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ORIGINAL ARTICLE

Sericulture: An Alternative Livelihood Option in Sikkim Himalaya

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ABSTRACT

Silk production, also known as sericulture, provides an important source of revenue for Himalayan communities and has helped diversify otherwise rural mountain economies. In the northeast-Indian state of Sikkim, this industry has received increased attention due to the value-added benefits of state policies on its resulting silk products. In 2015, Sikkim ratified a state law mandating that all Sikkim's producers uphold fully 'organic' practices (i.e., banned pesticides), including in animal husbandry. Because of this, all Sikkim's silk produced too confer an 'organic' status which would typically garner high demand in global markets. This report summarizes the results of n=1000 household surveys to better understand the volume of silk produced in Sikkim as well as the demographics of silk producers and its feasibility in the state of Sikkim. In 2019, about 2.80 MT of cocoon was produced in Sikkim (MIS data, DoS). The present results indicate that Sikkim has the potential of producing organic silk in the future as well as it has potential to provides an alternative income-generating source for the different communities of Sikkim Himalayas.

Key words: *Sericulture, Silkworm, Sikkim Himalaya, Mulberry*

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INTRODUCTION

State and local governments of the Himalayas have increasingly sought sustainable solutions to rural, mountain development (Sandhu, 2014; Bachmann, *et al.*, 2019). In the northeast-Indian state of Sikkim, these solutions have primarily centered on ecotourism and agricultural practices (Choudhury, *et al.*, 2018; Ramirez, 2001). Sikkim is one of the smallest states in India with approx 6 lakhs population (FSI, 2019) relies on the integrity of its natural resources to encourage visitation and support its growing population. In 2015, the Government of Sikkim implemented an ambitious plan mandating that all agriculture and related practices uphold fully organic practices in perpetuity.

Though first introduced in 1977-78, sericulture, also known to produce silk, has been platformed as a non-resource intensive means of diversifying Sikkim's economy. Sikkim Ministry of Environment and Forests have recently co-sponsored a Sericulture Directorate to encourage small-scale, forest-based enterprises that diversify the state's economy. Sericulture, or silk production, has been of particular interest because it requires relatively limited land and resources to produce high-value products (Dewangan 2017). In Sikkim, sericulture mainly comprises inter-linked activities such as food plant cultivation, maintenance to feed the silkworms, rearing of larva, and marketing of cocoons, etc (De and Das 2007)). Though Sikkim has the potential of producing different varieties of silk there are four major varieties of silkworm that are reported from Northeast India (Unni, *et al.*, 2009). Out of four varieties of Silkworm, Sikkim has

successfully grown three varieties of silk, namely, Eri, Muga, and Mulberry (Rai 2006). Nowadays with support from the Forest Department, mulberry culture is extensively practiced in the rural area of Sikkim, especially in low tropical belts. As per the local people's perception, mulberry plantation plays multiple roles both for Silkworm rearing and to feed cattle for quality milk production (Bharath, *et al.*, 2018).

At present, approximately 1000 families from middle-low income people are involved in cocoon production as part of their livelihood. The department of Forest & Environment under Sericulture Directorate has started a joint exploration program with both states as well as the central Silk Board Government of India by launching a flagship program called Intensive Bivoltine Sericulture Development (ISBDP). With the success of the program both state and central government providing basic training for sericulture farmers and for infrastructure development in the most potential villages of 3 districts viz. East, South, and West district respectively from the project. Another important responsibility of a sericulture directorate is to convince and motivate the local people through continuous education from time to time regarding feeding, caring, management of larva, plantation of mulberry, and pruning for obtaining good results (Utpal and Manjit 2010). The Indian state of Sikkim achieved the feat of being the world's first fully organic state and has been awarded the UN Future Policy Gold Award 2018 at headquarters of the Food & Agriculture Organization in Rome, Italy for its globally known green and organic policies. With the demand and popularity of Sikkim state as fully organic, the Sikkim silk has the potential of producing good quality organic silk in the future. Hence, sericulture has an immense potential of being suitable and feasible alternative livelihood option for the poor farming community especially women Self Help Group (SHG) in Sikkim to boost their income generation activities.

MATERIALS AND METHODS

The study was conducted in the three districts of Sikkim; east, west, and south district. The total sample respondents were 100 numbers randomly selected for the study. A random sampling procedure was adopted for the selection of farmers. We selected two areas from each district-Amba Kaizalay and Kamaray from the East, Tashiding, and Tikpur-Okhray from West and in South, Kateng & Wok village as a study area. We collected both primary & secondary data. A semi-opened questionnaire was used to local farmers for collecting primary data. We consulted with Sericulture Directorate, Forest & Environment Department of Sikkim for the secondary data.

RESULTS AND DISCUSSIONS

Sericulture is a viable industry in Sikkim that produces an organic, high-valued product of interest to international markets. Presently 1000 beneficiaries are practicing Sericulture in three districts of Sikkim Himalaya. As observed in the study, the social composition of different communities is equally involved in sericulture activities. Out of 1000 beneficiaries, 36% belong to the General category, 31% from Schedule Tribe category, 29% from Other Backward Communities (OBC), and 4% from Schedule Caste category respectively (Fig. 1). The social composition is common in every village with the majority of households belonging to General Category and Other Backward Communities followed by the other two communities (Patil, *et al.*, 2009). About 90% of farmers have taken up both mulberry cultivation and silkworm rearing and 10% of farmers are under process. Mulberry is largely preferred by local people and has been commercialized in villages whereas Eri and Muga are practice only in Govt Sericulture Farm-level nursery. Sericulture has been providing continuous farm-based employment and attracted the majority of farmers especially women to completely adapt sericulture for their alternative livelihood options (Dewangan 2017).

Fig. 1: District wise social composition of sericulture farmers in Sikkim Himalaya

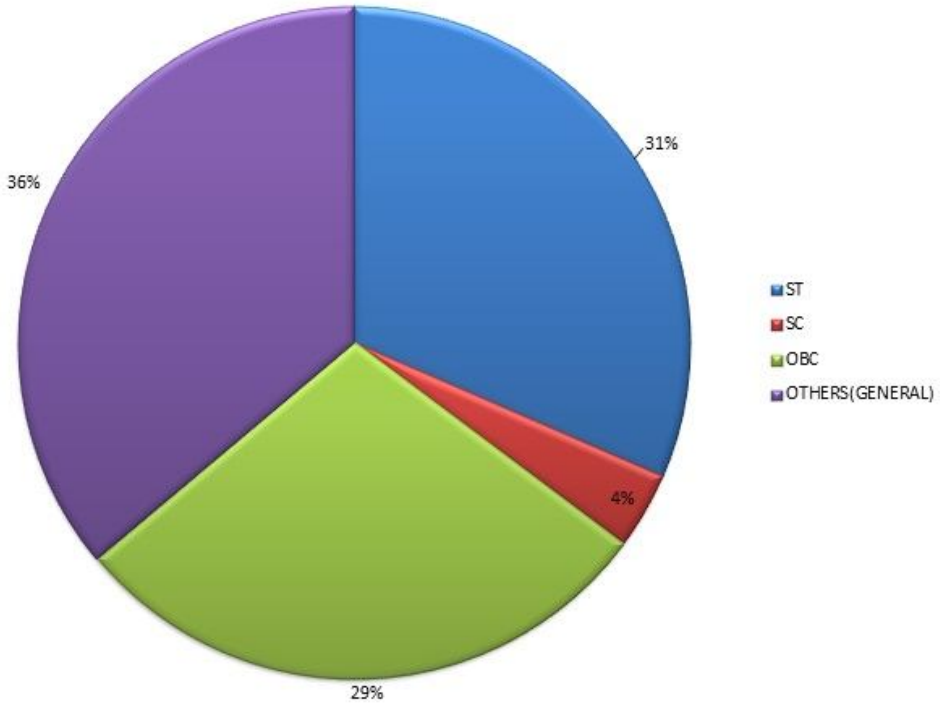


Table 1: Implementation of Intensive Bivoltine Sericulture Development Project in Sikkim

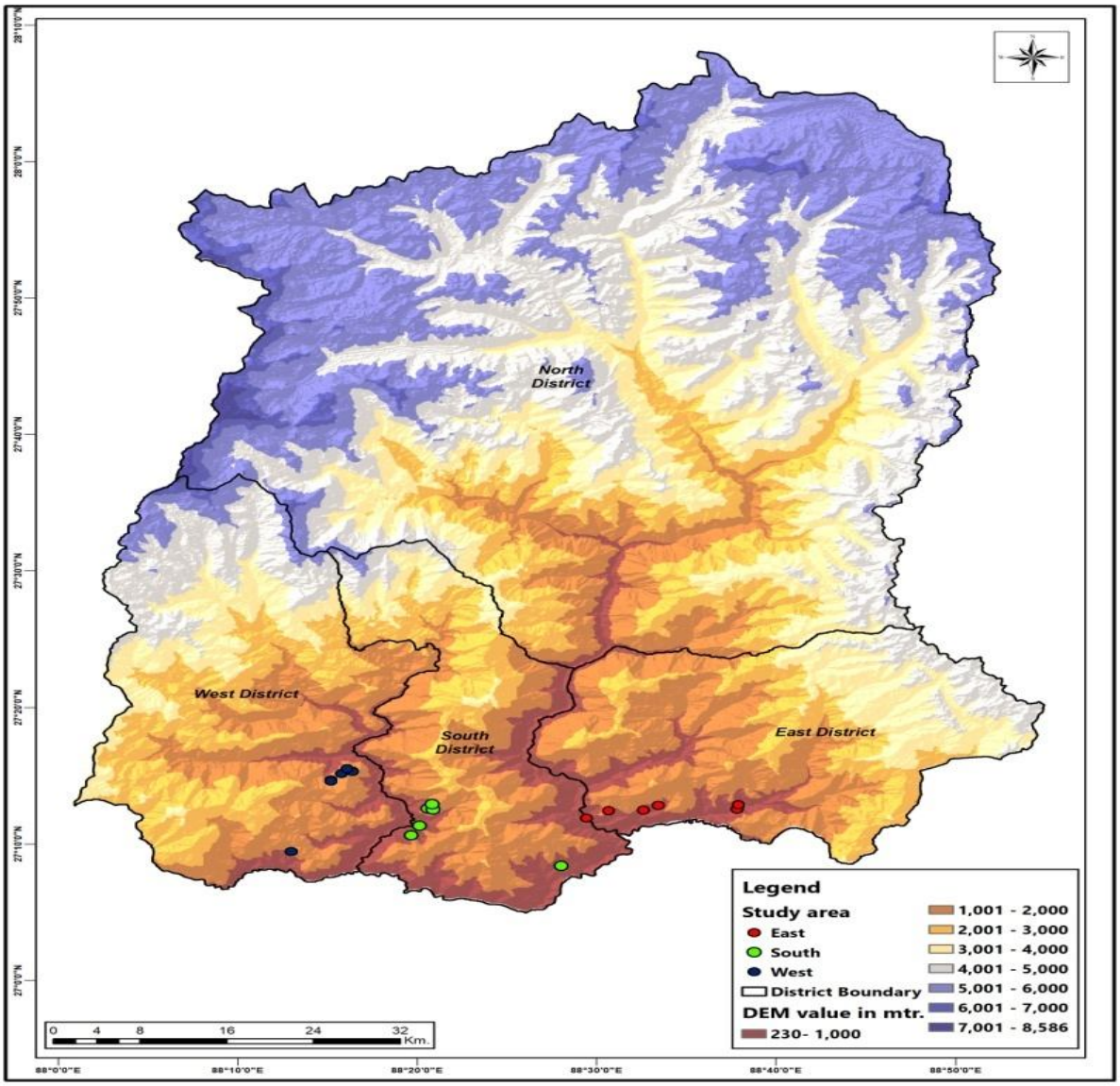
S.No.	District	Block	Total Beneficiary	Year	Cocoon Production (MT) *Source: MIS data, DoS*
1	South	Wok Omchu, Kamrang, Kichudumra, Mainabhotay, Pabung, Pokjor, Kateng, Borong, Wok, Jarung	274	2017	2.56
2	West	Malbassay-Budang, Sudung-Kamling, Tikpur-Okhrey, Chingthang, Rinchengpong, Nerdang, Lasso, Mabung, Pewthang, Tashiding, Bermiok	570	2018	2.76
3	East	Amba-kaizalay, Kamaray, Sakhu	156	2019	2.80 (approx.)
Total			**1000**		

Several initiatives were taken from both state governments as well as from the central government to strengthening the sericulture farmer especially women members. From the scheme such as the Intensive Bivoltine Sericulture Development Project (ISBDP), each Mahila Resham Karmi (MRK) as a supervisor receiving a monthly honorarium of Rs. 5000. Each sericulture farmer gets plantation support for raising 2500 mulberry plants and support of Rs. 1,20,000 for the construction of rearing houses from the project share. At present land used for sericulture land in Sikkim show that the area for mulberry plantation has increased by 500 acre which is smallest as compared to other states such as Andhra Pradesh, Karnataka, Tamil Nadu, Jammu Kashmir and West Bengal (Saheb and Dinesh 2016). Similarly, farmers used high variety leaves of mulberry plant BC259 and Kosen as a dietary for the mulberry silkworm larvae. Mulberry variety BC259 is especially good for the hilly region because it has a good survival percentage as well as higher leaf yield as compared to other local variety (Kunjupillai, *et al.*, 2012).

Farmers obtain silkworms eggs through Chawki Rearing Centre (CRC) which play a very important role during the first two instars stage for healthy and robust young age larva for better production of the cocoon (Umakanth and Manu 2013). The last five year results

were not that encouraging, but with continuous support, awareness, training, and infrastructure development from the Directorate of Sericulture, Forest and Environment Department and Central Silk Board, REC unit, currently, 1000 beneficiaries from three districts including 50 SHGs have started working progressively as sericulture farmers. The production of mulberry cocoons has increased over the years and in 2018 and 2019 the highest recorded total yield of 2.56 MT in 2018 and about 2.80 MT in 2019 respectively was achieved Table 1. Sericulture has emerged as the most important industry for middle-low income farmers as within a short period of 25-30 days they can earn a good source of money.

Fig. 2: Digital elevation model of a sericulture farmer cluster in the study area of the Sikkim Himalayas



Thus, sericulture provides the best-suited subsidiary or alternative livelihood option especially for women Self Help Group at this stage but over the years this industry has an immense potential to grow as a full-fledged farming option in the state of Sikkim as it being a fully organic state and the tag it holds would certainly boost the marketing of the Sikkim silk in future. Also at the moment, Sikkim is only farming till the stage of cocoon production and recently it has started for the post cocoon activities. Once the raw silk is

produced, it can fetch more prices thus making it a more feasible farming option for the villagers.

Therefore, for post-project sustenance of the sericulture industry in Sikkim, post cocoon production is mandatory with repeated and focussed outreach programs, research and development in sericulture, better infrastructures for ensuring better hatching percentage, production of quality disease free layings (DFLs) and seed cocoon and better marketing facilities.

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