ECONOMICS OF MUGA REARING

Dr. Bashanta Mangal Dutta, Mr. Biren Saikia

ABSTRACT

In order to understand the silkworm activities we have to travel in a wonderful world of sericulture. Being a wonderful dress material for any improvement over existing Seri cultural activities the researcher and administrator as a leader must had broad outlook. They have to be acquainted with social and economic problems as well as have through knowledge in sericulture. This is mainly because the entire silk industry as a whole comprises several sectors of different characters from cultivation to finished products. Like any other industry, there is always an exotic threat to the sericulture industry. In this age of global trade, sericulture in India to survive against the onslaught from China and to sustain export market, quality improvement and competitive price setting are the prime requirement. Cost and return structure of an industry determine the efficiency level of the industry. Industry like the Muga industry of Assam which has been running on fascination and tradition needs to determine the cost and return structure in order to understand the efficiency level of the industry as well as for policy prescription for the improvement of the industry. This paper attempt was made to determine the cost and return of Muga rearing to judge the potentiality of the industry in rural development in compared to other major activities performed by the sample households.

Keywords: Sericulture, Silk, Muga Rearing, Economy.

I. INTRODUCTION

India enjoys a distinct position in the world silk map producing all four varieties of silk viz. Eri, Muga, Tasar and Mulberry. The country is the second largest producer of silk next to China with 15 percent shares in the Global silk market. Among the four varieties of silk produced in 1999-2000, mulberry accounted for 91.7 per cent, Eri 6.4 per cent, Tasar 1.4 per cent and Muga 0.5 per cent of the raw silk production (Govt. of India, 2000-2001). In the process, India has developed an international market for silk goods having its own weaves, textures and designs. In 2000-2001, India earned foreign exchange revenue of Rs.1530.02 cores through exports of silk goods (Kumaresan, 2002). Mulberry silk is produced extensively in the State of Karnataka, Tamil Nadu, Andhra Pradesh, West Bengal and Jammu & Kashmir. The State of Karnataka alone contributes around 65 per cent of the countries production of Mulberry silk. While the tribal people of Madhya Pradesh, Bihar and Orissa rear Tasar silkworm traditionally. These three States contribute about 96 percent of Tasar silk

production of the country. On the other hand, Eri silk production remains confined mainly in Assam, Manipur and Meghalaya. Importantly, Assam has a global monopoly in the production of Muga silk, which is popularly known as the golden silk of Assam (Krishiworld, 2003).

II. STATEMENT OF THE PROBLEM

The characteristic climate, ecological conditions and soil quality have been congenial in Assam for the silkworm food plantation. As a result, sericulture is considered as one of the promising rural industries in Assam because of its unique characteristics of being ecofriendly, labour intensive, having short gestation period, capacity to develop into a family enterprise, limited capital investment and its interlink ages with other enterprises (Tamuli, 1997-98). Sericultural activities are concentrated in the State in 8885 sericulture villages involving 166854 families spreading over all twenty-three districts of Assam (Govt. of Assam, 2001). The commercial production of Muga silk is mainly confined to upper Assam while seed cocoon production is generally confined to lower Assam. Almost one third of the silk production of the State is contributed by two districts namely Dhemaji and Lakhimpur .On the other hand, Sualkushi, which is popularly known as silk town of Assam, has developed into a busy commercial center of weaving of high quality Mulberry and Muga silk e.g. mekhala, riha, chadar having tremendous internal as well as external demand (Saikia et al. 2002). Because of regional concentration of seed production units, rearing and cocoon production units and reeling and weaving units, the middlemen play an important role in linking various sericultural activities in the State (Baishya, 2002).

In spite of having immense potentiality, stagnation in the sericulture industry is a common phenomenon in the State. The production as well as productivity in sericulture remains almost stagnant over the past few decades (During 1938-2000, the muga production in Assam grew only at the exponential rate of 0.38 per cent per annum. Decade wise analysis reveals that there are wide fluctuations in muga production. During 1938-50 and 1971-80, the State experienced a negative growth rate. The maximum annual exponential growth was observed to be 4.18 per cent during 1961-70. The last decade of the twentieth century experienced a production growth rate of 2.53 per cent per annum.).Globalization and the reduction in tariffs as per the WTO commitments have created new challenges for the silk economy of Assam (Das, 2003).

The study of sericulture is a neglected area of research in Assam. No systematic attempt has yet been made to provide an economic analysis of the sericultural

activities in the State. There are only few studies, which throw some lights on the problems and prospects of sericulture in Assam (Chowdhuri, 1982, Dutta, 1998). Whatever studies have been undertaken so far tend to be either too general in their analysis of the situation or they are too narrow in their approaches to provide an insight or clue for better understanding of the issues involved in Muga activities in the State. Under this background, this study attempts to make an economic analysis of Muga activities of the State.

III. OBJECTIVES

The study is primarily aimed at understanding the economic aspects of the Muga activities at the household level in one of the poorest regions of Assam. The major objectives of the study have been set as follows:
1.   To examine the cost return of muga culture.
2.   To investigate the contribution of Mugaculture to the household economy in the study area.
3.   To explore the economic prospects of Muga Culture in compared to the other activities in the study area.

IV. LITERATURE REVIEW
Sericulture is an age old industry developed in China more than 5000 years ago. Since time immemorial it has been practiced in India, also having its mention in Vedic literature. There is a large literature on the subject in different aspects of sericulture industry. The literatures relevant to the topic of the present study are reviewed in the following sections.

Several studies have been conducted in Assam on sericultural development with special emphasis on its problems and potentialities in the state. The studies conducted so far are more general in nature. Some studies are based on historical background of sericulture, while others are on the methodological aspects of sericultural activities. Chakravorty (2002) observed that despite having a great deal of research work in other corner of India for sericulture improvement, the work towards the end in the NE parts including Assam was very scanty. Apart from the pioneering work on sericulture in Assam conducted by S.N. Choudhuri (Chowdhuri, 1965; 1968; 1970; 1978; 1980; 1982; 1989; 1992; 1998; 2000; 2001; 2002; 2003), very few study have been conducted on the economic aspects of the problem. A brief review of the available literature shows that sericulture is an age old practice in Assam.

A.   Historical Back Ground of the Silk Industry :

The ancient kings of Assam patronised the development of sericulture in the state. The Ahom kings as an economic incentive exempted the rearers from the payment of land revenue and separate administrative machinery was set up to look after the silk production. During the regime of Pratap Singha (1603-1641) it became obligatory on the part of every household to contribute one seer (0.94kg) of home spun silk to the king exchequer (Choudhuri, 1982, Saikia, 1999). In the Ahom kingdom, royal dresses such as Shupkan, Gomesang, Karship, Sisupat and Bankara etc. were made form Muga, Pat (mulberry) and Eri was generally used for preparing wrappers and scarfs of common people for which it was known as poor man's silk (Dutta, 1998, Saikia, 1999). During British regime, the British rulers did not pay much attention for the development of the golden silk and Eri. Whatever attention was paid remained confined to the technical up gradation of mulberry culture (Saikia, 1999). However, some enthusiastic British traders like Buchanon Hemilton, Jenkins, Hugon, Helfer, Wardole, Bronlow, etc. tried to develop sericulture on an industrial scale but their initiative were not up to the mark so as to develop sericulture on an industrial scale and hence their initiatives were not very successful. As a result the industry remains as primitive as it was a century ago. The entire muga silk industry in the state is still running on traditional basis and therefore no important changes have been noticed in the production and productivity of these valuable silk for decades together (Choudhuri, 1982). The sub-tropical climate, humid and moist temperature with frequent rainfall in summer, pleasant atmosphere in winter and the soil structure make the region the natural home of the sericigeneous insects and their food plants (Thongavalu, et-al, 1986, 1988). Chowudhuri et-al observed that despite having vast plant growing capacity in all over India successful Muga rearing ends in fiasco in all places rather than N.E. Region (Choudhuri et.al, 2000). Thangavalu observed the large scale existence of rich sericigenous flora and Fauna due to favourable climatic and ecological condition and soil qualities of the N.E. region (Thangavalu, 1986). He also observed that Assam and adjoining area had the prerogative in Muga production and pre dominance in Eri production. Therefore, he visualised the region as one of the potential home for all four types of silk viz. mulberry, Muga, Eri and Tassar. He was also of the view that through proper utilisation of natural and manpower resources the region could make tremendous progress in sericulture. These activities would provide greater scope for poverty alleviation by providing employment opportunity. The use of silk is infact, the symbol of culture in Assam. Muga and Eri silk known as Assam Silk is a pride of Assam and is closely related to the culture and civilization of Assamese people (Choudhuri, 1982; Dutta, 1998; Thangavalu, 1988). Muga silk has a unique place in socio-eco cultural life of rural Assam. The word muga in Assamese mean amber or brown colour which refers to the

cocoon colour (Thangavalu 2004). Muga, 'the Golden Silk' is indigenous and prerogative of India is being practiced largely in Brahmaputra valley of Assam and contributing in a great way to the unique position of India in world silk map for producing all commercially viable silk worms (Thangavalu, 1988).

V. METHODOLOGY

This study was mainly empirical one base on primary data generated through the field survey of 200 households of Dhemaji and Lakhimpur district of Assam. For collecting data a pre tested questionnaire was utilized. Data so collected were tabulated through SPSS package. Rearing is one of the important phases of silk activities. It is observed that out of the total households surveyed, 99.5 per cent was engaged in Muga and 94.5per cent was engaged in Eri production activities. In order to determine the cost and return of Muga rearing following five (5) factors are taken into account for computing cost of rearing –

(1) Z1= Seed cost.
(2) Z2 = Labour cost.
(3) Z3= Rearing instruments depreciation cost.
(4) Z4= Rent for host plant.
(5) Z5 = Other cost including transport and ritual cost.

The Rearing cost with respect to the chosen factors is obtained as per the following formula-

$$C_{ij} = \sum_{i,j=1}^{n} Z_{ij} \dots\dots\dots\dots\dots\dots\dots [i = 1,2,\text{---------},200] \text{ and } [j = 1,2,3,\text{-----},5]$$

C_{ij} = Rearing cost of ith   household with respect to jth factors.

In order to determine the return from rearing following three (3) factors are taken into consideration.

(1) R1 = Return from commercial cocoon sold.
(2) R2 = Return from seed cocoon sold.
(3) R3 = Return from spun cocoon sold.

The gross return with respect to the chosen factors is determined in terms of the following formula as-

$$V_{ij} = \sum_{i,j=1}^{n} R_{ij} \dots\dots\dots\dots\dots\dots\dots\dots\dots [i = 1,2,3,\text{----},200] \text{ and } [j = 1,2,3]$$

V_{ij} = return of ith household in respect to jth factors.

Then gross return is determined as the difference between V_{ij} and C_{ij} in terms of the formula as

$\Pi = V_{ij} - C_{ij}$.

The net return is determined as the difference between V_{ij} and C_{ij} in terms of the formula as

$\Pi^* = V_{ij}^* - C_{ij}^*$.

Π^* = Net return excluding imputed cost.

Since Muga rearing in different season takes different time and rearing has been done five to six times in a year, it is very difficult to have a uniform labour day of rearing for different brood. So here total Labour day spent by sample households for rearing Muga is taken into account for determining labour cost. Again cocoon is sold as seed cocoon and commercial cocoon even in the products of same brood at different price. The percentage of seed cocoon and commercial cocoon sold out of the total cocoon production is needed to count for computing the return of rearing.

VI. DETERMINATION OF COST AND RETURN OF MUGA REARING IN SURVEYED AREAS

During the survey period following characteristics is observed in Muga rearing in the surveyed area.

(i) All farmers are traditional rearer i.e they have been following the inherited methods of rearing.

(ii) No modernized tool is used in any phases of Muga production.

(iii) Muga is a secondary occupation to the sample rarer.

(iv) Commercialization of rearing is yet to take place.

(v) Ratio of spun cocoon to the total cocoon production is 1:10.

(vi) Total seed cocoon used in the sample households are 261650 out of which seed cocoon used in the Dhemaji and Lakhimpur District are 141100 (53.93 percent) and 120550 (46.17percent) respectively in the surveyed year.

(vii) Price of Seed cocoon is Rs.1000 for 1000 cocoon and that of commercial cocoon is Rs.520 per 1000 cocoon.

(viii) Total 9459.72 man day's labour is used in Muga rearing activities in the sample households.

(ix) Only 27 man days hired labour used in muga rearing activities in the sample house holds.

(x) Daily wage rate in the sample area is Rs.60.

(xi) Transportation cost for seed gathering in the sample households is Rs.86470 (Rs.432 per capita seed gathering cost) and racial cost during cropping period is Rs.46900.

(xii) Seed gathering cost (transportation cost) and ritual cost of the Sample house hold are Rs.86470 and Rs.46900

(xiii) Amount of seed cocoon sale is 397700 @ Rs. 1000 for 1000 seed cocoon in the sample households and that of commercial cocoon is 2534766 at the rate of RS.520 for 1000 cocoon.

(xiv)   Total production of the Muga cocoon in the sample households is 3258296 cocoons.

(xv) 1000 Spun Muga is bearing 1.5 kg weight.

(xvi)   Price of 1 Kg spun M.uga cocoon is Rs.90

 Various cost components are computed as follows-

Z1 = Amount of Seed used × price of per cocoon.

  = 261650 ×Rs 1.

Z2 = Numbers of hired labour × Wage of per labour (paid out) +

    Numbers of family labour ×Wage of per labour.(imputed)

  = 27 ×Rs.60 +9432.72 × Rs.60

  = 1620 + 565963.2

  = 567583.2

Z3 = 7024

Total value of rearing instrument used in the sample household is Rs.70240 subject to 10 year lasting. So depreciation charge is determined as Rs. 70240/10 = Rs.7024 and the rearers did not pay for the rearing instrument, so paid out charge of depreciation is zero.

Z3 = 0 + 7024

   = 7024.

Z4= 10 per cent of the total product × Rs..52

   =3258296 ×.1 × Rs. .52

   = 169431.39

Z5 = Transportation cost + Racial cost

   =Rs. 86470 + Rs.46900

   = Rs.1

The annual cost of Muga rearing is shown in the table-1.1 (Annexure-1)

The return factors are determined as per following formula-

R1 = Total amount of commercial cocoon product selling ×price of per cocoon.

   = 2534766 × Rs..52

  =Rs.1318078.32

R2 =   Total amount of seed cocoon product selling ×price of per seed cocoon.

   = 397700 × Rs.1

   = Rs.397700.

R3 = Amount of spun cocoon selling × Price of per kg.

   = 3258296 × .1 ×Rs..135

   = 43987

The annual Return from Muga rearing is shown in the table-1.2 (Annexure-1)

VII. RESULTS AND DISCUSSION

It is seen that per hectare annual gross cost of Muga rearing in Dhemaji district is Rs. 29574.63 which is high to the per hectare gross cost in Lakhimpur district of Rs.22606.47.And on an average per hectare gross cost is Rs.25785.72 in table-1.1(Annexure-1). It is also noticed a existence of difference between gross cost and net cost i.e the per family gross cost in Dhemaji district is Rs.5974 and the net cost of the district is Rs.3220.2 and the per family gross cost in Lakhimpur district is Rs,5461 and that of net cost is Rs.2404.45 and as a whole the gross cost in the study area is Rs.5695 and net cost is Rs.2830.36 .This indicate the involvement of own efforts in Muga rearing activities in the study area. It is cleared from the Table-1.2 (Annexure-1) that on an average per hectare net return from Muga rearing in the study area is Rs.27022.55 and the per hectare net return from Muga rearing in the Dhemaji district is Rs. 39526.69 which is higher than the per hectare return in Lakhimpur district of Rs.16479.95.This is may be due to utilization of more seed cocoon in Dhemaji district than Lakhimpur district (Table-1.2 (Annexure-1), row (2), taking the per hectare cost of rupees as number of cocoon used in per hectare as the price of 1000 cocoon is Rs.1000).It is also seen in Muga rearing that both the gross return and net return is positive and net return decreases with the addition of gross cost (Table1.2) (Annexure-1). It is also seen per hectare cost in Dhemaji district is high and high in all cost components which indicate that more effort was put in Dhemaji district in Muga rearing during survey period.

From Table –1. 3(Annexure-1) clearly indicate the existence of inverse relationship between the return of Farm size and operational holding in the study area. It observed that per family return of large farm is Rs 16067 which is lower than the all farm size. The corresponding t value is 9.83 significance at zero (o) percent level indicate the presence variation of per family income of different farm size. The per hectare net return of operational holding in Muga rearing for large farm with the range of .402-2 hectare earn Rs.26756 which is lower than small farm with the range of.03- .07 hectare of   Rs.208730. Even this return is lower than land less farmer rearing is done in rented host plant area.(Table-1.3 and Digram -1) (Annexure-1) The corresponding t value is 3.72 significance at .014 level indicate the presence of variation in income earning among different farm size. It is seen that annual per hectare operational holding return of Muga rearing of Rs.99777 is high compare to all major crops in the study area (Table-1.4) (Annexure-1). Dutta (1998) was also found similar result. Thus the earning of Muga rearing in the study area is remunerative compare to other crop in the study area and the study suggest to develop the silk industry as an instrument of rural development.

VIII. CONCLUDING OBSERVATIONS

Assam occupies an important place due to its unique faunal and floral wealth. The congenial climate and environment has made the region a natural abode of sericigenous insects and their host plants. Muga and Eri are two indigenous products of Assam known for its smoothness, durability and eco-friendly nature. The rural rearers are well acquainted with production and practices of these two varieties of silk. It can be used as an instrument for reshaping the rural economic foundation of Assam as it has immense potentiality for income and employment generation in the villages. Thousands of people in rural Assam have been engaged in silk industry and earn their livelihoods from the industry irrespective of age, sex and caste. The potentiality of the industry has not been flourishing much as expected during the past few decades.

The economy of Assam has had to pass through a lot of stringent financial position, insurgency problem and natural calamities; the NSDP has registered an annual growth rate of 4.21 per cent at constant prices (1993) during 2000-2001 as against the 6.6 per cent NNP at constant prices (1993-94) during the same period. In case of agriculture and industrial growth rate, Assam is far behind the national average. On the other hand the unemployment growth rate is above the national average. At present Assam had more than about 17 lakhs educated unemployed youths. Large scale abuse of human resources, saturation of employment generation in government sector and uneven inflow of foreign fund to a few developed states has become a matter of concern in the State. In such a situation the need is to draw our attention to develop those labour intensive industries which require very low level of skill and limited investment. Sericulture may be one of those industries which will be able to provide gainful employment to thousands of unemployed youth. In Assam, Muga and Eri occupy a unique position in the socio economic life of the Assamese people. Both these cultures provide livelihood to a large number of rural folk and plays a pivotal role in the economy of the State.

IX. REFERENCES

[1] Baishya, Prabin (2002): 'Prospect of Muga Silk', Indian Silk, July, pp10-14.

[2] Chowdhury, S.N (1965): 'Observation on Nutrition of Muga Worm, Antheraea assama Westwood', Ibidem, pp.1-6.

[3]_____(1968): 'Evolution, Differentiation and Breeding of Non-Mulberry Silk worms', Proceedings of the 12th Intern Congress of Genet, Tokyo. Pp.1-5

[4]_____(1968): 'Reorientation of Muga Culture', Ibiden.Vol.6, No.11, pp.9-11.

[5]_____(1970): Eri Muga Pat, Assam Biganayan Sammiti, (in Assamese), Guwahati.

[6]_____(1970): Muga Culture, Director of Sericulture and Weaving, Govt. of Assam.

[7]_____(1978): 'The Muga Silk Industry and its Status', Proceedings of All India Symposium of Sericulture Science, University of Agriculture Science, Bangalore.

[8]_____(1980): 'Present Status of Muga Culture', International Congress of Entomology, Tokyo, Japan, pp.21.

[9]_____(1980): Reeling and Weaving of Muga Silk, Central Silk Board, Bombay, pp.15-19.

[10]_____(1980): Reorientation of Sericulture – A Crash Programme, North Eastern Council, Shillong, pp.1-36.

[11]_____(1982): Muga Silk Industry, Director of Sericulture, Govt. of Assam, Guwahati.

[12]_____(1989): Aasamar Resom Silpa, (in Assamese), Director of Sericulture, Government of Assam, Guwahati.

[13]_____(1992)): Silk and Sericulture, Director of Sericulture, Government of Assam, Guwahati.

[14]_____(2001): Sericulture and Weaving (an overview), Dibrugarh Publishers, Dibrugarh.

[15] Chowdhuri S.N. et-al (1998): 'Performance of Muga Silk Worm (Antheraea Assama Ww) on Different Som (Persea Bombycina Kinh Ex Wook (F) kost.) Plant collection from Assam, India', Proceeding of the Third International Conference on Wild Silk Moth, Banglore, India, pp.66-69.

[16] Das, P. K (2005): 'Muga Silk Worm Seed Organisation-Some Issues', Indian Silk, June, pp.20-22.

[17] Dutta, P.C., (1998): Problems and Prospects of Muga Silk Production, Agro Economic   Research Center for North East India, Jorhat, Assam.

[18] Government of Assam, (2001): Hand Book of Assam Sericulture at a Glance, Director of Sericulture, Guwahati.

[19] Government of India, (2000): Economic Survey of India, New Delhi.

[20] Government of Assam, (2001): Statistical Hand Book of Assam, Directorate of Economics and Statistics, Guwahati.

[21] Government of India, (2001): Economic Survey of India, New Delhi.

[22] Government of Assam, (2001, 2002, 2003): Statistical Hand Book of Assam, Directorate of Economics and Statistics, Guwahati.

[23] Government of India, (2000-2001): Ministry of Textiles-Annual Report, New Delhi.

[24] Krishiworld, (2003) <http:// Krishiworld.com> internet material, access on 24th May.

[25] Kumaresan, P. (2002): Quality Silk Production: Some Economic Issues, Economic and Political Weekly, Vol.37, No.39, pp41-46.

[26] Rahman, Azizur (2004): 'Prospect of Muga Silk Industry in Non Traditional Areas of Assam', Journal of North-East India Council for Social Science Research, April, pp.20-24.

[27] Saikia, Jitul (1999): 'Mugai Shalani Karib Pare Aaham (in Assamese)', Aaluk Pat, April, pp.28-34.

[28] Saikia, Sharbeshwer et-al (2002): 'Dhemaji Zilar Muga Khetir Bratraman Aaru Year Bhabishyat (inAssamese)', Prantic, July, pp.33-36.

[29] Tamuli, Manuj Kumar (1997-1998): Economics of Muga in Assam (A case study of Dhakuakhana sub-division of Lakhimpur district), OKDISD, Guwahati.

[30] Thangavalu, K. (1986): 'Muga Silk Production', Literature on Sericulture, Surmaya Publisher, Banglore, pp.166-174.

[31]_____(1988): 'Management of Weeds', Hand Book of Muga Culture, CSB, Mysore, pp.37-41.

[32]_____(1988): 'Golden Muga Silk', Hand Book of Muga Culture, CSB, Mysore, pp.175-177.

TABLES

ANNEXURE-1

Table 1.1

Annual Cost of Muga rearing (In Rs.)

Cost factors	Dhemaji	Lakhimpur	Total
Z_1 (1)	141100 (7016.41)	120550 (5031.30)	261650 (10920.28)
Z_2 (2)	270277.8 (13433.29)	297305.4 (12408.41)	567583.2 (12854.92)
Z_3 (3)	3529 (175.40)	3495 (145.86)	7024 (159.01)
Z_4 (4)	109967.78 (5465.6)	59463.61 (1346.12)	169431.39 (3835.55)

Z_5 (5)	72533 (3605.02)	60837 (2539.11)	133370 (3019.2)
Cij = 1+,2+----+5) (6)	597407.58	541651.01	1139058.59
Cij* (7)	322021.39	244050	566071.39
PHC = (6)/THP (8)	29574.63	22606.47	25785.72
PHNC = (7)/THP (9)	15933.76	10185.73	12814.58
PFC = (6)/N (10)	5974.08	5416.51	5695.29
PFNC = (7)/N (11)	3220.21	2440.5	2830.36
PLGC = (6)/TL (12)	132.62	109.31	120.41
PLNC = (7)/TL (13)	71.47	49.25	59.84

Note:*Gross cost excluding imputed labour cost and imputed depreciation cost. Figure in the bracket indicate per hectare cost of Muga rearing. PHC = per hectre gross cost. PHNC = Per hectre net cost. PFC = Per family gross cost. PFNC = Per family net cost. PLGR = Per labour gross cost. PLNR = Per labour net cost.

Sources: From filed survey.

Table-1.2
Annual Return From Muga Rearing.(in Rs.)

Return factors	Dhemaji	Lakhimpur	Total
R_1 (1)	878586.28	439492.1	1318078.3
R_2 (2)	213700	184000	397700
R_3 (3)	28549.33	15437.67	43987
V_{ij} =(1)+ (2)+ (3) (4)	1120835.61	638929.77	1759765.38
Vij * (5)	322021.39	244050	566071.39
Π = (4) −C_{ij} (6)	523428.03	97278.76	620706.79
Π^* = (5)- * C_{ij} (7)	798834.4	394859.6	1193694.09
PHGR = (6)/THL(8)	25899.46	4060.05	14067.31
PHNR=(7)/THL(9)	39526.69	16479.95	27022.55
PFGR = (6)/N (10)	5234.28	1155.01	3103.53
PFNR= (7)/N (11)	7988.35	3948.6	5968.47
PLGR = (6)/TL(12)	116.19	19.63	65.61
PLNR(13)	177.33	79.69	126.19

Note:PHGR= Per hectre gross return. PHNR = Per hectre net return PFGR = Per Family gross return PFNR = Per hectre net return.THL= Total host plant land. PLGR = Per labour gross return PLNR = Per labour net return.TL = Total labour. Source :(i) Filed survey,2005.
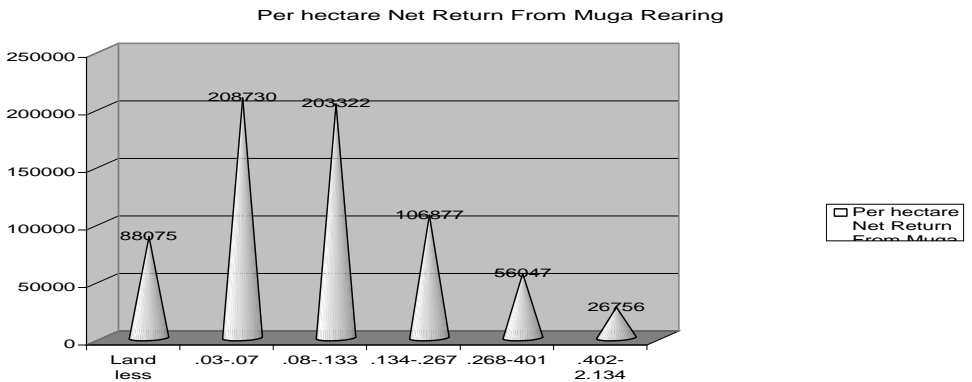
Table- 1.3

Farm size Returns of Operational Holdings From Muga Rearing.(in Rs.)

Farm size (In hectre)	Frequency	Muga Rearing	
		Per Family Net return	Net return per hectare
Land less*	7	14876	88075
.03 -.07	16	14015	208730
.08-.133	1	25211	203322
.134 - .267	87	15424	106817
.268-.401	56	15143	56047
.402 – 2.13	33	16067	26756
t value	NA	9.83*	3.72**

Note: Farmer who has no sericultural Land holding but rearing has been done in rented sericaltural host plant land .NA = not applicable. *Significance at 0 percent level. ** significance at .014 level. *** significance at .001level. Source: - From Field Survey.

Diagram -1.1

Per hectare Net Return From Muga Rearing

Source: From the Table- 1.3

Crops	Dhemaji			Lakhimpur			Total		
	Phc	Phgr	phnp	Phc	Phgr	phnp	Phc	Phgr	phnp
Rice	2150	9900	7750	2150	10100	7950	2150	10000	7850
Pulses	2250	4350	2100	2250	21200	18950	2250	23300	21050
oilseeds	4200	15350	11350	4200	15930	11730	4200	15740	11540
Bamboo	3200	27650	24450	3200	28750	25550	3200	28200	25000
Betelnut	3600	60330	56730	3600	62870	59270	3600	94000	58000
Muga	25785	123562	97777	25785	105128	79343	25785	114345	88560

Table -1.4

Per Hectare Cost And Returns Of Different Crops In The Study Area.

Note: Phc = per hectare cost,Phgr = per hetare gross return ,Phnp = per hectare net profit.

Source: - Field Survey, 2005.

ABOUT AUTHORS

Mr. Biren Saikia, M.A, M.Phil (First) Dept. of economics Dibrugarh University Assam. He has published about more than 8th research papers in National and International journals. He has presented many research papers at national and international seminars and conferences and most of them are published in different journals. He has interested to involve himself as a social researcher with the society and wants to participate in the national building activities. He can easily reached at-birensaikia38@yahoo.in (M) 09435962317

Dr. Bashanta Mangal Dutta-Qualification– M.A Ph.D. Department of Economics and HOD, Machkhowa Degree College Dhemaji. He has published five books and several papers in National and international journals and also he has got seven years of research experience. He has got the Sikha Bharati Award in 2011 by All India Business Congress.