CHAPTER 6
Summary and Conclusion

Background of the study

Muga culture is an age old traditional practice in Assam and it has immense potentiality for socio-economic improvement with sustainable income generation among the poor and marginal farmers. The improved technology packages recommended in muga culture was reported to be effective for enhancing production and productivity. However, production of muga raw silk was not reached into a desired level and it is swinging from 105 MT in 2003-04 to 158 MT in 2014-15. It was reported that in muga culture, yield gap between demonstration centre and the farmers is 50% in seed and 30% in commercial crop. Therefore, it was felt necessary to carry out a systematic study about the knowledge and adoption of technologies among the muga farmers, impact of improved technology in terms of production and productivity, socio-economic factors associated with the extent of knowledge and adoption of improved technologies and identification of constraints for non adoption of improved technologies, if any. Hence, with this background the present study was carried out with the following objectives.

1. To understand the knowledge and adoption of technologies by the muga farmers.
2. To study the association between the socio economic factors, knowledge and adoption of improved technologies.
3. To assess the muga cocoon yield through adoption of improved technology and traditional practices at the farmers' level.
4. To identify the constraints for non adoption of improved technologies by the muga farmers, if any.

The study was conducted in Golaghat district of Assam where both traditional as well as non-traditional muga farmers are existed. Besides, Central Silk Board has implemented different developmental schemes like Catalytic Development Programme (CDP), Special CDP for muga, etc through State

Sericulture Department, Govt. of Assam for providing technical as well as financial supports to the farmers. In order to ascertain the extent of knowledge and adoption of improved technologies, 12 recommended improved technologies of muga culture were selected. Survey was conducted among 200 farmers' to collect the required information *viz*., socio economic status of the farmers, knowledge and adoption of technologies, constrains for non adoption of improved technologies among the farmers, etc using the interview schedule structured for the purpose. Cocoon production under improved as well as traditional practice was also assessed at the framers field by observing the crop performance in different seasons for two years. Collected data were analyzed by using the suitable statistical methods to draw outcome of the study.

The study has come with the following findings:

Personal and socio-economic characteristics of muga farmers: Majority of the respondents belonged to male categories with middle age group (36 to 50 years) and education level was up to secondary level. Family size of most of the farmers consists of 4-5 members and agriculture is considered as primary occupation. Land holdings under cultivation of muga host plantation of majority of the respondents had less than 1.0 acre. Income from sericulture of the majority of the farmers had medium level ranged from Rs. 30000.00 to 40000.00. Most of the farmers possessed 10-25 years experience in muga culture. Majority of the respondents participated in extension and mass media programme occasionally.

Knowledge level of muga farmers about improved technologies: Majority of the muga farmers (40.0%) possessed high level of knowledge about improved technologies. Medium and low level of knowledge about improved technologies was observed in 32.5% and 27.5 % farmers respectively. Majority of the farmers were having knowledge about spacing of host plants (94.5%) followed by inter-cropping with muga host plants (87.0%), early stage silkworm rearing (86.5%), pruning schedule (81.5%) and lahdoi (81.0%). The large number of farmers was also possessed knowledge in pre-brushing care (74.0%), application of FYM and

NPK (64.5%), control of stem borer (63.0%) and improved mountage (78.0%). While, very less number of respondents had knowledge about biological control of uzi fly (39.5%), mother moth examination (24.5%) and egg surface disinfection (33.5%).

Socio-economic factors namely age, land holding, experience and extension participation showed positively significant relationship with knowledge level of the farmers.

Adoption of improved technologies among the muga farmers: Majority of the muga farmers (51.5%) belongs to low adopter followed by medium adopter (27.5%) and high adopter (21.5%) of improved technologies. Among the respondents, full adoption of technology was found in spacing of host plants (64.0%) followed by pre-brushing care (55.5%), early stage silkworm rearing (28.5%), pruning schedule (27.0%), intercropping (23.5%), control of stem borer (19.5%), lahdoi (17.0%), improved mountage (11.5%), application of FYM and NPK (8.0%) and biological control of uzi fly (3.0%). Partial adoption of technologies were found to be high in case of application of FYM and NPK (43.5%) followed by 42.0% each in case of pruning schedule, intercropping and early stage silkworm rearing. Partial adoption was observed 39.0%, 31.0%, 21.5% and 11.0% in the cases of lahdoi, control of stem borer, improved mountage and biological control of uzi fly respectively. On the other hand, none of the respondents was found in full adoption of mother moth examination and egg surface disinfection. Partial adopters of mother moth examination and egg surface disinfection were noticed in 3.5% and 1.5% of the respondents respectively. Non adoption of technologies were observed as high in egg surface disinfection (98.5%) followed by mother moth examination (96.5%), biological control of uzi fly (86.0%), improved mountage (67.0%), control of stem borer (49.0%), application of FYM and NPK (48.0%), lahdoi (44.0%), intercropping (34.5%), pruning schedule (31.0%) and early stage rearing (29.5%).

Socio-economic factors namely age, seri income, land holding, experience and extensionparticipation had positively and education had negatively significant relationship with the adoption of improved technology.

Traditional practices: The farmers mostly followed the traditional practices of muga culture particularly for silkworm rearing and silkworm seed production. A healthy brood of silkworm is selected by observing different characters and behaviours at the time of rearing such as feeding of entire leave, light green body colour, copper colour mandible, uniform growth, instantaneous response while touch, free from any disease, presence of solid form of excreta in the rectum, of the silkworm larvae. Seed cocoon are preserved at perforated bamboo cage locally called '*chakari pera*' in single layer. During winter, the seed cocoons were kept near the kitchen fire and time to time exposed to sunlight for early emergence of moths. Moths are allowed to couple naturally before midnight. At the time of pairing, hind wings of female moths are tied in *"kharika*" with the help of cotton thread. The kharikas along with the moths are hanged in a rope and allowed the moths to lay eggs. At the time of shortage of male moths, the female moths were tied in *khorikas* and hanged it on branches of plants or bamboos in outside to allow coupling with wild male moths at night. After 10-12 hours of pairing, paired moths were exposed to smoke generated through burning of paddy straw for a few minutes at the evening for self depairing. Moths were allowed to lay eggs for maximum three days. After three days of egg laying, female moths were removed from the *kharika* and the eggs along with *khorikas* were kept in dark and shady place till hatching. Disinfection of rearing and grainage equipments are done by keeping them over the kitchen fire. Spread tulsi *(Oscimum sanctum)* twigs over the layings to prevent infections. Use to burn unwanted substances to repel pests of silkworms before and during rearing. Early stages rearing of silkworm are done on Dighlati plants (*Litsea salicifolia)* to reduced disease incidences of silkworm.

Cocoon yield under improved and traditional practices: Cocoon yield in both seed and commercial crops was found to higher in improved practice

against the traditional practice of muga culture. In improved practices, average number of cocoon yield was found 47 and 42 per dfl against the cocoon yield of 31 and 20 per laying in traditional practice during Chatua and Bhadia seed crops 2014 respectively. Similarly, the average number of cocoon yield in both Chatua and Bhadia seed crops during 2015 was higher in improved practice (45 & 24) against the traditional practice (37 & 19) respectively. Hence, the ERR of Chatua and Bhadia seed crops during 2014 and 2015 was found higher in improved practice than the traditional practice.

Likewise, average number of cocoon yield per dfl in both Jethua and Kotia commercial crops during 2014 was higher in improved practice (62 & 58) against the cocoon yield per laying in traditional practice (49 & 43) respectively. Similarly, the average number of cocoon yield per dfl in both Jethua and Kotia commercial crops was higher in improved practice (65 & 52) against the cocoon yield per laying in traditional practice (47 & 43) respectively during 2015. Hence, the ERR in both Jethua and Kotia commercial crops was found higher in improved practice than traditional practice in both the year. The t-test conducted for equality of variance in ERR between traditional and improved practices, it was observed that t- tests was highly significant at 1 & 5% level of significance in all the seed and commercial crops in both the years . Hence, there is a clear difference of yield between the improved and traditional practice of muga culture. In other sense, it could be depicted from the results of descriptive statistics that improved practice was better than traditional practice in terms of cocoon yield and ERR.

Economics of cocoon yield under traditional and improved practice: From the study, it could be ascertained that better crop performance in muga culture give higher net income and thus benefit cost ratio (BCR) was relatively high in improved practice (1: 0.52 in seed and 1: 1.30 in commercial crop) against the BCR in traditional practice (1: 0.10 in seed and 1: 0.80 in commercial crop).

Constraints for low and non-adoption of improved technologies: Various constraints were identified for low and non adoption of improved technologies

among the farmers. Among the constraints, inclination towards traditional practice, lack of proper knowledge, non availability of silkworm seeds on time were the major and serious constraints identified for low and non adoption of improved practices. Other constraints were non remunerative, lack of time, non availability of materials, high cost & labour intensive, non availability of own farm and marketing of cocoons.

Conclusion

Present study clearly revealed that improved technology package of muga culture is effective for enhancing muga cocoon yield. Although, the knowledge level on some of the improved technologies was high among the farmers, but adoption level was too low. High inclinations towards traditional practice, lack of proper knowledge, non availability of silkworm seeds on time are the most serious constraint for low and non adoption of improved technologies. Certain socio economic traits of the farmers namely age, sericulture income, land holding, experience and extension participation had positive and significant relationship with the adoption of improved technology. Hence, the extension workers in the field of sericulture should involve more as a collaborator, consultant and facilitator in dissemination of the improved technologies among the muga farmers. The farmers must be educated about the benefits of improved technologies by using different extension tools for quick acceptance. Practical training with exposure visit, result demonstration of the technologies with farmers participatory programme, awareness programme, mass media, etc may be helpful to educate the farmers about improved technologies effectively. Besides, the socio economic factors which are significantly associated with knowledge and adoption of improved technologies must be taken in to consideration for disseminating the improved technologies effectively. Refinement of improved technologies for reduction of high cost in to an affordable level and suitable approach for making the technologies easily accessible are also important for their speedy dissemination in to field. Providing required financial assistance from the concerned government sectors

to the poor farmers may be helpful for adopting the recommended technologies properly. Hence, the various developmental schemes of sericulture implemented by the government as well as non government organization need to be continued for giving financial support to the farmers under strict monitoring of the implementing agencies.

Effective strategies should also be taken by the Muga Silkworm Seed Organization (MSSO) of Central Silk Board and State Sericulture department to make the muga silkworm seeds available on time for the farmers. Strengthening of the units of muga silkworm seed organization providing with required infrastructure including cold staorage facilities, manpower, etc should be taken in to consideration for production and supply of sufficient seeds to the farmers. Hence, government should provide sufficient financial supports to all the MSSO units working under central and state govt department. Further, existing Silkworm Seed Act should be followed strictly by all the concerned for maintaining the quality of silkworm seeds.

The study also revealed that various traditional practices and beliefs are associated with the muga culture. Most of the farmers strongly preferred these traditional practices used them at the time of seed production and rearing of muga silkworm. Some of these traditional practices have strong scientific inference and thus, these practices may be helpful for production of muga cocoon. Hence, these traditional practices are needed to be scientifically validated to test their efficiency on cocoon yield. After validation, the effective traditional practices, if any may be integrated with the modern improved technology package for sustainable development of technologies in muga culture. This will help for further enhancing the production of muga cocoon as well as raw silk in the country.