



A COMPARATIVE STUDY AND ANALYSIS OF CHAWKI REARING CENTRES AND SERICULTURE FARMERS AND THEIR TECHNOLOGY ADOPTION LEVELS

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Abstract

Sericulture comprises large scale rearing of silkworms and cultivation of mulberry to feed the silkworm larvae. Sericulture is an agro-based industry playing very important role in the economic activity of our country. This welfare-oriented enterprise provides scope for fast and sustainable economic growth and more employment opportunity with very short gestation period and less capital investment of establishment. Sericulture combines the attributes of both agriculture and industry, as it comprises three distinct activities viz., cultivation of mulberry, rearing of silkworms and the reeling of cocoons. In India, only 10 to 12% of farmers alone get the benefit of Chawki Rearing Centres compared to the sericulturally advanced countries where more than 90% of farmers receive silkworm larvae from Chawki Rearing Centres. The present study was conducted in different CRCs in the towns/villages of Kanakapura and Malavalli. The required information was collected through the spot inspection, visual observation and interviewing the staff and the workers of CRCs by using the standard questionnaire. In the same way, the study was conducted in the surrounding villages of CRCs i.e., the farmers who are purchasing chawki worms from CRCs mentioned above. The following information was collected from the farmers namely total land area, mulberry cultivated land area, types of mulberry plantation, method of irrigation, pest affecting the crop, pesticides used, methods of harvesting mulberry, number of feedings per day, type of disease incidence in silkworm larvae, cocoon production, constraints/problems faced by farmers. A total of 100 farmers were interviewed and the data relevant to each of the above list were analyzed, presented and discussed.

Introduction

Sericulture, the industry of producing silk, is a traditional agro-based industry playing a very important role in the rural economy of any developing country. This welfare-oriented enterprise provides scope for fast and sustainable economic growth and more employment opportunity within a very short gestation period with less capital

investment of establishment. Sericulture is a component of agriculture and comprises large scale rearing of silkworms and cultivation of mulberry to feed the silkworm larvae. The word “sericulture” is derived from the Greek word “sericos” meaning silk and the English word “culture” means rearing. It is a land-based occupation suitable for establishment in the rural areas where land is abundantly available; this industry is rightly described as “the industry of the poor”. Sericulture industry combines the attributes of both agriculture and industry, as it comprises three distinct activities viz. cultivation of mulberry, rearing of silkworms and reeling of cocoons, these three activities work in concert with each other. The cultivation of mulberry and rearing of silkworms come under agriculture sector and the reeling of cocoons under industrial sector. Large scale rearing of silkworm’s up to 2nd stage in required climatic conditions (28 °C & 85% R.H) and providing nutritiously rich mulberry feed raised from separate mulberry gardens as an exclusive activity by the centre is known as “Commercial Young Silkworm Rearing Centre” or “Chawki Rearing Centre” (CRC).

In India only 10 to 12% of farmers alone get the benefit of Chawki Rearing Centres. In China and other sericulture advanced countries, more than 90% of farmers receive only chawki reared worms from Chawki Rearing Centres (Singh *et al.*, 2006). The advantages of commercial CRCs are raising of robust young silkworms, stabilization of crop and increase of cocoon yield, control over disease occurrence and spread, reduction in expenditure, distribution of labour for other farm works and facilitation of batch brushing and efficient crop supervision. Chawki rearing is one of the vital activities in silkworm rearing, which enables the farmers to reap good harvest of quality cocoons. Thus, CRCs are essential for ensuring success and stability of silkworm crops. In this study of selected chawki rearing centres, an attempt has been made to study the knowledge, adoption levels regarding chawki technologies and the impact of chawki rearing training to the Chawki Rearing Centre (CRC) and the farmers attached with CRC’s. At present, the raw silk production is 42033 MT, of which mulberry silk is 32250 and vanya silk is 9783 during 2025-26.

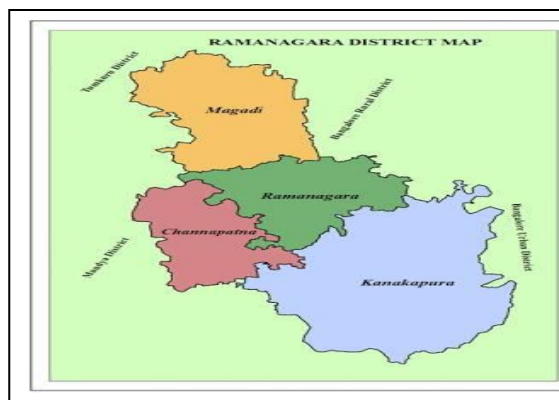
KEY WORDS: Chawki Rearing Centres, mulberry, silkworm, cocoons, raw silk.

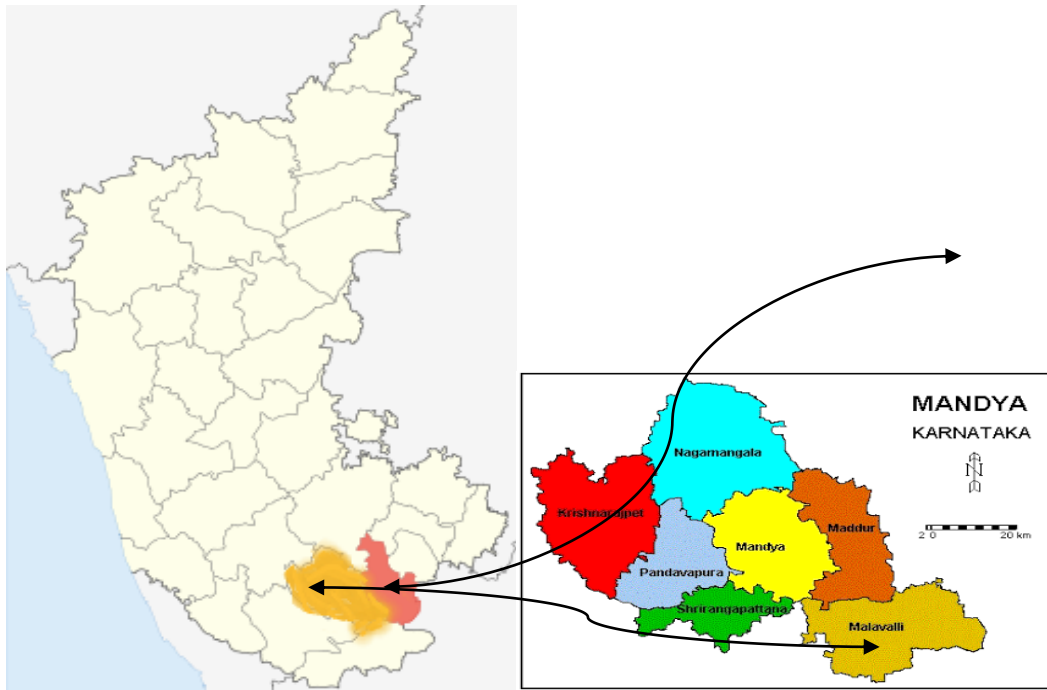
Materials and methods

In the process of achieving the objectives of the study, it is very important to follow a systematic and scientific approach to present and interpret the results of the study conducted. The methodology outlines the features of the study area, the method of sampling and collection of data, the analytical frame work employed and the concepts are defined and explained to facilitate a clear understanding of the issues related to the present study.

- The present study was conducted in different CRCs in the towns/villages like Kanakpura, and Malavalli.
- The required information was collected through the spot inspection, visual observation and interviewing the staff and the workers of CRCs by using the standard interview schedule that is using a questionnaire.
- In the same way the study was conducted in the surrounding villages of CRCs i.e., the farmer purchasing chawki worms from CRCs mention above.

1. Description of the study area:





Ramanagara District is now called as Bangalore South District and one of the prominent out of 31 districts of Karnataka State in southern India. Ramanagara city is the administrative headquarters of this district. The district is the part of Bengaluru and carved out of the erstwhile Bangalore rural district on 23 Aug. 2007 comprising Ramanagara, Channapatna, Kanakpura and Magadi taluks. Kannada is the official and most widely spoken language. Demographics according to the 2011 census Ramanagara district as a population of 82,636 roughly equal to the nation of Cyprus or the US state of Rhode Island. This gives it a ranking of 421st (out of the total of 640). The district has a population density of 303 inhabitants per square kilometre (780 per sq.ml). Its population growth rate over the decade 2001 to 2011 was 5.06 percent. Ramanagara has a sex ratio of 976 Females for every 1000 Males, and a literacy rate of 69.2%.

Kanakpura is a town and the headquarters of Kanakpura taluk in the Ramanagara district in the state of Karnataka, India. This city is famous for the production of silk and Granite. It is located among the lush green forests of the state of Karnataka and the town is a tourism hotspot and an often-visited tourist favourite in the entire state of Karnataka.

Malavalli is the town and a taluk place in Mandya district state of Karnataka in India. Malavalli town is a very vibrant and active rural market. Malavalli is now an important Centre for Sericulture. A growing industry in this part of the state. Malavalli also has a flourishing leather unit.

Geographical location: Kanakpura is located at 12.55°N 77.42°E. it has an average elevation of 638 meters (2093 feet) Kanakpura is situated 55 km South to Bangalore on national highway.

2. Sampling procedure and source of data:

KANAKPURA and MALAVALLI taluks were chosen where a good number of households are practicing sericulture. 100 farmers were chosen for the present study. Data was collected by direct personal interview method using a questionnaire. The pre-structured questionnaire covering all activities of mulberry cultivation, land holdings, irrigation and fertilization, socio-economic conditions, education, experience, silkworm rearing, income, type of rearing house, cocoon storage methods, pests, diseases of silkworm, cocoon marketing, livestock, extension, govt. schemes, etc.

3. Analytical tools and techniques employed:

Tabular analysis: The data collected from 100 respondent farmers were subjected to simple tabular analysis. Tabular analysis including the computation of means, percentages etc., were employed to present the data in respect to demographic feature, socio-economic profile and cropping pattern adopted by sericulture farmers. The different parameters were calculated using following formula:

$$\text{Total percentage of respondent} = \frac{\text{Total no. of respondents} \times 100}{\text{No. of respondents}}$$

RESULTS AND DISCUSSION:

- 1) Total land area.
- 2) Mulberry cultivated land area.
- 3) Types of mulberry plantations.
- 4) Method of irrigation.
- 5) Pest affecting the crop.
- 6) Pesticides used.
- 7) Methods of harvesting mulberry leaves.
- 8) Number of feeding per day.
- 9) Type of diseases incidence in silkworm.
- 10) Cocoon production / crop
- 11) Constraints /problem faced by farmers.

1) Total land area:

Mulberry foliage is the only food for the silkworm and is grown under varied climatic conditions ranging from temperate to tropical. Mulberry leaf is a major economic component in sericulture since the quality and quantity of leaf produced per unit area have a direct bearing on cocoon harvest. In India, most states have taken up sericulture as an important agro-industry with excellent results. The total land area of mulberry in the country is around 269670 ha. (2025-26, CSB website data)

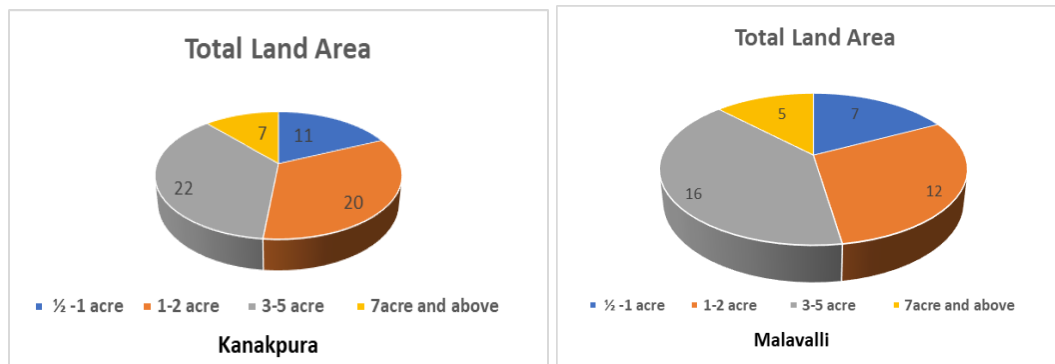
Figure 1 & 2 showing the total land area

Figure 1 & 2 shows that out of 100 farmers, 60 respondents of farmers from Kanakpura and 40 respondents of farmers from Malavalli, 38 (38%) farmers having 3-5 acre of mulberry land area, 32 (32%) farmers having 1-2 acre(s) of mulberry land area, 18 (18%) farmers having 0.5-1.0 acre of mulberry land area and 12 (12%) farmers having 7.0 acre and above mulberry land area.

2) Mulberry cultivated land area:

Mulberry is a fast-growing deciduous woody perennial plant and it has a deep root system. The leaves are simple, alternate, stipulate, petiolate, entire or lobed. The number of lobes varies from one to five. Plants are generally dioeciously. Inflorescence is catkin with pendent or drooping peduncle bearing unisexual flowers. Inflorescence is always auxiliary, male catkins are usually longer than the female catkins. Male flowers are loosely arranged and after shedding the pollen, the inflorescence dries and falls off. Female inflorescence is usually short and the flowers are very compactly arranged. There are four persistent perianth lobes, the ovary is one-celled and the stigma is bifid. Mulberry cultivation is practiced in various climates; the major area is in the tropical zone covering Karnataka, Andhra Pradesh and Tamilnadu states, with about 90%. In the subtropical zone, West Bengal, Himachal Pradesh and the north-eastern states are the major areas under mulberry cultivation.

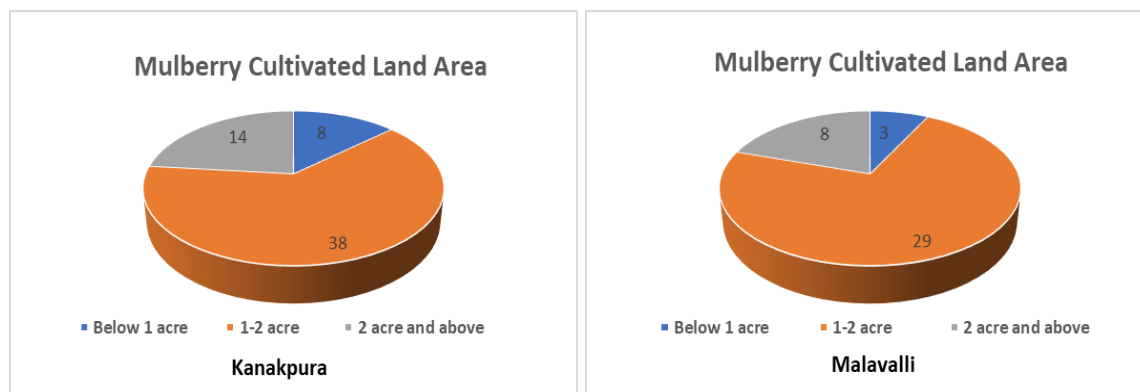
Figure 1 & 2 showing the mulberry cultivated land area.

Figure 1 & 2 shows that out of 100 respondents of sericulture farmers, 60 respondents of farmers from Kanakpura and 40 respondents of farmers from Malavalli, show the maximum of the respondents 67 (67%) have mulberry cultivated land area of 1-2 acres, 22 (22%) respondents have mulberry cultivated area of 2 acres and above 11(11%) respondents have mulberry cultivated area of less than 1 acre.

3) *Type of mulberry plantations:*

The success of mulberry leaf production depends on three factors namely, variety, cultivation practices (agronomical inputs) and plant protection methods. The variety selected for cultivation must respond well to optimum agronomic inputs and plant protection measures. Mulberry flourishes well in soils that are flat, deep, fertile, well drained, loamy to clayey, and porous with good moisture holding capacity. The ideal range of soil pH is 6.2 to 6.8, the optimum being 6.5 to 6.8. Cultivating improved or high yielding mulberry varieties forms the most important aspect of improving the leaf yields. Different varieties are cultivated at different agro-climatic zones and regions depending upon the suitability of the soil, abiotic factors, availability, and acclimatization. Mulberry can be raised as dwarf, bush, or tree type.

Figure 1 & 2 type of mulberry plantation.

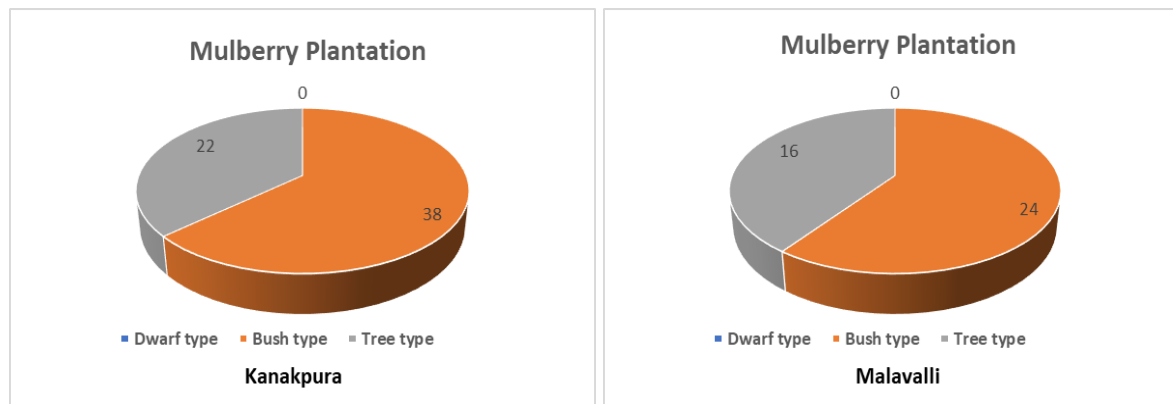


Figure 1 & 2 shows that out of 100 farmers, 60 respondents of farmers from Kanakpura and 40 respondents of farmers from Malavalli, 62 (62%) are practicing bush type of plantation, 38(38%) are practicing tree type of plantation, and no one can practice dwarf mulberry plantation,

4) *Method of irrigation:*

Irrigation is the application of controlled amounts of water to plants at needed intervals. Irrigation helps to grow agricultural crops, maintain landscapes, and revegetate disturbed soils in dry areas and during periods of less than average rainfall. Irrigation also has other uses in crop production, including frost protection, suppressing weed growth in grain fields and preventing soil consolidation. In contrast, agriculture that relies only on direct rainfall is referred to as rain-fed or dry land farming. Several methods of irrigation are used today depending on water availability, the type of irrigated crop and the financial investment the grower is willing to make.

Figure 1 & 2 showing the method of irrigation:

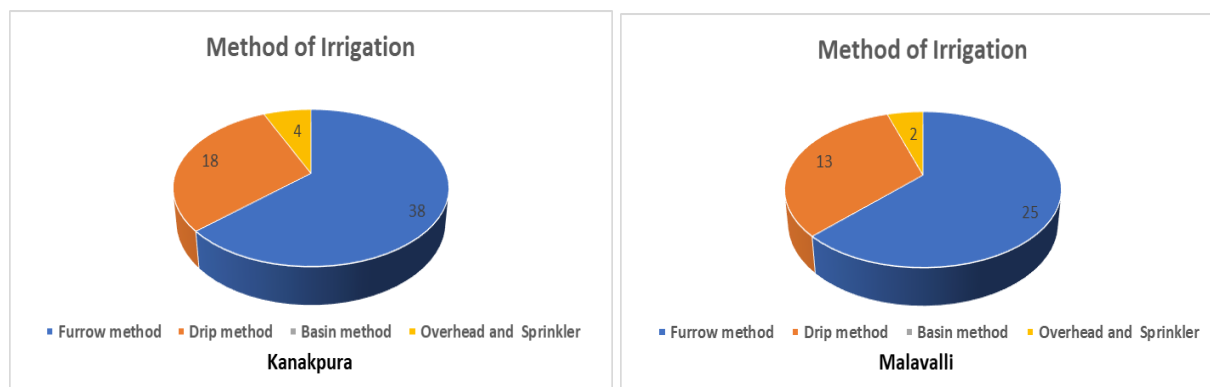


Figure 1 & 2 shows that out of the 100 farmers, 60 respondents of farmers from Kanakpura and 40 respondents of farmers from Malavalli, 63 (63%) majority of the farmers irrigated their land by using furrow method of irrigation, 31 (31%) of the farmers irrigated their land by drip method and 06 (6%) irrigated their land by overhead and sprinkler method.

5) *Pests affecting the crop:*

In the plant's world, pests refer to harmful organisms that latch on to plants, rendering them unsuitable for harvest. While most of these organisms tend to be insects, some fungi or plants can also be classified as pests. Every garden is prone to pests. Some organisms are harmless but the majorities are detrimental to plant's roots, leaves, and overall health. Pests can stunt a plant's growth, especially smaller ones, disturb the soil, harm the foliage's appearance and drastically reduce to overall quality of crop. When left untreated, pests often result in the plant's death. Ants, snails, slugs, caterpillars, spider mites, whiteflies, fungus, and aphids are the most common types of garden pests.

Figure 1 & 2 showing the pests affecting the crop

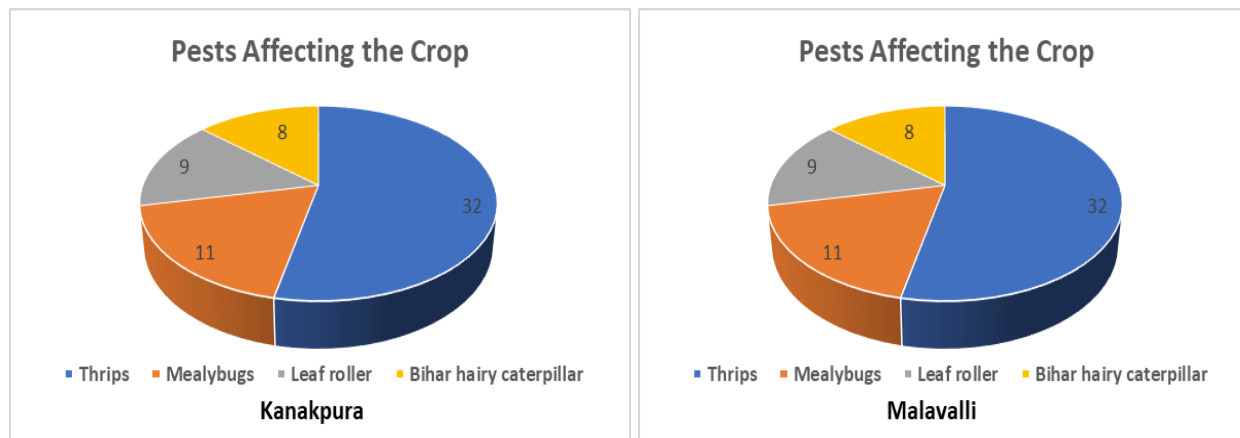


Figure 1 & 2 shows that out of the 100 farmers, 60 respondents of farmers from Kanakpura and 40 respondents of farmers from Malavalli, majority 44 (44%) of the crop is affecting by Thrips, 19 (19%) of the crop is affecting by leaf roller, 22 (22%) of the crop is affected by the mealy bugs and 15 (15%) of the crop is affected by the bihar hairy caterpillar.

6) *Pesticides used:*

Pesticides are substances that are meant to control pests, including weeds. The term pesticide includes all of the following: herbicide, insecticides (which may include insect growth regulators, termiticides, etc.) nematicide, molluscicide, pesticide, avicide, rodenticide, bactericide, insect repellent, animal repellent, antimicrobial and fungicide. The most common of these are herbicides, which account for approximately 80% of all pesticides used. Most pesticides are intended to serve as plant protection products (also known as crop protection products), which in general, protect plants from weeds, fungi or insects. Like other crops, several pests like insects, pathogens, nematodes, mites, weeds, etc. also affect mulberry. However, the use of pesticides is inevitable in mulberry ecosystem.

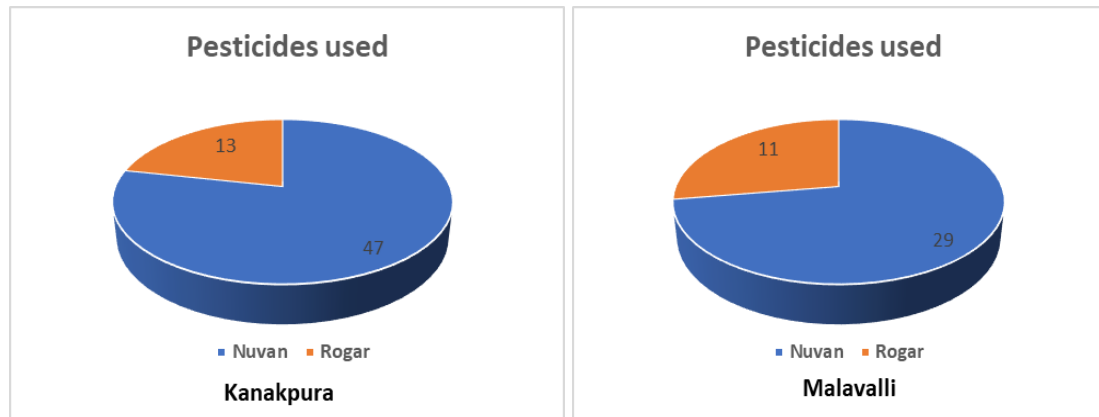
Figure 1 & 2 showing the pesticides used

Figure 1 & 2 shows that out of the 100 farmers, 60 respondents of farmers from Kanakpura and 40 respondents of farmers from Malavalli, most of the farmers 76 (76%) are using Nuvan for controlling pests, 24 (24%) of farmers are using Rogar pesticide for controlling pests.

7) Method of harvesting mulberry leaves:

Silkworm feed on the mulberry leaves, the success of silkworm rearing depends on the quality of leaf that is fed to silkworms. Silkworms prefer fresh, healthy and succulent mulberry leaves. Silkworm during different stages prefers different nutritive quality of leaf. Harvesting of mulberry leaves from the mulberry garden mainly is of two types. (a) Leaf picking and (b) shoot-harvest. Leaf harvest depends on the type of rearing method adopted. Young age silkworms are fed with the leaves of more water content for easy ingestion; preferably the top leaves of the mulberry plant are harvested. Late age worms require mature leaves. Inferior quality mulberry leaves damages the health condition of silkworm and leads to failure of the crop.

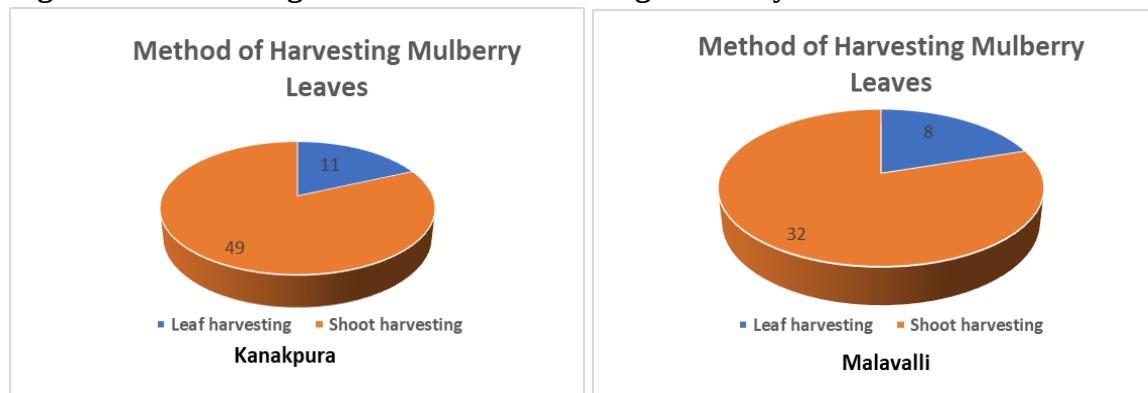
Figure 1 & 2 showing the method of harvesting mulberry leaves

Figure 1 & 2 shows the method of leaf harvest, out of 100 farmers, 60 respondents of farmers from Kanakpura and 40 respondents of farmers from Malavalli, 81 (81%) farmers harvest their mulberry leaves by shoot harvesting method and 19 (19%) farmers harvest their leaves by leaf harvesting method. Most of the farmers harvest the leaves by shoot harvesting method, which is the most common method of leaf harvesting.

8) Numbers of feedings per day:

Timely provision of nutritionally rich mulberry leaves in optimum quantity is most important component, which largely influence the cocoon productivity feeding frequency as direct effect the growth and development of worms. The number of feeds given varies from place to place depending upon many factors.

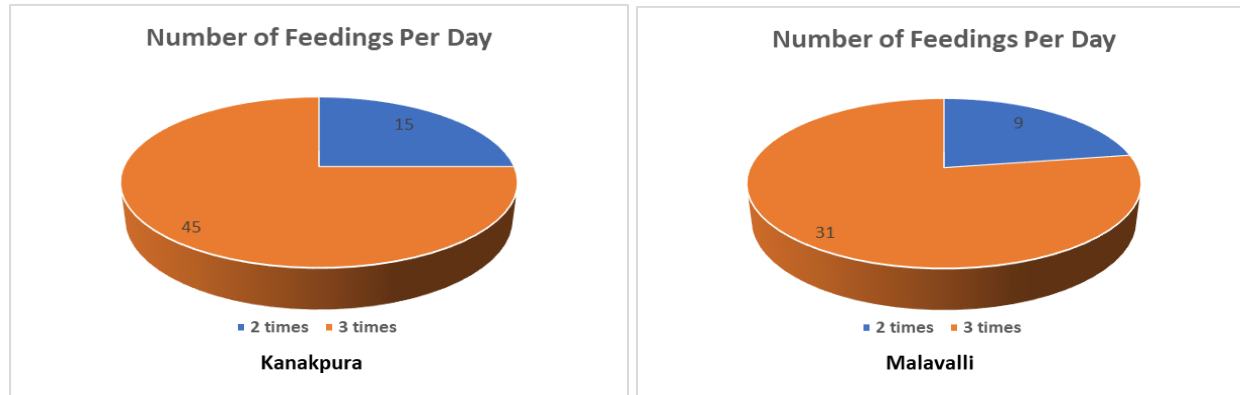
Figure 1 & 2 showing the number of feedings per day

Figure 1 & 2 shows number of feedings per day, out of 100 farmers, 60 respondents of farmers from Kanakpura and 40 respondents of farmers from Malavalli, 76 (76%) farmers feeds 3 times per day followed by 24 (24%) farmers feeds twice a day.

9) *Types of diseases incidence in silkworm:*

The mulberry silkworm is susceptible to various diseases and is attacked by parasites and pests. Various types of silkworm diseases of larvae are caused by virus, bacteria, fungus and protozoa. These diseases of larvae cause great trouble and loss to the silkworms. Therefore, each silkworm disease is to be treated seriously, otherwise can create epidemic.

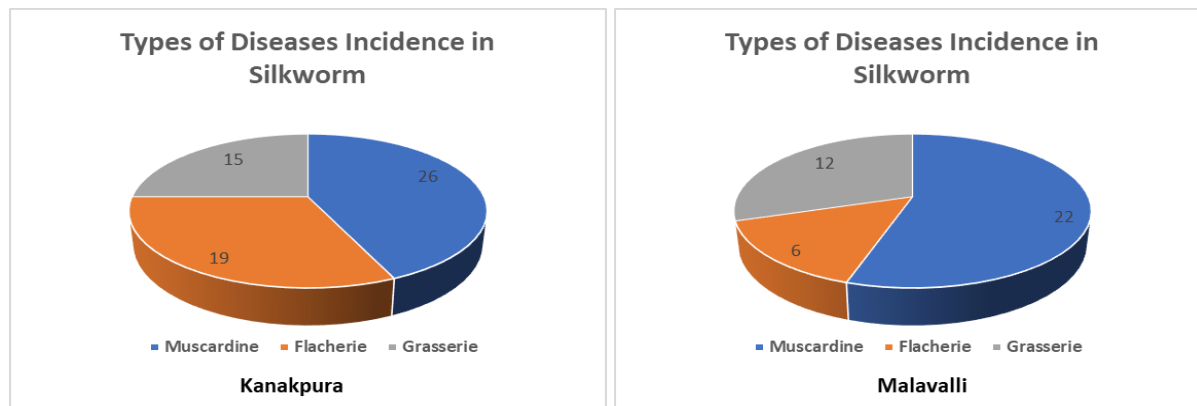
Figure 1 & 2 showing the types of diseases incidence in silkworm

Figure 1 & 2 shows that out of 100 farmers, 60 respondents of farmers from Kanakpura and 40 respondents of farmers from Malavalli, 48 (48%) farmers have Muscardine disease incidence, 25 (25%) farmers have grasserie disease incidence, 27 (27%) farmers have flacherie disease incidence.

10) *Cocoon production/crop:*

Mulberry sericulture is one of the incomes assuring occupations to rural folks. It needs low capital and ensures year-round employment opportunities. The cocoon production consists of two major economic activities namely, cultivation of mulberry and rearing of silkworms. The establishment takes six months and garden maintenance has to be done round the year and the silkworm rearing activity for cocoon production is for 30 to 40 days/ cycle.

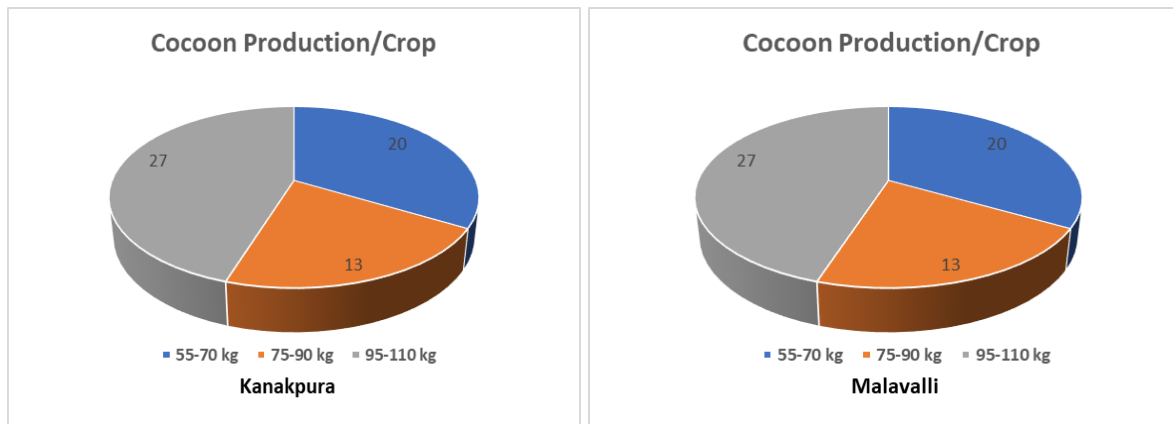
Figure 1 & 2 showing the cocoon production/crop.

Figure 1 & 2 shows cocoon production per crop, out of 100 farmers, 60 respondents of farmers from Kanakpura and 40 respondents of farmers from Malavalli, majority of the farmers 39 (39%) produces 95-110 Kg cocoons per crop, 37 (37%) farmers produce 55-70 Kg cocoons per crop and 24(24%) farmers produce 75-90 Kg cocoons per crop.

11) *Constraints / problems faced by the farmers:*

Constraints faced by the farmers in mulberry cultivation and silkworm rearing were assessed. The association between the personal and socio-economic characteristics of the farmers and the constraints faced by them in sericulture was also determined. The farmers expressed constraints in mulberry cultivation such as high labour wages, inadequate labour, inadequate irrigation facilities, high cost of manures and fertilizers, lack of guidance and lack of knowledge about mulberry diseases and pests. They also reported constraints viz., high cost of rearing room and equipment, lack of credit and subsidy, lack of manpower, difficulty in controlling silkworm diseases, lack of knowledge regarding physical conditions in rearing room and grading of cocoons, long distance of cocoon trading units and non-remunerative rates for cocoons during silkworm rearing. The personal and socio-economic characters of the farmers such as caste, social participation and level of knowledge in sericulture were found to have a significant association with the constraints faced by them in sericulture.

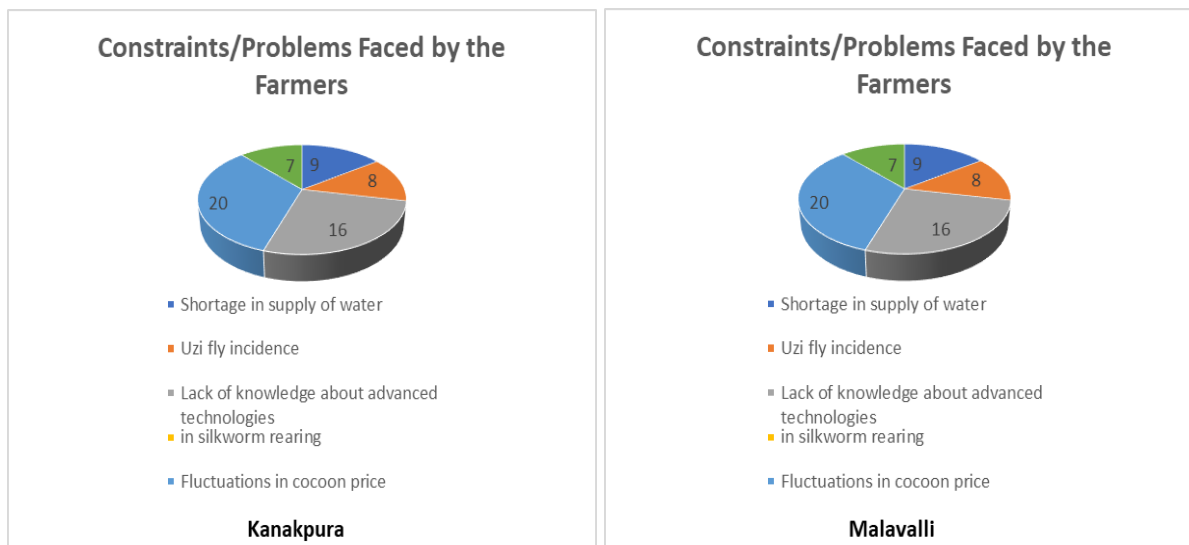
Figure 1 & 2 showing the constraints / problems faced by the farmers

Figure 1 & 2 show that out of 100 farmers, 60 respondents of farmers from Kanakpura and 40 respondents of farmers from Malavalli, The most serious constraints / problems faced farmers is 33 (33%) farmers are facing fluctuations in cocoon prices, 23 (23%) farmers are facing lack of knowledge about advanced technologies in silkworm rearing, 12 (12%) farmers are facing Uzi fly incidence, 16 (16%) farmers are facing shortage and high rate of labour, and 16 (16%) farmers facing shortage supply of water.

As shown in (table 1) indicates the most of the farmers are possessing a land area of about 3.0 -5.0 acres followed by half acre, 1.0 acre, and 2.0 acres, (table2) shows that most of farmers have mulberry cultivated area of 1-2 acres followed by 2.0 acres and above, (table3) Different varieties are cultivated at different agro-climatic zones and regions depending upon the suitability of the soil, abiotic factors, availability, and acclimatization. Mulberry can be raised as dwarf, bush, or tree type, shows that most respondents are practicing bush type plantation followed by tree type plantations, (table 4) shows that most of the farmers irrigated their land by furrow method followed by drip and sprinkler method. Irrigation and methods of irrigation helps to grow crops, maintain landscapes disturbed soils in dry areas and during periods of less than average rainfall, (table 5) shows that majority of the crop affecting pests are thrips, followed by mealy bug, leaf roller, bihar hairy caterpillar, (table 6) shows that most of the farmers are using Nuvan for controlling pests and some of the farmers are also using Rogar for controlling pests of the mulberry garden, (table 7) shows that the most common type of leaf harvest practiced by farmers is shoot harvest, which is followed by leaf harvest, (table 8) Feeding frequency has direct effect on the growth and development of silkworm larvae.

The number of feeds given varies from place to place depending upon many factors, shows number of feeding per day, majority of the farmers followed 3 times per day. (table9) various types of silkworm diseases of larvae are caused by virus, bacteria, fungus and protozoa. These diseases of larvae cause great trouble and loss to the silkworms. The type of silkworm diseases reported varies in different climatic conditions. Muscardine is the most reported diseases, which is followed by Grasserie and Flacherie, (table10) shows cocoon production per crop, majority of the farmers produces 95-100 kg of cocoons per crop (table11) shows that maximum farmers are facing fluctuations in cocoon price and Uzi fly incidence and shortage in supply of water as compared to other things.

Conclusion

Based on the above study it can be concluded that the single factor of education level or experience of the farmers or extension methods cannot bring the desired level of changes in skill, attitude and behaviour towards technology adoption and realization of the better income by the farmers. Hence, a bi model approach combining different extension strategies needs to be developed. Farmers need more intensive programmes for technology awareness, infrastructure facilities and other incentives. Whereas, most of the villages in Kanakpura and Malavalli taluk needs programmes for change of mind set of the farmers towards adoption of new methodology/technology as well as higher education levels etc. for rapid expansion of sericulture ensuring better income to the farmers, different approaches with group/community farming like cooperatives, field schools, onsite demonstrations and better pricing and access to the cocoon markets etc. needs to be considered as women are also involved in several sericulture practices techno economic empowerment of women is also of vital importance for higher income and growth.

Considering the acreage of mulberry and the number of layings produced and brushed, the annual production figures of cocoons and the silk appears to be depressing compared to the established norms prevailing in China. Hence, concerted efforts must be made by the extension personnel to enhance the Knowledge level of farmers on sericulture technologies towards greater adoption of recommended sericulture practices for higher cocoon production. In view of the static conditions of the above components, adoption of new technologies has become a matter of debate among the scientists and the administrators.

REFERENCES :

1. Anil Kumar Yadav, (2008), yield gaps and constraints in cocoon production in Karnataka: an econometric analysis. MSc. (Agri.) Thesis, Univ. Agric. Sci., Dharwad, Karnataka (India).
2. Babulal & Khatri, R. K. & Sharma, A. K. and Sharma, V.P. (2009) Multivoltine hybrid seed production in Uttar Pradesh –Strategies. 48. 14-16.
3. Balasaraswathi, S., Lakshmanan, S., Mani, A. and Qadri, S. M. H., (2006) Comparative economics of mulberry and cocoon production in erode and Dharmapuri districts of Tamil Nadu. Indian J. Seric., 45 (1): 58-61.
4. Balasaraswathi, S., Lakshmanan, S., Mani, A. and Qadri, S. M.H., (2006), Comparative economics of mulberry and cocoon production in Erode and Dharamapuri districts of Tamil Nadu. Indian J. Seric., 45(1):58-61.
5. Battula Sujatha, Pyinti L. Reddy, Madduri A. S. Babu, Bheemireddy A. Reddy, Pasupula S. Kumar and Sapavathu S. Naik (2015). Socio economic factors influencing the adoption levels of new sericulture technologies by different farming groups in Anantapur District of Andhra Pradesh. International Journal of Agricultural Extension, Vol. 3(2) pp. 149-153.
6. Beula Priyadarshini, M. and Vijayakumari, N. (2013), A study on the knowledge and adoption level of improved sericulture practices by the farmers of Chittoor district. Indian Journal of Agricultural Science and Research (IJASR), 3(2), 43-46.
7. Bidyut Nath Choudhury, Suresh Ch. Das, Mridul Ch. Sarmah, Maniruddin Ahmed (2018) A study on the influence of socio-economic factors on knowledge and technology adoption of sericulture farmers of Aizawl district of Mizoram. International Journal of Advance Research, Ideas and Innovations in Technology, Vol. 4 (3).
8. Chairman Langerodi M., Malakmohammadi, I. Chizari, M. and Seidavi, A. (2011). The Role of Sericulture extension for revitalizing of silkworm cocoon production in Iran. Journal of Food, Agriculture and Environment. 8 (3 &4): 1113-1119.
9. Dayanandal, S B Kulkarni, P Rama Mohana Rao, Gopinath, O.K. and Nirmal Kumar, S. (2011). Evaluation and selection of superior bivoltine hybrids of the silkworm *Bombyx mori* for tropics through large scale in house testing. Journal of Precision Agriculture and Intelligent Farming, Vol 1(3).
10. G. S. Geetha and P. Sudhakar Rao (2016), Group approach and technology adoption – A case study in Sericulture, Global journal of interdisciplinary social science. G.J.I.S.S., Vol.5 (3):52-56.
11. Geetha, G. S., Srinivasa, G., Jayaram, H., Iyengar, M. N. S. and Vijaya Prakash, N. B. (2001) Socio economic determinants of farmers-oriented technology packages for sericulture- A field study. Indian Journal of Sericulture, 40(1), 96-99.
12. Guru raj, R., Magadum, S. B. and Dandin, S.B., (2007), Sericulture at Kodagapura: a case study. Indian Silk 46(2): 20-21.
13. Hajare, T. N., Jadhav, A. D., Challa, O. and Gajbhiye, K. S. (2005). Sericulture Empowers Women Farmer. Indian Silk, 25(4), 19-20.
14. Hiriyanna, Kumaresan, P. Mahadevamurthy, T.S. Suma, A. S. and Qadir, S.M.H. (2009). Technological Impact on productivity and profitability in mulberry silk cocoon production. Journal of Agricultural Extension Management, 10(2), 77-86.

15. Kumari, K. M. V. and Rajan, R. K. (2006). Knowledge and adoption level of technologies by commercial chawki rearing centre owners in Karnataka. *Indian Journal of Sericulture*, 45(1), 7-10.
16. Kumaresan P. and G. Srinivasa (2005) *Sericulture Extension Management and Economics*, Published by Central Silk Board, Bangalore.
17. Lakshmanan, S, and Geetha Devi, R. G. (2007). Knowledge and adoption level of farmers of bivoltine and crossbreed sericulture technologies. *Indian Journal of Sericulture*, 46(1), 72-75.
18. Muniraju, E., Sekharappa, B.M. and Raghuraman R. (2003). Chawki transportation-a study. *Indian J. Seric.*, 42:28-31.
19. Philip, T. and Qadri, S. M.H. (2004). Study on the level of adoption and constraints for non-adoption of improved sericulture technologies by farmers in Kerala. *Indian J. Seric.*, 43:46-49.
20. Sailaja, A. and Narasimha Reddy, M. (2008). Knowledge of farm women in paddy cultivation. *Mysore J. Agric, Sci*, 42:154-158.
21. Umakanth, R.S and Manu, H. N. (2013). Study of Sericulturists in four villages of Mysore and Chamarajanagar district covered under SGSY project. *National Seminar on Sustainable Development, Climate Change and Food Security*, Mysuru. ISBN 978-93-81437-48-3.