



Balancing Tradition and Sustainability: Muga Rearing Practices of Assam

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Abstract : *Antheraea Assama* locally known as Muga, is a wild silkworm endemic to the North-Eastern region of India. It is an important labour intensive, low investment, eco-friendly, agro-based cottage industry which promotes village self-sufficiency and rural development. This silk, which is a heritage for the state of Assam, has gathered the attention of the world for its texture and durability and its demand is increasing in both domestic and foreign markets. Muga silkworm is a polyphagous insect reared outdoors on different host plants, by following various indigenous traditional practices. These practices are eco-friendly, and shows the path to a sustainable future. This paper will try to explore and focus on these traditional practices, and how they can help in creating a sustainable development model for this industry, which will also help in boosting the economy of the state.

IndexTerms - Muga, endemic, indigenous knowledge, sustainable development

I. INTRODUCTION

Silk is a delicate protein fibre made of threads which are harvested from a variety of insects or larvae cocoons ^[1]. There are four major varieties of Silk, namely, Mulberry, Tassar, Eri and Muga. Asia is the major producer of silk (95% of global production) ^[2]. India occupies the second position in silk production in the continent after China. The silk industry of India is an age-old industry, with Indian silk being reputed for its quality. All the four major varieties of silk are found in the country, with Muga silk being endemic to the North-Eastern region, particularly in the state of Assam.

The North-Eastern region of the country has a unique biodiversity, which can be observed in the varied and unique flora and fauna of the region. The unique ecosystem and climate of the region has led to the growth of many endemic species, of which Muga silkworm (*Antheraea assama*) is quite noteworthy. The state of Assam enjoys a near monopoly in the production of Muga silk, with other states like Arunachal Pradesh, Meghalaya, Mizoram and Nagaland, comprising the rest of the Muga producing states of the region. However, there is no concrete evidence regarding the origin and development of this industry. The silk industry of the state had received a significant impetus in the medieval period, as the ruling Ahom dynasty had provided royal patronage to this industry ^[3]. Muga silk was first officially mentioned by the French traveller Jean Joseph Tavernier in 1662 ^[4]. Muga rearing is an integral part of the traditions and customs of the Assamese people. Presently, 32,353 families are directly involved in Muga rearing in Assam ^[5].

Muga rearing industry is an important labour intensive, low investment, eco-friendly, agro-based cottage industry which promotes village self-sufficiency and rural development. Muga silk is a heritage for the state of Assam and has gathered the attention in both domestic and foreign markets. Muga silkworm is a polyphagous insect reared outdoors on different variety of host plants, by following various indigenous traditional practices ^[6]. Muga rearers apply traditional knowledge and practices in different phases of rearing which contains ideas of sustainable development ^[7]. The process of Muga silk rearing offers a variety of ecosystem services and helps in achieving global sustainability.

II. OBJECTIVES

- To explore the various Muga rearing traditions
- To understand how these practices show a way towards attaining sustainable development

III. STUDY AREA

Muga rearing is mostly concentrated in Dhemaji, Dibrugarh, Goalpara, Golaghat, Jorhat, Kamrup, Kokrajhar, Lakhimpur, Sibsagar, Sonitpur and Tinsukia districts of Assam.

For the purpose of this study, the study area is confined to the Ghilamara and Dhakuakhana development blocks of Lakhimpur district of Upper Assam, as these two blocks contain 60% of the total rearers of the district.

IV. METHODOLOGY

- Both Primary and Secondary sources were used in the present study.
- Primary data comprises of empirical fieldwork, while government reports, books and journals were consulted as secondary sources.
- As per government records available, Lakhimpur district comprises of 7571 Muga rearers, of which 4543 are in the selected development blocks. From this, 10% of rearers (454 rearers) were selected randomly for the interview to know about the traditional practices associated with Muga rearing. A thematic analysis was made on the basis of the information of the respondents on traditional practices used in Muga rearing.
- Moreover, visual observations and photographs were used to gather further information about the tools used and practices of the Muga rearers.

V. TRADITIONAL PRACTICES OF MUGA REARING

The practice of rearing of Muga silkworm is indigenous to the land of Assam. There are many traditions associated with this practice from a very long period of time. Generally Muga farmers are habituated and interested to apply their age-old traditional knowledge and practices in different phases of Muga rearing i.e., host plant selection, seed selection, seed preparation, rearing methods and rules and traditions in rearing.

V.I. HOST PLANT SELECTION

The most common host plant of Muga silkworm is som (*machilus bombycina*) in upper Assam and sualu (*Litsaea polyantha*) in lower Assam. As some types of Muga host plants are totally eaten by the Muga silkworm larvae while leaves of some types of host plants are totally discarded or eaten partially, therefore, Muga farmers use traditional knowledge in identifying the suitable Muga hostplants. According to Muga rearers, leaves having sweet taste are suitable for silkworm rearing and leaves having sour or bitter taste are found unsuitable for silkworm rearing. Even in the same species of som, the shape of leaves varies and according to the shape of the leaf, they are named Agarpatia, *Jampatiya* and *Naharpatiya*, of which *Naharpatiya* is considered as the most suitable for rearing of silkworm. Out of the *three* varieties of sualu trees mentioned by the rearers, the best variety for Muga silkworm rearing is the one having *oval-shaped leaves* in clusters as this allows the worm to eat the entire leaf. However, in recent times a crisis of host plants has been observed and rearers are not able to procure good quality host plants. This is because of both natural and man-made causes like floods, soil erosion, deforestation, conversion of Muga *sumonis* to tea and rubber plantations.

V.II. SEED SELECTION

Muga rearers often believe in the saying “*Namonir sonch ujanir goch*”^[8]. Seed cocoons taken from lower Brahmaputra valley that is reared in upper Brahmaputra valley always ensures a successful harvest of Muga cocoons. Seed cocoons are mainly produced in the hilly tracts bordering lower Assam like Goalpara, Boko and Hahim of Kamrup district etc. and rearing is done primarily in upper Assam like Dhemaji, Dibrugarh, Lakhimpur and Sibsagar district. Traditional Muga rearers of Assam collect their seed cocoons from these areas for commercial rearing during the spring and autumn season. From their long-time experience Muga rearers observe Muga from the third stage (diseases of Muga develop during this stage) and can recognise the quality of healthy seeds. Muga rearers select seeds by considering the colour of larva, movement, feeding behaviour of silkworm etc. The market of Muga seed cocoons is a highly competitive market. There is a scarcity of healthy seed cocoons and this has led to a gap in meeting the needs of the rearers. This has led to a “buyer’s market” where the buyers dictate the price of the produce. To meet this demand, the government has established Muga Seed Farms, to supply the rearers with healthy seeds, however, it has not proven to be a success as the rearers who follow the traditional practices are averse to using Seed Cocoons which are preserved, as done by the Government farms.

V.III. SEED PREPARATION

Seed cocoons are kept in a cool environment by avoiding direct sunlight or fluctuation of external conditions like temperature and humidity. The suitable temperature, as stated by many scientists, required for the growth of healthy Muga silk worms in the spring season ranges from 22°C to 27°C with a range of relative humidity from 74%, and in the autumn season, it ranges from 20°C to 27°C with a relative humidity of 81%^[9]. However, the rise in global temperature, has led to a huge problem for the rearers as the Muga silkworm are very sensitive to their environment, and the changing climate has led to a decline in its production.

Muga rearers stored seed cocoons in bamboo-made box called Chakori-pera. Rearers tie and hang paired moths (chakara and chakari) in kharika, which is made of grass thatch for coupling and egg laying. Sometime rearers hang tulsi leaves in between kharikas and they believed that it would prevent the pebrine disease of Muga. Male moths are decoupled by smoking through devices made by paddy straw in grainage.

V.IV. REARING METHODS

Farmers rear muga silkworm in natural som plantation called *Somoni*. After hatching, rearers place the *kharikas* in the selected host plants, where the larvae crawl and starts feeding on leaves. If there is scarcity of leaves, the rearers use a triangular bamboo appendage called *Chaloni* to transfer the larvae to other plants.

To prevent crawling down of silkworms rearers tie a Gari bandh (made of bark of banana tree/*tara* tree etc.) on the tree trunk as a barrier. As the silkworms are reared outdoors, to protect them from attacks by other insects, pests, birds etc., the rearers use handmade bamboo instruments like bow, *batoloo guti* (catapult) etc to prevent them.

The matured silkworms are transferred to a cocoonage traditionally made of branches and leaves of Ajar, Nahar etc. The cocoons are stifled by smoke using a traditional equipment called *dhowachung*, which also helps in preserving them.

V.V. RULES AND TRADITIONS IN REARING

Muga rearing is an intrinsic part of the customs, culture, and traditions of the rural people of Assam, not just a profitable profession. Rearers are engaged in the process of rearing for an average of four weeks. During this time, the rearers are dressed in white, remains unshaven and unkempt with no use of detergent and consumes a vegetarian diet, as this process for the rearers is not less than worshipping their gods. Rearers restrict the entry of other people to the *somoni* as they believed that the evil sight of outsider may cause *Mukhloga* disease (bacterial disease) of muga silkworm. Moreover, a menstruating woman is forbidden to visit the muga rearing site as it is thought that her flow is so powerful that the mere touch of a living object by her will render it sterile. This shows the belief of the rearers about how external factors may influence the silkworm and cause diseases. The rearers are thus very superstitious and conservative in their views of rearing Muga silkworms.

VI. SUSTAINABLE DEVELOPMENT

Sustainable development is a way for the society to grow and develop, meeting the needs of the present, while not compromising the ability of the future generations in meeting their own needs. It is a holistic approach that tries to find solutions to the interrelated challenges of environmental protection, social equity and economic prosperity. This ensures that both the present and future generations will enjoy a better life.

The United Nations has decided on 17 Goals (SDGs) to achieve Sustainable Development. The key aspects of sustainable development includes reducing chemical use, crop diversity, water and energy efficiency, and adaptation to climate change.

VII. MUGA REARING AND SUSTAINABLE DEVELOPMENT

Muga rearing shows us the path to balance traditions with the advances made through social solidarity, environmental stewardship, economic empowerment, and cultural preservation. The United Nations had formed the SDGs to provide a path to achieve sustainable development. The Muga rearing industry, contains certain characteristics which greatly help us in attaining these goals. As a forest based, labour intensive and low investment cost industry, Muga silk industry helps in attaining a self-sufficient green economy with sustainable development.

Firstly, Economic Viability. In the rural areas, a large number of populations, irrespective of age or gender, are engaged with the different activities of the Muga rearing and earn their livelihood. Thus it helps in fostering economic stability, particularly in the rural areas of Assam. This goes hand in hand with SDG 1 which aims to “end poverty in all forms everywhere”.

Secondly, Women Empowerment. As the ancient knowledge of Muga rearing is frequently preserved by women, and their participation encourages economic independence and gender parity, hence it helps in attaining SDG 5 (Achieve gender equality and empower all women and girls).

Thirdly, Innovation and Sustainability. Muga rearing shows the way to integrate innovation with tradition. It tries to maintain the integrity of the practice while embracing new ideas. Muga silk is a long-lasting and durable fabric, which promotes the idea of discarding disposable fashion and promoting sustainable consumption practices. It helps in attaining SDG 9 (Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation) and 12 (Ensure sustainable consumption and production patterns).

Fourthly, environmental Sustainability. Muga rearing requires proper plantation of host plants, which promotes sustainable forestry and biodiversity conservation. The rearers also use various eco-friendly tools and traditions for the proper growth of the silkworms. Further, Muga rearing does not include the use of various chemical inputs, which help in reducing pollution and ecological harm. Most of the raw materials used include bamboo, straw, leaves of various plants etc. This helps in attaining SDG 15 (Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss).

VII. CHALLENGES FACED AND THE WAY FORWARD

Muga Rearing in Assam faces certain challenges. These are:

- Lack of healthy Muga seed cocoons and host plants.
- Unpredictable harvests and diseases in the silkworms because of outdoor rearing.
- Uncontrolled deforestation, which causes environmental degradation and soil erosion.
- The industry faces competition with other industries like tea, rubber etc.
- Illiteracy of the Muga rearers.

Thus, there is a high need for a joint collaboration between the various stakeholders, the government, the rearers and researchers, to come together and form various ideas and policies to meet these challenges of Muga rearing which will lead to an overall development of the industry. The following suggestions will favour the development of the industry:

- The idea of “pollution-free Muga rearing zones” should be formulated. This is because the Muga silkworm is wild and natural and is highly sensitive to its environment.
- Proper monitoring of the Government schemes to augment the growth of Muga host plants should be initiated, to ensure a stable supply of healthy host plants.

- The Muga rearers should be made aware of the potential of the Muga Industry, and its growing demand in the international market. The new generation should be encouraged to take up this profession, and proper communication and information networks should be strengthened to give the Muga rearers up-to-date information about the industry.

Proper policies have to developed incorporating the traditional knowledge and practices of the rearers with the advances of modern scientific methods.

VIII. CONCLUSION

Muga Culture is not only a cultural heritage of Assam, it can also become a pioneer in achieving sustainable growth. The various practices associated with this culture, promotes the conservation of biodiversity and responsible land use; offers an opportunity of livelihood to countless families, especially in the rural areas; and helps in empowering women and achieving gender parity. However, unfortunately Muga cultivation is not in a satisfactory position due to problems like scarcity of healthy seeds and foodplants, floods, climate change, unpredictable harvest, ecological degradation, environmental pollution, low priority on sericulture by the State Governments, lack of business attitude of sericulture farmers, remoteness of area of operation, illiteracy of Muga farmers, unorganised market system and lack of interest of the present generation and so on. It is high time to take efforts and preserve this industry and its associated knowledge, because it is not just a cultural legacy of the state, but it is an international chance to achieve sustainable development. Moreover, since Muga rearers are rooted in old traditions and practices and they are ecofriendly in nature, therefore, the government should also prepare policies and programmes in such a manner that they *incorporate the traditional knowledge and practises of rearers* and further enhance them using modern scientific techniques to increase the production of Muga silk.

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