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## Impact of bivoltine cluster promotion programme on cocoon productivity and quality in Bandipora area of Jammu & Kashmir state

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### Abstract

Cluster promotion programme was implemented in Bandipora district of Jammu & Kashmir from 2011-12. This programme was launched to have a mass impact of sericultural technologies so as to improve the socioeconomic conditions of farmers and to strengthen the long production chain of sericulture through improvement in cocoon production, productivity, quality. A cluster of villages and families located within the radius of 18 km from Research Extension Centre sub unit Bandipora were selected to facilitate closer monitoring and interaction of scientist as well as field functionaries with the farmers for obtaining remarkable results. Initially 150 farmers in 32 villages were identified for the programme and later on new farmers were added every year. Both the scientific as well as technical staff of Research Extension Centre sub unit, Bandipora with close coordination of field officers/staff of Department of Sericulture monitored the activities of the cluster. Technological interventions like distribution of chawki reared silkworms, rearing of high yielding silkworm double hybrids, pre and post crop disinfection of rearing houses and appliances were part of the programme. To facilitate transfer and adoption of technologies trainings, extension communication programmes and study tours were organized for the farmers. The results of these interventions were that the average cocoon production increased from 35.00kg/100dfls set as benchmark at the initiation of programme (2011-12) to 53.10 kg/100dfls (2015-16) and defective cocoon percentage decreased from 25.10 percent (2011-12) to 12.50 percent (2015-16). From the results it is clear, that technological interventions, monitoring, coordination along with the communication, transfer and adoption of technologies played an important role in the success of cluster promotion programme. Further to boost the bivoltine silk production of the country in a sustained manner, new clusters be opened in traditional and nontraditional areas for horizontal and vertical expansion of Silk industry.

**Keywords:** Technological intervention, silkworm double hybrids, defective cocoon percentage, Chawki reared silkworms, extension communication Programmes

### Introduction

Sericulture plays a vital role in economic development of the country by generating employment, income as well as foreign exchange. Sericulture being a long chain industry (like raising of mulberry food plants, silkworm seed production, silkworm rearing, cocoon production, silk reeling, twisting, weaving, printing, dyeing, finishing and marketing) with backward and forward linkages. And any weak link in the chain affects the overall development of the industry [2, 14]. Therefore, a well-knit network of extension agencies, research institutes, universities and the ultimate stakeholders *i.e.* farmers is required [14].

From time to time different approaches have been adopted to catalyze the development of this industry and have a mass impact with the active participation of primary, secondary and tertiary stakeholders [8, 14]. One of the approaches adopted during XI plan keeping an eye on XII plan targets of increasing the bivoltine silk in the country (3A grade and above) from 1685 MT to 5000MT along with improving socioeconomic conditions of farmers was CPP [17]. Central Silk Board in association with the Department of sericulture in various states introduced this concept of cluster promotion programme (CPP).

Among different states in India, North western states of Jammu and Kashmir, Himachal Pradesh, Uttar Pradesh, Uttarakhand, Haryana and Punjab having immense scope for sericulture development owing to suitable socioeconomic and climatic conditions were selected as part of the programme [3]. And among these NWI states, the state of Jammu and Kashmir in particular was selected in view of its salubrious climatic conditions for successful production of high grade bivoltine silk [5, 11, 12, 4]. So for the purpose two mulberry clusters in Kashmir region one at Bandipora under Research Extension Centre sub unit Bandipora located in north of Kashmir and other at Tral area under Research Extension Centre sub unit Tral located in south of Kashmir were established.

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### Status of Sericulture in Bandipora district of J&K

Sericulture under operational areas of Bandipora was spread in 32 villages with 400 rearers. The average cocoon production before the start of cluster promotion programme was 35.00kg/100dfis<sup>[1]</sup>. The availability of mulberry wealth, ideal climatic conditions, topography of land, the socio economic conditions of the people in general and status of sericulture of the district offered ideal conditions for sericulture development through extension support mechanism along with new technological inputs<sup>[1]</sup>. The basic objectives of the programme were as follows.

- To improve production
- To improve productivity
- To improve quality
- To improve socioeconomic conditions of farmers.

### Materials and Methods

In order to increase bivoltine silk production Cluster Promotion programme (CPP) was implemented initially for three years from 2010-2013 but later on extended up to 2015 to analyze its impact. In the cluster promotion programme, a cluster of villages and families located within the radius of 18 km nearby were selected and adopted in order to have impact of improved technologies, facilitate closer monitoring and interaction of scientist and the programme be managed successfully by limited scientific and extension staff with the close coordination of DoS staff and local stake holders. Initially 150 farmers in 32 villages were identified for the programme and later on new farmers were added every year. Adopted villages were regarded as field operational unit.

A preliminary (Bench mark) survey was conducted jointly by staff of Research Extension Centre sub unit, Central Silk Board, Bandipora and Department of sericulture, Bandipora to identify the basic requirement/needs of the farmers like high yielding mulberry variety, rearing houses for increasing rearing space, rearing equipments, mountages, disinfectants and other allied technological needs. Assistance was provided to farmers under these components through Cluster Development Programme (CDP). For the successful implementation of the programme, the necessary steps taken were as follows.

- (1) Cluster Bandipora was established during the year 2010-11 and was kept under the control of Research Extension Centre sub unit) Central Silk Board, Bandipora. Both the scientific as well as technical staff of the unit with the close coordination of field officers/staff of DoS monitored the activities of the cluster.
- (2) A Cluster Promotion Committee (CPC) was framed headed by concerned scientist of CSB unit with members from CSB technical staff, local DOS officer and two local progressive farmers. The constituted committee met once in a month and discussed schedule of activities to be carried out under various components of the project and also reviewed the progress/performance of silkworm rearing crop regularly. Curative measures were also taken where ever necessary.

- (3) For providing healthy and robust Chawki worms to farmers, Chawki rearing centres (CRC's) were established and were fully equipped with rearing appliances. Silkworm seed of different silkworm hybrids received from various silkworm seed organizations of Central Silk Board and Department of Sericulture were incubated and Chawki reared as per the procedure<sup>[10]</sup>. The Chawki reared worms were distributed among the selected farmers spread over to 32 villages of Bandipora in 11 beats as per the rearing capacity assessed before the initiation of the silkworm rearing.
- (4) For maintenance of disease free/pathogen free rearing environment, pre and post crop disinfection of rearing houses along with appliances was carried out thoroughly with Sanitech (Chlorine dioxide) as per the advocated procedure developed by Central Sericultural Research and Training Institute, Mysore (CSR&TI - M).
- (5) Training was provided to farmers on various aspects like Mulberry cultivation, Disinfection techniques, Mulberry leaf harvesting and preservation, Shoot rearing, Mounting technology and Cocoon sorting and drying. Extension communication programmes like awareness programmes, group discussion, field days, and Vichar goshti were organized to educate/update the farmers to latest improved technologies developed by research institutions of the country. Feedback was also received from farmers for redressal of the problems. Farmers were also taken for study tours so as to have interaction with fellow farmers of other states.
- (6) For strict monitoring of silkworm rearing crop, concerned scientist and technical staff of CSB unit frequently visited the field. Besides, subject matter specialist from CSR&TI, Pampore and Sher Kashmir University of Agricultural sciences and Technology, Kashmir (SKUAST-K) made visits to farmers at crucial stages of rearing and provided technical guidance to them.
- (7) At the end of silkworm rearing, cocoon crop performance was monitored constantly during post crop review meetings at high level by analyzing the achievements verses annual targets visa vis successes/failures. After conclusion of the programme impact analysis like impact of CPP on cocoon production, productivity and cocoon quality of adopted farmers of the cluster was carefully observed.

### Results and Discussion

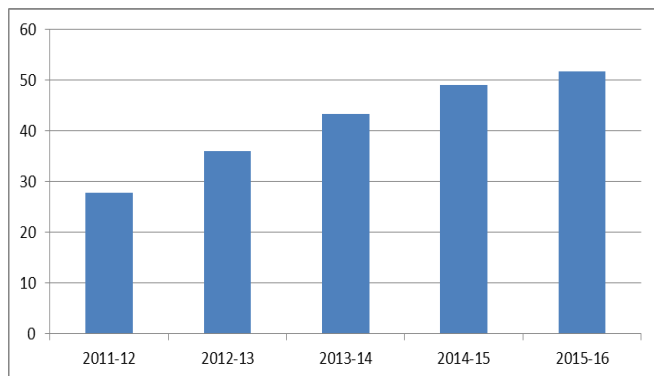
Bandipora cluster was adopted during 2010-11 to boost up the bivoltine cocoon production but the impact was observed from Spring, 2011 onwards. The spring rearing crop data for 2011 to 2015 (Table-1) indicates that number of farmers increased from 150-300, thus recorded 100% increase in number of farmers. Seed intake capacity of farmers increased from 15000 to 30000 dfis. Cocoon productivity (Kg)/100 dfis green was recorded as 44.73, 47.59, 50.19, 52.15 and 53.10 kg in 2011-12, 2012-13, 2013-14, 2014-15 and 2015-16 respectively (Table-1) against the bench mark of 35kg/100 dfis before the launching of cluster promotion programme.

**Table 1:** Cluster Bandipora (J&K) Rearing performance of spring commercial crop (2011-2015)

| Year    | No. of Farmers | No. of Dfls reared | Cocoons Harvested (Kg) | Avg. Yield/100 Dfls (Kg) | (%) Gain over bench mark | Defective cocoon (%) | Defective cocoon (%) reduction over bench mark |
|---------|----------------|--------------------|------------------------|--------------------------|--------------------------|----------------------|--|
| 2011-12 | 150            | 15000              | 6710                   | 44.73                    | 27.80                    | 25.10                | 4.90   |
| 2012-13 | 150            | 16000              | 7615                   | 47.59                    | 35.97                    | 23.25                | 6.75   |
| 2013-14 | 150            | 16000              | 8030                   | 50.19                    | 43.40                    | 20.00                | 10.00  |
| 2014-15 | 150            | 16800              | 8760                   | 52.15                    | 49.00                    | 16.10                | 13.90  |
| 2015-16 | 300            | 30000              | 15930                  | 53.10                    | 51.72                    | 12.50                | 17.50  |

\*Bench mark for Avg. yield/100 dfis before the launching of CPP =35.00 kgs \* Bench mark for defective cocoon %age before the launching of CPP=30%

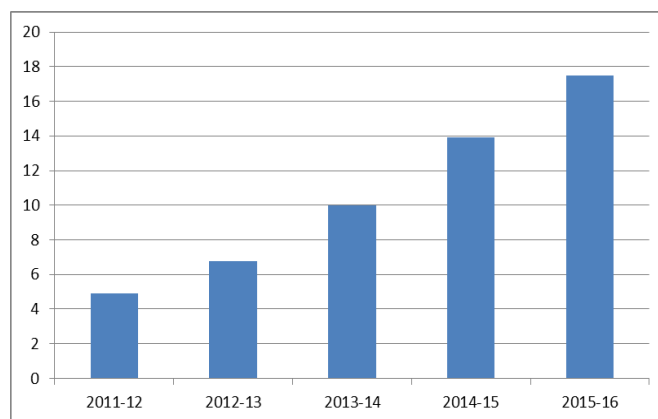
The percentage gain in yield/100 dfls over bench mark was registered, 27.80, 35.97, 43.40, 49.00 and 51.72% in 2011-12, 2012-13, 2013-14, 2014-15 and 2015-16 respectively (fig. 1). This increase in cocoon productivity is mainly due to better adoption of technologies by the farmers *viz.* disinfection and hygiene in and around farmers places, better rearing management practices which provided disease free environment for silkworm rearing besides development of robust silk worm larvae. The results are in confirmation with that of [9, 16, 17, 18, 14].



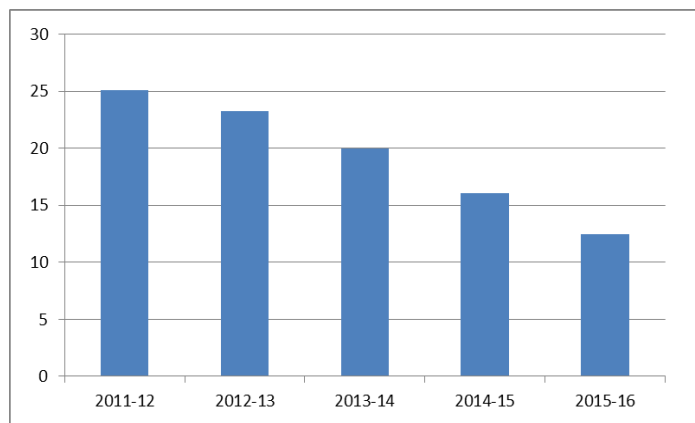
**Fig 1:** (%) gain in cocoon yield/100 Dfls (Kg)

The defective cocoon percentage (fig. 2) was recorded as 25.10% in 2011-12, 23.25 in 2012-13, 20.0% in 2013-14, 16.10% in 2014-15 and 12.50% in 2015-16, thus showed 4.9%, 6.75%, 10.00%, 13.90% & 17.50% reduction in

defective cocoon percentage during 2011-12, 2012-13, 2013-14, 2014-15 and 2015-16 over bench mark of 25% defective cocoon percentage (Fig. 3). The reason for reduction in defective cocoon percentage in successive years is attributed to better use of mounting technology by the adopted farmers particularly use of plastic mount age for mounting/seriposition of ripe silkworm larvae. Due to this quality improvement in cocoons, some farmers fetched a good market rate of Rs 900-1100/kg of dry cocoons at cocoon auction market. This is in accordance with the studies conducted by [6, 7, 15, 13] who reported improvement in cocoon quality by using plastic collapsible mount age for mounting of silkworm larvae.



**Fig 2:** Defective cocoon (%)



**Fig 3:** Reduction in defective cocoon (%)

Through participatory interaction and observation method, it was also learnt that sericulture farmers used the money earned from selling of cocoons for purchase of day to day house articles, Jewellery, children education, besides some money for conducting sericultural activities, thereby giving boost to their socio economic status. This is in conformity with the results of [16] and [8] who reported that the money earned by farmers from sericulture was successfully utilized for different house hold purposes.

### Conclusion

From the study, it can be concluded that technology intervention with certain amount of refinement played an important role for achieving targets set under Cluster Promotion Programme (CPP). The success of the cluster promotion programme can also be attributed to meticulous planning, prompt and timely support of CSB, DoS authorities along with coordinated work carried by scientist and officials

of Research Extension Centre sub unit Bandipora, officers/field workers of Department of Sericulture Bandipora, CSR&TI, Pampore and National Silk Worm Seed Organizations (NSSO). The success is also attributed to regular review of crop performance and technical guidance provided by CSR&TI, Pampore for solving problems faced by implementing agencies and beneficiaries. To further, boost the good work carried under Cluster promotion programme and to improve the bivoltine silk production of the country in a sustained manner, this programme should be continued further and new clusters be set up in traditional and nontraditional areas so as to achieve also horizontal and vertical expansion of Silk industry.

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