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Research Paper

Sericulture an inventive farming in transforming the socio economic conditions of the Zaheerabad cluster farmers of Telangana state

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Abstract

Cluster Promotion Programme (CPP) was implemented under XI & XII five year plans during 2013-2019 in India for boosting the bivoltine sericulture development to uplift the socio economic conditions of the seri-farming community. Central Silk Board (CSB) and State Sericulture departments have jointly launched the CPP all over India. Out of 17 clusters choose to develop Bivoltine sericulture in Andhra Pradesh and Telangana States, Zaheerabad was selected as one of the potential cluster to impart CPP during 2013-2019. During the 5 years period a total of 11.89 lakhs DFLs were distributed as against 11.60 lakh target among 5295 farmers with 102.5% achievement. A total of 11.23 lakh DFLs were harvested generating 768.84MT Bivoltine cocoon contributing in the generation of 10.98MT of raw silk during the period. The cocoon yield was recorded as 67.81kg per 100 DFLs as against the bench mark yield of 39.45kg with 71.89% fold increase. During the cluster implementation period the sericultural farming community have fetched the average market rate of Rs. 346.40 per kg is significantly higher (74.51%) than the average market rate of Rs. 198.50 recorded as benchmark before initiation of the CPP venture. All the above achievements happened because of undertaking 271.30 acres of V1 & G4 new mulberry plantation in improved spacing among 194 farmers contributing to horizontal sericultural development and through the extensive organization of 53 extension & communication programmes (ECPs) *viz.* Group discussions, Awareness programmes, Farmers days, Field days, Farmers trainings, Farmers study tours, Exhibitions and Film shows sensitising more than 2322 farmers on improved technologies under the Cluster Promotion Programme during 2014-2019. Due to all the above through the intensive implementation of CPP has not only achieved the bivoltine sericulture development at anticipated level but also contributed in accelerating the socioeconomic conditions of the Telangana farming community under CPP, Zaheerabad.

Keywords: Bivoltine, Sericulture, Disease Free Layings, Silkworm rearing, mulberry cultivation.

Introduction

Though the annual raw silk production of India has reached a peak level of 23,060 MT in the year 2011-12 but 90% of the raw silk produced in the country is of cross breed silk which is neither gradable nor used for the export. Therefore, production of gradable bivoltine silk has become the prime agenda of Indian sericulture industry[1,4,7]. 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 and involvement of Scientists, Extension and Field functionaries towards the end users to identify, assess and find a solution to a problem. These kind of participatory approaches will definitely results in achieving the anticipated targets. In this direction many extension approaches such as Catalytic Development Programmes (CDP), Institute Village Linkage Programmes (IVLP) and Technology Validation and Development Progarmmes

(TVDP) have adopted by the Central Sericultural Research and Training Institute (CSR&TI), Mysore was adopted this ideal concepts in sericulture for the transfer of technologies to the farmers from time to time with the support of State Sericulture Department and the results were encouraging[6]. Among them cluster development approach is one such approach, which is holistic, information based and participatory extension mode with Research-Extension-Farmer (R-E-F) linkage. This approach was effectively implemented in the form of five year plans during 2008-13 for large scale promotion of bivoltine sericulture in India particularly in Southern major silk producing regions and the results was encouraging[3,7].

The Cluster Promotion Programme (CPP) was implemented during 2013-2019 and newly opened 178 clusters all over India *i.e.,* 106 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 106 clusters in Southern India 46 clusters were implemented in Karnataka, 28 clusters in Tamil Nadu, 13 clusters in Andhra Pradesh, 4 in Telangana, 9 in Maharashtra, 4 in Madhya Pradesh, whereas 2 in Kerala with an anticipated 167.06 lakh DFLs brushing and generate 1920MT of bivoltine raw silk. Among 17 clusters to be implemented in Andhra Pradesh (AP) and Telangana States (TS) Zaheerabad under Medak District was considered to implement Bivoltine sericuluture.

Telangana region is a former princely state comprises ten districts. Topographically state is on high level giving a picture of Deccan Plateau situating towards the Eastern Coast. Most of the rivers flow through the eastern plains and finally confluences the Bay of Bengal not benefitting for irrigation, The total population of the state is more than 665 lakh are mostly dependent on agriculture. The State is blessed with many congenial agro-climatic conditions most suitable for agriculture and horticulture crops are grown practically around the year such as rice, jowar, bajra, maize, ragi, pulses, groundnut, castor, cotton, mulberry, sugarcane and vegetables and horticultural (fruit) crops are the principal crops grown in the State. Sericulture is ideally suited to a predominantly agricultural State of Telangana. The state records with 42°C as high temperature during summer with an average temperature of 22-23°C with little humidity. Along with sericulture with subsistence of agricultural crops such as rice, corn, millet, pulses, cotton, sugar cane too will be cultivated beside sericulture. Therefore, with the above profiles of the region the CPP was implemented scrupulously. The results were encouraging and the same were presented and discussed in the Table 1 & Figure 1, 2.

Materials and Methods

Though the Cluster Promotion Programme (CPP) was implemented in Telangana state (TS) during X and XI five plans but X five year plan was not given anticipated results. Hence, under XII five year plans from 2014-2019 CPP was meticulously imparted among Zaheerabad cluster under Medak District to implement CPP scrupulously for the development of Bivoltine sericulture. Before initiation of CPP a preliminary bench mark survey was conducted jointly by the Scientist of CSB and Dept. of Sericulture (DOS) in the cluster areas to understand the status of mulberry area, variety, spacing, rearing house and rearing facilities to quantify the requirement of farmers and also funds to meet the farmers requirements. Basing on survey the assistance is provided to the farmers through Catalytic Development Programme (CDP) to strengthen the facilities, encourage and motivate the bivoltine sericulture farming under the cluster. The survey revealed that brushing of Cross Breed along with meagre quantity of other improved DFLs was ranging from 35,000 to 45,000. The cocoon yield was recorded in 42.5kg/100dfls with a meagre market value of Rs. 226/- per kg indicating sericulture was not a profitable venture for the farming community. For effective implementation of the cluster activities the following steps were imparted. In the CPP approach in each cluster group of villages and conventional sericultural families located nearby were selected and adopted to have areas/mass effect of the improved technologies incorporated under the programme so that the activities are manageable easily with the limited technical (Scientist & Technical staff) and extension field functionaries jointly by the active involvement of local stake holders. Under this programme, contiguous villages within the radius of around 20-30km are selected to save time and money on transport and to facilitate closer monitoring and interactions of scientist as well as field functionaries with cluster farmers and to ensure good and anticipated results. One village or a cluster of villages located nearby is selected such way that as far as possible eligible farmers of villages/cluster of villages are covered under the CPP[4,7]. Rest of the CPP modalities were followed as depicted by Sudhakar *et al*., 2019.The impact of CPP implementation for 5 years from 2014-2019 under the

cluster, impact study was conducted to analyse the brunt of CPP on cocoon production, quality and economic gain of the sericulturists and the results are presented in Table 1 & Fig. 1,2.

Results and Discussions

Intensive imparting of cluster promotion programme (CPP) from 2014-2019 it was noticed that the DFLs brushing shown study increase of DFLs distribution and promotion of brushing was noticed. The distribution of DFLs was recorded 1.38 lakh against 1.30 (2014-15), 2.22 vs 2.20 (2016-17), 2.96 vs 2.60 (2017-18), 3.60 vs 3.50 lakh (2018-19) except in 2015-16 the DFLs brushing was recorded lower (1.73 lakh) against the target of DFLs (2.00 lakh) with a total DFLs distribution of 11.90 lakh as against 11.6 lakhs. The percent of increase of DFLs distribution was ranged from 86.7% to 113.75 with a mean improvement of 101.5% during the CPP period. Harvesting of DFLs was also recorded *vis-a-vis* as stated in DFLs distribution ranging from 70.14 to 225.8mt during 2014-19 periods with a mean raw silk production of 768.8mt (Table 1 & Figure 1).

Table 1: Impact of CPP in achieving anticipated Bivoltine sericulture targets under Zaheerabad

CPP Parameters	Particulars	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	Total
DFLs brushing (lakhs)	Target	1.30	2.00	2.20	2.60	3.50	11.6
	Achievement	1.38	1.73	2.22	2.96	3.60	11.9
	% of achievement	103.6	86.7	100.7	113.7	102.9	101.5
	Among farmers	413	539	1065	1624	1654	5295
DFLs harvested (lakhs)	--	1.05	1.73	2.22	2.96	3.27	11.2
Actual yield (mt)	--	70.14	108.2	154.8	209.9	225.8	768.8
Cocoon yield kg/ 100DFLs	Achievement	66.8	62.37	69.85	71.01	69.03	67.8
	% of achievement on BM	57.18	46.75	64.35	67.08	62.42	59.53
Raw silk Production (MT)	Achievement	10.02	15.46	22.11	29.99	32.26	109.8
	% of achievement on BM	75.48	170.75	287.22	425.22	464.97	1822.94
Average market rate (Rs/kg)	Achievement	358.0	267.0	374.0	419.0	314.0	346.4
	% of achievement on BM	58.41	18.14	65.49	85.40	38.94	53.27
New plantation (acres)	--	60.5	55.5	37.8	42	75.5	271.3
Among farmers (no)	--	45	45	18	21	65	194
ECPs organised (no)	--	11	7	12	13	10	53
Farmers sensitised (no)	--	300	252	600	720	450	2322

Bench mark (BM) values of DFLs brushing, 35,000 to 45,000, cocoon yield 42.5kg/100dfls, average market value of Rs. 226/- per kg

Bivolotine cocoon yield was recorded in the range of 62.37 kg to 71.01kg per 100 DFLs with a mean yield of 67.8kg as against the bench mark yield of 41.5kg/100 dfls. The percent of achievement was ranged from 57.18 to 62.42 during the CPP period with an average yield of 59.53kg over the bench mark value. The average market rate was recorded ranging from Rs. 267.0 to 419.0 with an average market value of Rs. 346.4. The increase in market value was significantly recorded (18.14-85.40%) with an average achievement of 53.27% over the bench mark market rate. Similarly raw silk production was registered 10.02mt to 32.26mt during the period with a total of 109.8mt with an achievement of 75.48 to 464.97% with 1822.9% increase over bench mark raw silk production (Table 1 & Figure 1). The increase of DFLs brushing and cocoon yield/100DFLs among the farmers of CPP Zaheerabad cluster under Telangana state may be due to the better adoption of critical technologies in imparting recommended manure and fertilizer applications and adopting soil analysis based amelioration of their mulberry gardens and effective disinfection of silkworm rearing houses by the use of improved bed disinfectants such as Asthra & Serifit followed by the personal hygiene and better rearing management, the results were in agreement with the earlier studies conducted[2,5]. This study is also corroborated with the similar study conducted by other Scientists in various clusters[1,6,7,8].

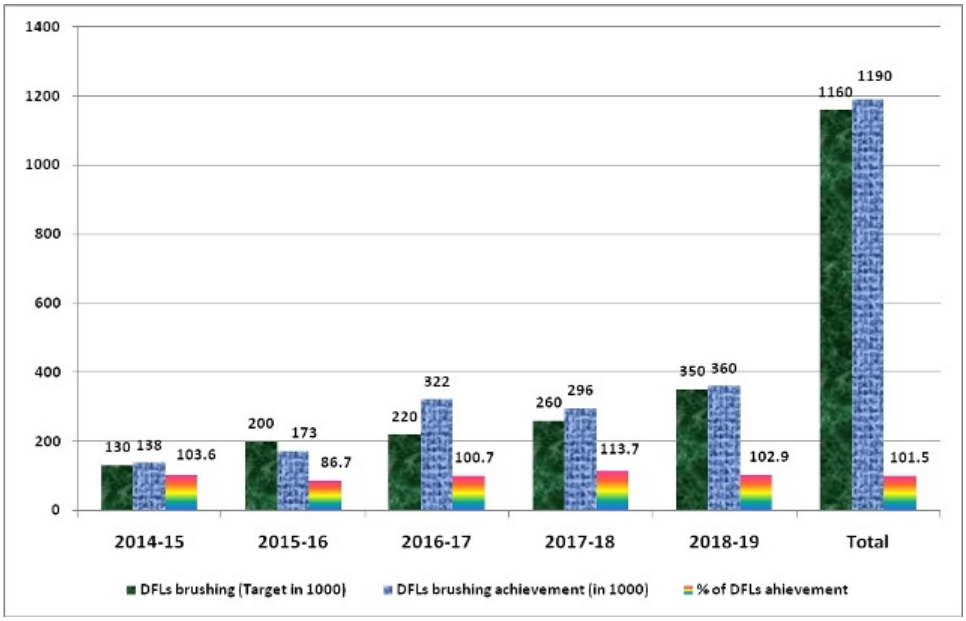

Figure 1: DFLs brushing and achievement of brushing against the target under Zaheerabad cluster

The results of the study are in conformation with the earlier studies because of intensive efforts such as imparting integrated nutrient management (INM) to improve farmers garden soils through green manuring by sowing sunhemp (*Crotolaria 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 prevention of diseases in silkworm rearing crops and there by contributing in producing enhanced quality cocoon as detailed in Tables. The improved rearing technologies popularized among the farming group also resulted in minimizing the cocoon melting percentage. Again it is proved that generating awareness on improved rearing technologies among the cluster farmers resulted in prevention of diseases in silkworm rearing crops and reduction of defective cocoon percentage leading to enhanced quality cocoon production.

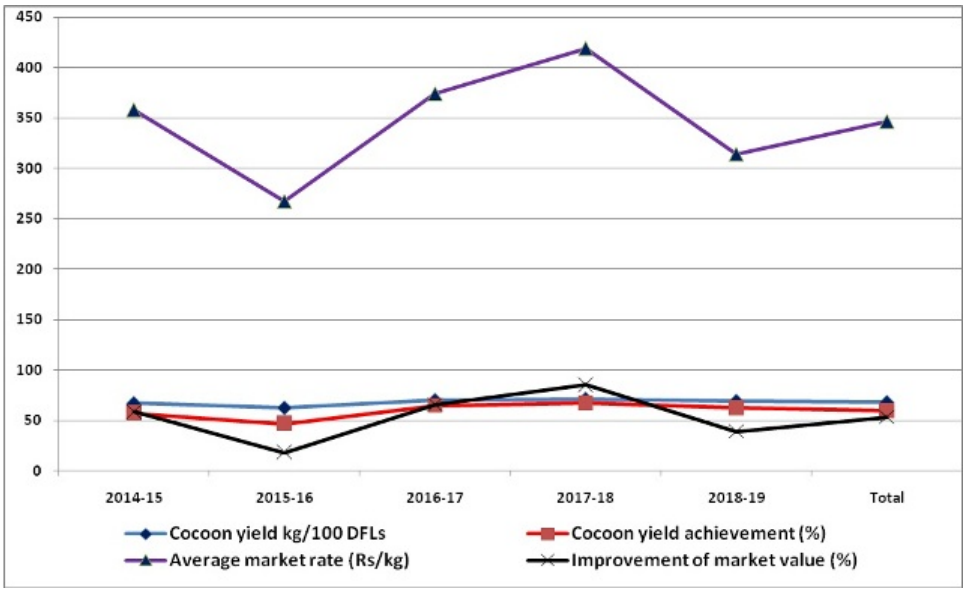

Figure 2: Bivoltine cocoon yield and average market rate during CPP under Zaheerabad cluster

During the period of CPP implementation under Zaheerabad cluster 271.3 acres of new V1 mulberry plantation was under taken in improved and recommended spacing among 194 sericulture farmers contributing in horizontal expansion of sericulture development. Further, the sericultural farmers were sensitized due to the organization of various kinds of extension and communication programmes (ECPs) such as group discussions, farmers days, field days, awareness programmes, exhibitions, skill training programmes and sensitized the farming community skills on various improved technologies involved in mulberry plantation and silkworm rearing. During the period a total of 53 ECPs were organized by sensitizing more than 2322 farmers on improved technologies under the cluster for the development of Bivoltine sericulture (Table 1).

During the CPP period the cluster farmers were motivated and financially supported by the Central Silk Board as well as Department of Horticulture and Sericulture, Telangana in under taking new mulberry plantation, rearing house construction, 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), Mahathma 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 under XI and XII five year plan farmers have undertaken new mulberry plantation with high yielding mulberry varieties like V1 and G4 in varied geometries such as paired row [(3'x2')5'], 3'x3' and 4'x4' in low bush form and wider spacing like 6'x3', 8'x4' and as 10'x10' spacing in tree form with partial irrigation or micro irrigation (drip irrigation) conditions to combat with the prevailing drought stricken conditions in Andhra Pradesh and Telangana states. During the CPP programme significant improvement in socio-economic conditions of the seri-farming community was noticed. The programme supported the farmers in adoption of bivoltine sericulture, earning encouraging money, investing the same for sericulture up-liftment, purchasing land, Tractors for mechanized cultivation, Two-wheeler for mobility, house hold articles, improved children higher studies, conducting events, ceremonies & rituals in respectable manner and becoming self sufficient in repayment of long pending borrowed loans.

Success stories of the sericulture farming community under CPP programme:
Sri. U. Tirumalesh , S/o Mallanna, Bijawaram, Gadwal, Telangana State was basically from an Agriculture family was having 4.0 acres of cultivation land and practicing mainly paddy, cotton and chilly. But he could never be a happy farmer with all those farming due insufficient yields, lack of transportation facilities and disappointing market rates. Moreover, he could also incur with debts of >10,00,000/- due to the above crops farming. Under the circumstances Tirumalesh along with family migrated to the Hyderabad city and started working as daily wage workers. In the mean time he also practiced Tailoring started earning small perks for his struggling family. However, he and his family members earnings could not make them sustain in the city life ultimately they have come back to their village and began sericulture in their dwelling house a smaller way without any support and technical knowhow.

Figure 3: Tirumalesh and his family in his well managed garden rearing house and bovine

In the year 2014 Tirumalesh was considered to adopt under Cluster Promotion Programme got support in taking up of new mulberry plantation in 3'x3' spacing and constructed a low cost rearing house of 250-300 DFLs brushing capacity. Under the CPP he and his family members could become well aware with improved sericulture and technical knowhow. With the support of his mother and wife Tirumalesh started rearing 300 DFLs per crop, rearing minimum of 10 crops in a year harvesting above 80kg/ 100 DFLs average proving himself as a learned farmer with the support and technical guidance by the Department of sericulture Field functionaries and Central Silk Board Scientists and Technical staff follow up and in participating most of the Extension Communication Activities (ECPs). The average market rate was fetched by the farmer Rs. 380/- and the annual income of the farmer has gone up to more than 9.00 lakhs. Due to sericulture he could clear his financial lending of >10.00 lakhs, purchase good quality bullocks, built posh house and impart better education to his children. By the adoption of Bivoltine Sericulture he has become role model farmer to the villagers. He says that by adoption of Bivoltine Sericulture his socio economic conditions was drastically changed and expresses regards to the sericulture farming and the fraternity of the sericulture departments (Fig. 3).

Thus, the success of the programme can be attributed to co-ordinated 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 the states and active participation of the sericultural fraternity (Figure 3,4) are helped the farmers to accept and adopt the improved technologies and achieve the anticipated and encouraging results in improving bivoltine cocoon yield levels significantly[1,4,7,8,9].

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