

## CLUSTER PROMOTION PROGRAMME (CPP) - A BOON FOR DEVELOPMENT OF BIVOLTINE SERICULTURE IN KALYANDURG, ANANTHAPUR DISTRICT OF ANDHRA PRADESH

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### ABSTRACT

Cluster Promotion Programme (CPP) was implemented during 2008-2019 under XI & XII five year plans to generate gradable Bivoltine raw silk and project India as a potential Bivoltine silk producer in the international scenario. Kalyandurg has become one of the clusters selected for implementing the CPP out of 17 clusters selected to implement CPP in Andhra Pradesh. CPP was implemented in Kalyandurg during 2010-19 and distributed 28.51 lakh of DFLs against the target of 24.75 lakh with a significant achievement of 121.44%. During the CPP implemented period, 26.80 lakh DFLs were harvested, produced 1397.7MT of cocoons and contributed in generation of 275.85MT graded Bivoltine raw silk. Bivoltine DFLs brushing was raised progressively from the bench mark level (25000) to 59600 (2010-11), 63300 (2011-12), 69925 (2012-13), 133025 (2013-14), 246945 (2014-15), 327895 (2015-16), 540625 (2016-17), 653100 (2017-18) and 756400 (2018-19) DFLs with a percentage of achievement as against the given annual target was recorded as 119%, 106%, 108%, 133%, 165%, 109%, 150%, 102% and 101% respectively. Cocoon yield kg/100 DFLs was also recorded significant level of increase ranging from 61 kgs (2010-11) to 76 kgs (2018-19) per 100 DFLs whereas, bench mark yield was 45 kg/100 DFLs. Bivoltine cocoons generated by the Kalyandurg cluster farmers fetched higher market prices which ranged from Rs. 288/kg to Rs. 482.0/kg with average rate of RS. 347/kg while benchmark rate was Rs. 223. For the horizontal development of sericulture around 1857 acres of new mulberry plantation was undertaken among 1453 farmers followed by the organization of 157 extension & communication programmes (ECPs) and 41 Farmers Skill Trainings (FSTs) and sensitised 6,632 sericultural farming communities on various improved technologies for further accelerating the Bivoltine sericulture development under the cluster. The improvement in all aspects indicates the success of CPP in Kalyandurg during 2010-19 is nothing but intensive adoption of integrated technologies in cluster approach.

## INTRODUCTION

In India, the annual raw silk production was 20,410 MT, during 2010-11 and it was insufficient for the actual requirements of the country. As a result, India had imported 5,870 MT of raw silk and 3780 MT silk fabrics (Himantharaj *et al.*, 2012; Sudhakar *et al.*, 2018). Hence, there is urgent need for qualitative and quantitative improvement of production and productivity of raw silk in Indian to meet the demand for domestic usage of our country. Development and popularization of Bivoltine sericulture in India is the only way to become self sufficient with graded silk development and popularization Bivoltine sericulture is the only way.

Jaishankar and Dandin (2005) emphasised on the effective extension communication mechanisms, percolation of cost-effective technologies that fit well into the region and

followed by the better interaction, involvement of Scientists, extension and field functionaries towards the end users to identify, assess and find a solution to a problem. In this direction, many extension approaches such as Catalytic Development Programmes (CDP), Institute Village Linkage Programmes (IVLP) and Technology Validation and Development Programmes (TVDP) ideal concepts were adopted by the Central Sericultural Research and Training Institute (CSR&TI), Mysore in sericulture for the transfer of technologies to the farmers with the support of State Sericulture Department (Sreenivas *et al.*, 2010).

Central Silk Board (CSB, Ministry of Textiles) and Department of Sericulture, Andhra Pradesh State have jointly launched Cluster Promotion Programme during XI (2008 to 2012) and XII (2013-2019) five years plan. CPP

was implemented in 174 clusters all over India i.e., 102 clusters in 5 states of Southern zone, 45 in 5 states of North-western zone, 11 in 3 states of Central Western Zone, 7 in 3 states of Eastern zone and 9 in 8 states of North Eastern zone, respectively. Out of 102 clusters in Southern India 46 clusters were implemented in Karnataka, 28 clusters in Tamil Nadu, 17 clusters in Andhra Pradesh, 4 in Maharashtra whereas 2 in Kerala with an anticipated 167.06 lakh DFLs brushing and to generate 1920 MT of graded bivoltine raw silk (Himantharai *et al.*, 2012; Qadri, 2012; Sudhakar *et al.*, 2018, 2019).

Kalyandurg has become one of the clusters selected for implementing the CPP out of 17 clusters chosen to implement CPP in Andhra Pradesh and CPP was implemented in Kalyandurg during 2010-19. Kalyandurg is one of the historical important areas under Ananthapur District (Sathyanarayana Raju, 2014; Vindhya, 2012). Kalyandurg is geographically located at 14°55'N and 77°10'E under arid zone with poor stony red lateritic soils. The annual rainfall of the area is about 550 mm, temperature from min. 16 to max. 42°C with a relative humidity (RH) between 30-90%. The area also witnesses moderate to high density of pump sets, low level irrigation with low cropping intensity. Benchmark survey was conducted in Kalyandurg cluster during 2009-10. According to the survey, 446 acres of mulberry garden was established by 413 sericulturists and they were practicing cross breeds. Survey of Kalyandurg cluster also revealed that, 25,000 Bivoltine hybrid DFLs fetching 45.0 kg/100 DFLs yield and 93,000 cross breed (CB) DFLs with 53.4 kg/100DFLs yield contributing 13,133 kg raw silk production of CB and Bivoltine. The above information indicates that Kalyandurg area is not new for Bivoltine sericulture but traditional for cross breed. Therefore, CPP was implemented in order to increase graded bivoltine raw silk production during XI and XII five year plans in Kalyandurg cluster (Kiran Kumar *et al.*, 2019).

## MATERIALS AND METHODS

A bench mark survey was conducted in Kalyandurg cluster, to assess the initial status of bivoltine sericulture existence and to discern the status of technical knowhow of the farming community on various aspects of sericulture before initiation of the Cluster Promotion Programme (CPP) during 2009-10. Subsequently, the CPP was launched by involving all the modalities during 2010 to 2019 to boost the Bivoltine sericulture in and around the vicinity of Kalyandurg cluster. Under this programme, adjoining villages within the radius of around 30-40km are selected to facilitate closer monitoring and interactions of scientist as well as field functionaries with cluster farmers and to ensure good and anticipated results (Sudhakar *et al.*, 2019; Vindhya, 2012). Basing on the survey the following assistance was provided to the farmers through Catalytic Development Programme (CDP) to strengthen the facilities,

encourage and motivate the bivoltine sericulture farming under the cluster.

- The cluster was operated closely by the REC, CSB and DOS, Kalyandurg a Scientist as Cluster Development Facilitator (CDF) and Technical Staff of REC, in association of a CDF from the DOS with Co-ordination of extension functionaries of Kalyandurg.
- Various subsidies construction of the rearing house, veranda, shoot erection, cooling system for maintenance of optimum ecological factors, equipments, for soil nutrition maintenance etc. were given to the farmers.
- A localized Chawki Rearing Centre (CRC) was recognized followed by the proper training to the entrepreneur at CSRTI, Mysore and required financial assistance was extended under CDP.
- The chawki worms were reared at CRC and healthy and chawki worms were supplied after joint quality Chawki certification by the coordinating Cluster Development Facilitators (CDFs) - Scientist and DOS official.
- Sericulture farmer's field visits were regularly conducted by CDFs, Technical and field functionaries and extended technical guidelines for quality mulberry leaf production and successful rearing crops.
- Sericulture farmer's garden soils collection, analysis and analysis based soil nutrient management recommendations were served followed by the issue of soil health cards to improve their garden soils for enhanced quality leaf production.
- Sensitised farming community on the importance of green manuring during monsoon with sunhemp (*Crotalaria Juncea*) green manure seeds (@ 8kg/ac to sow during monsoon) under INM to enrich the soil nutrient status.
- Bio-control agents like *Cryptolaemus montrouzieri*, *Cryptolaemus montrouzieri* and *Nesolyntx thymus* were supplied to control Tukra, Leaf roller and Uzy, respectively.
- The Extension communication programmes *viz.* Film shows, Group discussions, Awareness Programmes, Farmers days, Field Days, Enlightenment programmes, Exhibitions, Study tours and Farmers Skill Training Programmes were conducted to enrich the knowledge of the farmers on Bivoltine sericulture framing.

Required data was collected systematically and subjected for statistical analysis to know the impact of CPP implementation on cocoon production quality, cocoon quality and economic benefit of the sericulturists in Kalyandurg cluster (Jaishankar and Dandin, 2005; Sreenivas *et al.*, 2010; Sudhakar *et al.*, 2019).

## RESULTS AND DISCUSSION

A bench mark survey Kalyandurg cluster revealed that, both bivoltine and cross breed (CB) silkworm rearings were existing to a limited level, disease free laying (DFLs) brushing was ranging at 25000 lakh with a insignificant level of cocoon yield with 45 kgs/100dfles obtained a market value of Rs. 223/- per kg indicating the uneconomic and not

a viable venture of adopting sericulture by the farming community. CPP was implemented in Kalyandurg during 2010-19 and distributed 28.51 lakh of DFLs against the target of 24.75 lakh with a significant achievement of 121.44%. During the CPP implemented period, 26.80 lakh DFLs were harvested, produced 1397.7MT of cocoons and contributed in generation of 275.85MT graded Bivoltine raw silk (Table 1).

**Table 1:** Influence of Cluster Promotion Programme in the improvement of Bivoltine sericulture in Kalyandurg cluster

CPP Activities	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	Total/Average
DFLs target (Lakh)	0.50	0.60	0.65	1.00	1.50	3.00	3.60	6.40	7.50	24.75
No. of DFLs reared (Lakh)	0.60	0.63	0.70	1.33	2.47	3.28	5.41	6.53	7.56	28.51
% of Achievement	119	106	108	133	165	109	150	102	101	121.44
DFLs harvested (Lakh)	0.55	0.60	0.66	1.26	2.15	3.26	4.96	6.43	6.93	26.80
Actual cocoon yield (MT)	20.7	23.2	25.5	57.9	96.5	165.3	248.5	362.0	398.2	1397.7
Yield/ 100 Dfles (kg)	61	62	62	68	67	71	71	75	76	68.11
Production of raw silk (MT)	4.85	5.34	5.88	12.16	20.57	33.26	49.99	68.95	74.84	275.85
Market Rate (Rs/ kg)	301	309	311	331	341	288	423	482	338	347.11
New plantation Target	20	25	50	50	50	50	50	50	50	395.00
Mulberry plantation achieved	23	56	88	103	193	259	302	392	442	1858.00
% of achievement	115	224	176	206	386	518	604	783	883	432.78
Among the no. of farmers	20	43	99	80	174	199	288	274	276	1453.00

### Bivoltine Sericulture in Kalyandurg Cluster

Improvement of Bivoltine sericulture in Kalyandurg cluster under CPP from 2010-11 to 2018-19 is detailed in Table 1. Bivoltine DFLs brushing was raised progressively from the bench mark level (25000) to 59600 (2010-11), 63300 (2011-12), 69925 (2012-13), 133025 (2013-14), 246945 (2014-15), 327895 (2015-16), 540625 (2016-17), 653100 (2017-18) and 756400 DFLs (2018-19) with percentage of achievement to the given annual target was recorded 119%, 106%, 108%, 133%, 165%, 109%, 150%, 102% and 101% respectively, during the reporting period. Bivoltine DFLs brushing has shown linier gradual significant achievement from 2010-11 to 2018-19 (Fig. 1). Cocoon Yield/ 100 DFLs (kg) was also recorded significant level of increase ranging from 61 kg to 76 kg per 100 DFLs compared to the bench mark yield of 45 kg/100 DFLs. Bivoltine DFLs brushing and cocoon yield/100 DFLs were increased due to the adoption of various technologies like usage of recommended manure and fertilizer application, adopting soil analysis based amelioration of their mulberry gardens and effective disinfection of silkworm rearing houses by usage of Serifit and better rearing management. The results obtained are in agreement with the earlier studies conducted by Jaishankar and Dandin, 2005; Himantharaj *et al.*, 2007; Sreenivas *et al.*, 2009. This study is also corroborated with the similar study conducted by other scientists in various clusters (Sreenivas *et al.*, 2010; Himantharaj *et al.*, 2012; Sudhakar *et al.*, 2018, 2019). Bivoltine cocoons generated

by the cluster farmers fetched higher market prices which ranged from Rs. 288 to Rs. 482/kg during the CPP implementation period 2010-2019 in comparison to the benchmark rate of Rs.223 due to qualitative improvement. The results of the study are in conformation with the study conducted by Himantharaj *et al.* (2011, 2012; Sudhakar *et al.*, 2019). Over all obtained improvement may be due to intensive efforts such as imparting integrated nutrient management (INM) to improve farmers garden soils through green manuring by sowing sunhemp (*Crotalaria juncea*), dhaincha (*Sesbania bispinosa*), cowpea (*Vigna unguiculata*) and horse gram (*Macrotyloma uniflorus*) etc. in monsoon crops, use of integrated pest management (IPM) through the supply of biological control agents such as lady bird beetles (*Scymnus coccivora* and *Cryptolaemus montrouzieri*) for tukra and *Trichogramma chiloins* for leaf roller to enhance quality mulberry leaf production. Whereas, biocontrol agents of *Nesolynx thymus* to control Uzi menace during silkworm rearing and Asthra and Serifit as effective rearing bed disinfectants for newly evolved silkworm rearing crops were played a major role in preventing the silkworm rearing crops failures and contributing in producing enhanced quality cocoon. The improved rearing technologies popularized among the farming group also resulted in minimizing the cocoon melting percentage. Again it is proved that the prevention of silkworm rearing crops and reduction of defective cocoon percentage is also due to the result of the intensive efforts made by way of organizing several kinds of extension and

communication (ECPs) and training programmes in sensitizing and generating awareness among the sericultural farming community on sorting of infectious and ill healthy

bivoltine silkworms as stated by Himantharai *et al.* (2012) and Sudhakar *et al.* (2019).

**Table 2:** Details and Achievements of Extension Communication Programmes conducted in Kalyandurg cluster under CPP

Name of ECP	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
Film shows	3	9	6	0	0	0	0	0	0
No. of farmers sensitized	36	105	165	0	0	0	0	0	0
Group discussion	6	9	6	4	6	7	6	6	10
No. of farmers sensitized	86	98	126	76	154	221	167	186	283
Awareness Programme	2	4	4	9	2	1	2	0	0
No. of farmers sensitized	63	118	139	257	65	189	336	0	0
Farmers days	0	0	0	2	0	0	2	4	2
No. of farmers sensitized	0	0	0	64	0	0	145	278	157
Field Day	2	6	4	0	2	0	1	3	2
No. of farmers sensitized	40	100	111	0	66	0	165	361	221
Enlightenment programme	1	1	1	0	1	0	0	0	0
No. of farmers sensitized	133	96	157	0	150	0	0	0	0
Exhibition	0	4	4	2	2	0	0	0	0
No. of farmers sensitized	0	94	227	191	275	0	0	0	0
Study tour	3	3	0	1	0	0	2	0	0
No. of farmers sensitized	64	60	0	39	0	0	40	0	0
<b>Target of ECPs</b>	<b>17</b>	<b>36</b>	<b>24</b>	<b>11</b>	<b>13</b>	<b>8</b>	<b>10</b>	<b>13</b>	<b>8</b>
<b>Total ECPs conducted</b>	<b>17</b>	<b>36</b>	<b>25</b>	<b>18</b>	<b>13</b>	<b>8</b>	<b>13</b>	<b>13</b>	<b>14</b>
<b>% of achievement</b>	<b>100</b>	<b>100</b>	<b>104</b>	<b>164</b>	<b>100</b>	<b>100</b>	<b>130</b>	<b>100</b>	<b>175</b>
<b>Total farmers sensitized</b>	<b>422</b>	<b>671</b>	<b>925</b>	<b>627</b>	<b>710</b>	<b>410</b>	<b>853</b>	<b>825</b>	<b>661</b>

NB: A total of 157 ECPs were organized and sensitized 6104 farmers on various technologies of sericulture during XI & XII plan in Kalyandurg cluster under CPP

During the CPP period, the farmers of Kalyandurg cluster were motivated to undertake new mulberry plantation, rearing house construction, improving infrastructural facilities of rearing and mulberry garden establishment by supporting under various Govt. subsidized programmes such as Catalytic Development Programme (CDP), State Sericulture Development Programme (SSDP), Mahatma Gandhi National Rural Employment Generation Programme (MGNREGA), Rashtriya Krishi Vicas Yojana (RKVY) and Prime Minister Krishi Sichayee Yojana (PMKSY) and several central Sector Schemes (CSS) etc. During the programme period 2010-2019 a total of 1453 farmers have undertaken 1857 acres of new mulberry plantation with high yielding mulberry varieties like V1 and G4 in varied geometries such as paired row [(3'x2')5'], 6'x2', 3'x3' and 4'x4' in low bush form and wider spacings like 8'x8' and 10'x10' spacing in tree form with partial irrigation or micro irrigation (drip irrigation) conditions to combat with the prevailing drought stricken conditions in Kalyandurg area under Ananthapur District, Andhra Pradesh. Since from the inception of CPP in Kalyandurg cluster, 23 acres of new mulberry plantation was undertaken among 20 farmers

(2010-11), 56 acres among 43 farmers (2011-12), 88 acres among 99 farmers (2012-13), 103 acres among 80 farmers (2013-14), 193 acres among 174 farmers (2014-15), 259 acres among 199 farmers (2015-16), 302 acres among 288 farmers (2016-17), 392 acres among 274 farmers (2017-18) and 442 acres among 276 farmers (2018-19) was undertaken and reached a total of 1857 acres of new mulberry plantation by 1453 farmers (Table 1 & Fig. 2).

#### Extension Communication Programmes (ECP) and Farmers Skill Training Programmes (FST)

Details and achievements of ECPs and FSTs conducted in Kalyandurg cluster under CPP are depicted in Table 2 & Fig 3. During the period 157 ECPs and 41 FSTs were organized on various aspects of sericulture and sensitized 6104 and 527 farmers, respectively during XI & XII plan in Kalyandurg cluster under CPP (Fig. 4). Enthusiastic participation of sericulturists in various ECPs is also one of the main reasons for the successful implementation of CPP and achieving anticipated results in bivoltine sericultural development in Kalyandurg cluster during 2010-2019.

Significant improvement in socio-economic conditions of the seri-farming community was noticed during CPP implementation period which has supported the farmers in adoption of bivoltine sericulture, earning encouraging money, investing the same for sericulture upliftment,

purchasing land, vehicles, jewels, house hold articles, improved children education, conducting respectable rituals and becoming self sufficient in repayment of long pending borrowed loans.

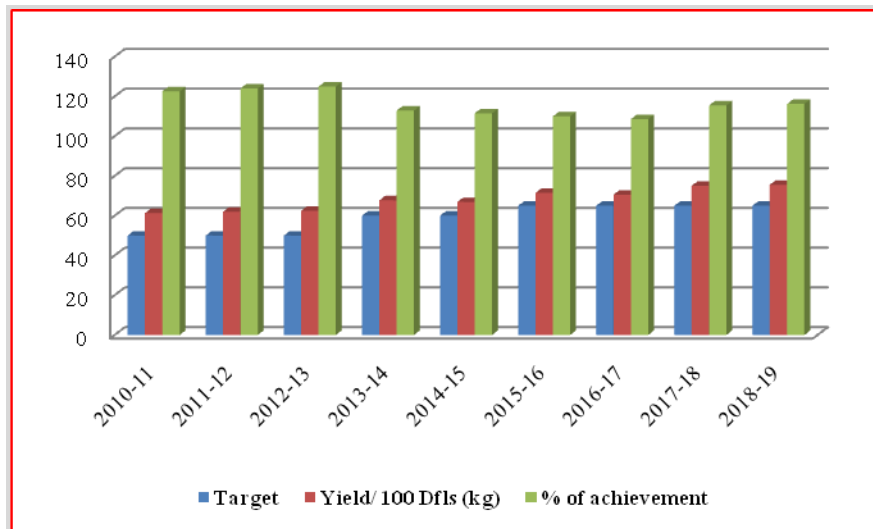


Figure 1: Improvement of cocoon yield

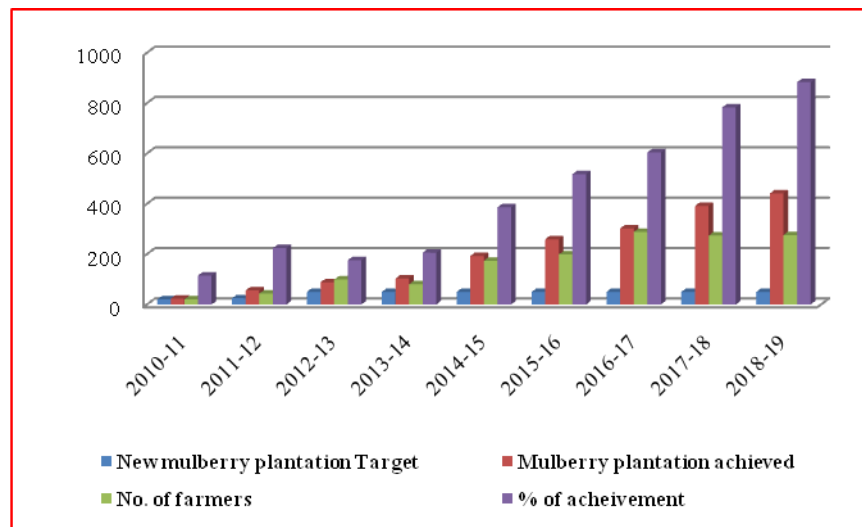


Figure 2: New mulberry plantation undertaken

Thus, the success of the programme can be attributed to coordinated and close working of different organizations involved in sericulture development such as REC, CSRTI, Mysore, National Silkworm Seed Organization (NSSO), Central Silk Technological Research Institute (CSTRI), Bangalore and State Sericulture Department at gross root level as well as higher level for common cause. Further, the cluster approach helped in succeeding in pooling the resources such as man power, money, and infrastructural facilities *etc.*, for conducting extension programmes

effectively. The CPP offered how best the limited resources could be effectively utilized for promotion of bivoltine sericulture. Intensive ECPs undertaken under CPP Kalyandurg and active participation of the sericultural fraternity (Fig. 2) have helped the farmers to accept and adopt the improved technologies to achieve the anticipated and encouraging results in improving bivoltine cocoon yield levels significantly (Himantharaj *et al.* 2012; Vindhya *et al.*, 2012; Sathyanarayana Raju, *et al.*, 2014; Sudhakar *et al.*, 2019).

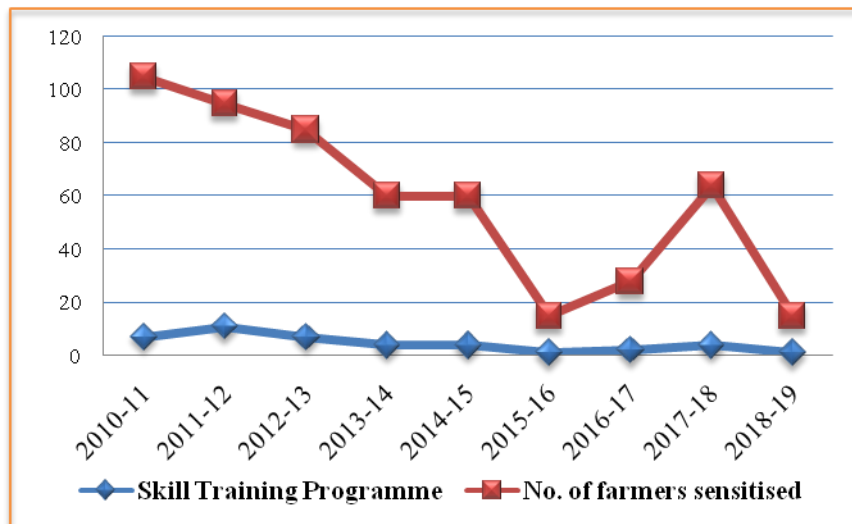


Figure 3: Farmers skill Training programmes conducted

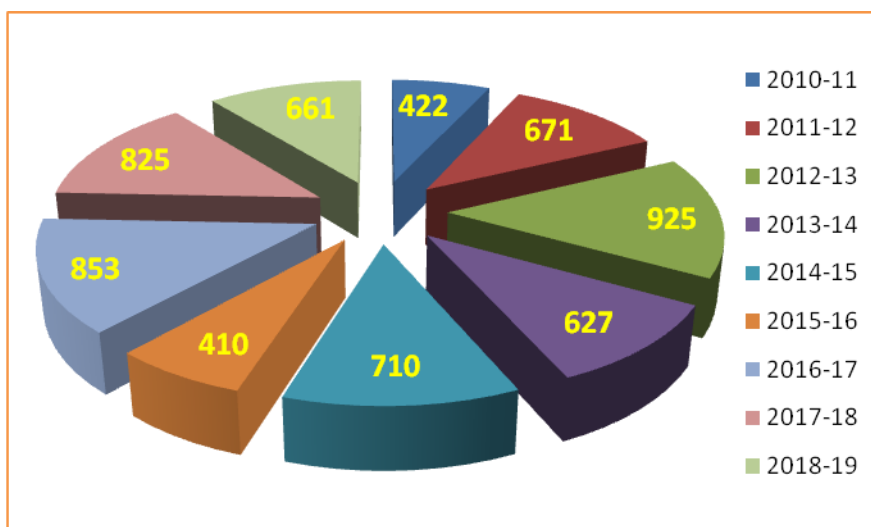


Figure 4: Sensitizing of sericulturists through ECPs

**CONCLUSION**

Based on the above depicted results of the study, it can be concluded that the improvement in all aspects indicates the success of intensive execution of CPP in Kalyandurg during 2010-19. The similar strategy and technical knowhow is enforced elsewhere in the sericulture areas of the country in future to ensure higher rate of adoption of technologies, higher returns from sericulture farming and promotion of bivoltine sericulture. Moreover, it is essential to continue the intensive bivoltine sericulture programmes through CPP or any other methods of this kind in the new clusters established to make our country self sufficient and self reliable in enhanced quality bivoltine silk production thereby projecting India as one of the potential bivoltine silk producers at international market.

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