matrix (SIMM) model

This study developed the technology using Simulation Matrix (SIMM) model. System can be defined as a collection of components and their interrelationships. Simulation is a procedure of equations for computing successive time increased. The system simulation model includes "She sheep – kid operation" with 2 major components of the system as i) sheep population ii) wool collection. The simulation model is used as a tool of the decision maker, extending his ability to evaluate the outcome. The SIMM model was used to simulate the female breeding stock (FBS), male breeding stock (MBS), male kid (MK) and female kid (FK). The overall SIMM technology discussed from January to December.

The following equations of the SIMM Model are used for sheep population.

Female Breeding Stock (FBS):

$$FBS_{(t+DT)} = \int_{t}^{t+DT} [FBS_t - MFBS_t]dt \qquad (1)$$

$$TFBS_{(t+DT)} = \sum_{i=1}^{n} FBS_{i\,(t+DT)} \qquad (2)$$

(FBS = Female Breeding Stock , MFBS= Mortality of Female Breeding Stock, TFBS = Total Female Breeding Stock)

Male Breeding Stock (MBS):

$$MBS_{(t+DT)} = \int_{t}^{t+DT} [MBS_t - MMBS_t]dt \qquad (3)$$

$$TMBS_{(t+DT)} = \sum_{i=1}^{n} MBS_{i\,(t+DT)} \qquad (4)$$

(MBS = Male Breeding Stock, MMBS= Mortality of Male Breeding Stock, TMBS = Total Male Breeding Stock)

Female Kid (FK)

$$FK_{(t+DT)} = \int_{t}^{t+DT} [FK_t - MFK_t]dt \qquad (5)$$

$$TFK_{(t+DT)} = \sum_{i=1}^{n} FK_{i\,(t+DT)} \qquad (6)$$

(FK = Female Kid, MFK= Mortality of Female Kid, TFK = Total Female Kid)

Male kid (MK)

$$MK_{(t+DT)} = \int_{t}^{t+DT} [MK_t - MMK_t]dt \quad (7)$$

$$TMK_{(t+DT)} = \sum_{i=1}^{n} MK_{i\,(t+DT)} \quad (8)$$

(FK = Female Kid, MFK= Mortality of Female Kid, TFK = Total Female Kid)

Estimation Procedure

Data collection

Data on different number such as 1, 10, 100 and 1000 female sheep have been considered for small, medium, large and commercial farm respectively to analyze the wool collection using Simulation Matrix (SIMM) and Annual Selling technologies.

Data Design

In developing the model, kidding rate at 90%, mortality rate at 5% of female sheep and kid mortality at 30% have been used for 3rd and 5th parity of female breeding sheep. Wool collection is twice in a year.

Data adjustment

Kid production from the breeding stock inventory classified into male and female kids and assumed that 50% of current kid production is female kids and 50% is male kids (Honhold, 2001).

Housing

7-10 sft. room is needed for each sheep of 6 to 15 month aged normal and decease free sheep and 5 sft. for each kid.

Stall feeding

Sheep rearing in a confined shed with feed and health management in a scientific way which innovated from research is known as stall feeding 60-80% fiber (grass, leaves, straw etc.) and 20-40% grain (rice, pulse bran, hask, etc.) requires under stall feeding system.

Shearing

For this study, the amount of wool after shearing is assumed on an average 500g per. Due to twice shearing is in a year, 1 kg wool is collected from each sheep annually.

RESULTS AND DISCUSSION

The results obtained are discussed based on the values of the estimated equations of the respective SIMM model in the system under Group A: Sheep- population Distribution and Group B: Wool Collection and Group C: Annual Selling Centre.

Group A: Sheep population distribution

Table 1 shows the estimated value of sheep population at kidding rate at 90%, mortality rate at 5% of female sheep and kid mortality at 30% have been used for 3rd and 5th parity of female breeding sheep under the SIMM model. Total sheep (TS) includes female breeding sheep, male breeding sheep, female kids and male kids. Both monthly and annually population distribution is shown Table 1. In case of one invested female sheep, total sheep is expected to increase from 1 head in January to 5 heads in December and total sheep is expected to increase from 1 head in January to 50 heads in December in case of 10 invested female sheep. If invest 100 female sheep, than total sheep is expected to increase from 100 heads in January to 499 heads in December where as total sheep is expected to increase from 1000 head in January to 4989 heads in December in case of 1000 invested female sheep.

Results indicate total sheep population increases almost 5 times from January to December in a year. The total increasing number of sheep depends on the increasing number of invested female sheep If number of invested female sheep increases from 1 to 10, total sheep would be increased almost 10 times i.e. 50. If number of invested female sheep increases from 1 to 100, total sheep would be increased almost 10 times i.e. 499. If number of invested female sheep increases from 1 to 1000, total sheep would be increased almost 10 times i.e. 4989. Sheep farm with more than 10 sheep is suitable for commercial purpose.

Table 1. Total sheep-population distribution according to the number of female sheep

Month	1 female sheep	10 female sheep	100 female sheep	1000 female sheep
January	1	10	100	1000
February	3	39	385	3850
March	3	37	365	3651
April	3	35	347	3467
May	3	33	330	3297
June	3	31	314	3141
July	3	30	300	2996
August	6	58	583	5826
September	6	56	559	5994
October	6	54	538	5378
November	6	52	518	5177
December	**5**	**50**	**499**	**4989**

Group-C: Wool collection

Table 2 shows the estimated value of sheep wool under the SIMM model. Total sheep wool collection includes twice shearing of wool in a year. Annually wool collection is shown Table 2.

Table 2. Total sheep-wool collection according to the number of female sheep

Farm Category	Investment Sheep Female Breeding Stock (Number)	Wool collection (Kg)
Small	1	1
Medium	10	10
Large	100	100
Commercial	1000	1000

In case of one invested female sheep, wool is expected to collect 500g in March and 500g in October and the total 1kg in a year by small farmers. If invest 10 female sheep wool is expected to collect 5kg in March and 5kg in October and the total 10kg in a year by medium farmers. If invest 100 female sheep wool is expected to collect 500kg in March and 50kg in October and the total 100kg in a year by large farmer. If invest 1000 female sheep wool is expected to collect 500kg in March and 500kg in October and the total 1000kg in a year commercially.

Group-C: Annual Selling Center

At the end of the year, farmers will sell their sheep and wool to businessmen, market and commercial farms and in case of large amount of wool also can export to abroad.

CONCLUSION AND POLICY IMPLICATION

There are different sheep rearing systems in Bangladesh which are economic. Small farmer can rear up few number of sheep and sell to slaughter house/ whole-sale market/ commercial farm. Sheep like goat, cattle-buffalo can produce meat, milk, and skin but only wool produce from sheep. So there is an opportunity to earn money from wool business. This technology is suitable for small farmer as well as large farmer, commercial farm using minimum land. Therefore, 'Wool collection from annual selling" can be a 'Technology' of sheep farming to alleviate poverty. Further research on wool marketing (local and international) is needed to improve sheep farming to remove the poor condition of small farmers in Bangladesh. Results of estimated value of collected wool increases with the number of female sheep but results also suggest for establishing wool-market before sheep production. Technology is needed for proper collection of wool annually by establishing wool market.

REFERENCES

BBS, 2012. Statistical Year Book of Bangladesh. Bangladesh Bureau of Statistics, Statistics and Information Division (SID), Ministry of Planning. Government of the Peoples Republic of Bangladesh, Dhaka, Bangladesh, pp- 183.

Bose, S., Duttsgupta, R. and Maitra, D.N. 1999 . Phenolypic Characteristics and management practices of Bengal sheep. *Indian J. Small Ruminants,* 15: 18-22.

Gittinger, J.P.1994. Economic Analysis of Agricultural Projects. 2nd edn. The Hopkins University Press. Baltimore and London.pp-343

Honhold, N. 2001. Veterinary epidemiologist. ARMP Project, November 12-April 24, BLRI, Dhaka.

Khan, B.B., Iqbal, A. and Mustafa, M.I. 2003. Sheep and Goat production. Dept. of Livestock Management, University of Agriculture, Faisalabad, Pakistan, pp21.

Prasad, J. 1994. Goat, sheep and pig production and management. Kalyani Publishers, New Delhi, India.

Pan, S. and Sahoo, A.K. 2003. Garole sheep, Report of ad-hoc research scheme on survey evaluation of garole sheep in sundarban area of west Bengal university of agriculture and fisheries science, Mohanpur, Westbengal, India.

Pan, S., Sahoo, A.K., Tania, M.S. and Ahlawat, S.P.S. 2004. Garole sheep, NATP (MM) on animal Genetic resource bio-diversity. West Bengal university of agriculture and fisheries science (WBUAFS), Mahanpur and Kolkata, West-bengal and NBAGR, Karnal, Haryana, India.

Sarker, R.H. 2001. Apprisal of Goat Keeping in the Upland Area of Sakhipur Upazila in Tangail District. MS Thesis. Dept. of Agricultural Economics. BAU. Mymensingh.

Sayeed, M.A., Rahman, S.M.A., Taimur, M.J.F.A., Faruque, S. and Yasmin, F. 2004. A study on profitability of goat production in some selected areas of Bangladesh. *J. Bangladesh Agricultural Univ.* 2(1): 63-71.

Sharma, R.C., Arora, A., Narula, H.K. and Singh, R.N. 1999. Characteristics of Garole Sheep in India , AGRI, 2657-64.

Sing , E.N. and Bohra, S.D.J. 1996. Garole sheep: (A profile Bengal breed of sheep locally known as garole) . The Indian J. Small Ruminants, pp.238-43.

www. sheep101info/201/shearing. html "sheep 201. A Beginner's guide to Raising sheep"

Yasmin, F., Haque, K.S., Chowdhury, S.A. and Miyan, A.H. 2004. Annual selling method for goat rearing under stall feeding system in Bangladesh. BLRI Report.

Yasmin, F. and Miyan, A.H. 2005. The Sheep Production and Marketing Status in Bangladesh. BLRI Report.

Yasmin, F. 2010. Technology for Policy Analysis. Aftab Book Publisher. Dhaka, Bangladesh.