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Institute Village Linkage Programme-A Participatory approach for the development of sericulture in India

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ABSTRACT

During the XII five year plan Central Silk Board set target of increasing the bivoltine raw silk production to 5000 MT to meet out the domestic demand as well as to cut on the imports from leading country China. Focus was given on development of location specific technological packages and to test those packages in a participatory manner and diffuse by showing the superior results of the refined technological packages. One of the steps in this direction was Institute Village Linkage Programme-a novel frontline programme adopted from Indian Council of Agricultural Research. For North West India five sites were selected out of these sites one of the sites selected in participatory mode was Pampore area of Kashmir. Mixed methods research design involving Participatory Rural Appraisal tools , direct observation and semi structure schedule was utilized for baseline survey and agro ecological analysis. These tools were applied in a phased manner by arranging meetings and discussions with field functionaries of Sericulture Development Department Kashmir, Village Heads and lead farmers of the area. After analysis of primary data, 100 farmers were adopted and based on the agro ecology of the area, technological package was refined and step by step the different technological interventions were demonstrated among the adopted rearers ranging from mulberry cultivation to silkworm rearing. Along with the technological package, inputs and implements in the form of mulberry saplings, disinfectants, mountages, fertilizers were provided to the adopted farmers. With the adoption of these interventions and the monitoring support provided by the experts from CSR&TI, Pampore and field functionaries of Sericulture Development Department Kashmir, during 2015-16 the average cocoon productivity increased from 34kg/100dfls (baseline data) to 38.60 kg/dfls and during the year 2016-17 the average productivity increased from 38.60/100dfls to 42.79kg/100 dfls with a percentage increase of 25.85% from baseline data providing an additional income of Rs 3000-4000.

Key Words*:- *Agro Ecological Analsis, Participatory Rural Appraisal, Technology Package.

I INTRODUCTION

Silk industry in India from 2000 onwards is facing the increasing competition of low cost Chinese silk. In order to safeguard the interests of sericulture farmers and the silk industry in general different interventions are made by the Ministry of textiles, Government of India. Among these interventions, Institute Village Linkage Programme (IVLP) was introduced through the research institutes functioning under Central Silk Board,

Ministry of Textiles. Institute Village Linkage Programme is an innovative programme which was first of all initiated by the Indian council of Agricultural Research (ICAR) on a pilot basis form in 1995-96 and was later brought under World Bank funded National Agricultural Technology project (NATP) since 1999(1). It is different from the earlier first line extension efforts of ICAR, in sense that it lays emphasis on the research aspect through the participation of farmers to be carried out by the multidisciplinary team of scientists[2]. This Programme was introduced with broad objectives of having an area and region specific problem identification, participatory refining of technologies and priority setting for bridging the gap between research, extension and farmer. One of the project site under this programme is Pampore area of district Pulwama in Jammu and Kashmir.

II METHODOLOGY

IVLP a novel frontline programme, its initiation began with selection of sericulture farmers in villages with the active cooperation of Sericulture Development Department, J&K and other local stakeholders, village heads etc.The selected cluster of villages from Pampore area of district Pulwama are within 10-15 km radius. Mixed methods design was used to collect baseline data involving Participatory Rural Appraisal (PRA), direct observation methods and thereafter a semi-structured interview schedule and for rearing data structured schedule was utilized. After the problem diagnosis phase, technological interventions were finalized and regular monitoring of rearing cycle was carried by organizing different extension communication programmes in the area. The refining of technologies was carried in order to adapt to the local agro ecology[3]. These technologies were demonstrated to the farmers and diffused in the form of a technological package.

2.1 Problem diagnosis phase: - Problem diagnosis phase involved detailed agro ecosystem analysis and prioritizing of the problems based on interaction between social and ecological factors. Some of the problems identified in the area are as below:-

2.1.1 Lack of awareness about mulberry cultivation & pruning schedule:- It was observed that any specific mulberry cultivation and pruning schedule was not available with the farmers of the area and also the awareness about the different packages and practices of mulberry cultivation was meagre in the farming community. Mulberry cultivation and pruning schedule was prepared by the scientists of CSR&TI, Pampore, taking into consideration the local agro ecology and the ecology of temperate region and was finally distributed among the rearers for ready reference.

2.1.2 Non availability of quality mulberry leaf:- Sufficient mulberry wealth was not available in and around the area there by limiting the silkworm rearing capability of the farmers. The available mulberry plantation was not properly pruned, trained and also there was not any care taken for their nutrition through inorganic and organic fertilizers. Kaneez Fatima[4] has also reported that during her field survey, it was found that the rearers always are constrained by adequate availability of good quality mulberry leaf, at proper time and place.

2.1.3 Non availability of quality silkworm seed:- Silkworm seed distributed in the area was preferably from the local grainages only and a mix of different hybrids was distributed in the area. It was ensured that only disease free layings of commercial CSR double hybrid is distributed in the area which has performed better in rest of the regions in Kashmir Valley.

2.1.4 Lack of awareness about disinfection & hygiene:- Farmers were unaware about the importance of proper disinfection schedule for successful rearing. Although farmers were aware about the disinfection but they lacked the knowledge of methodology for applying disinfectants. Knowledge about the importance of ventilation in the rearing rooms was also very poor among the farmers. Awareness about maintaining personal hygiene before and after the application of disinfectants was also poor.

2.1.5 Lack of awareness about Chawkie rearing concept:- Chawki rearing concept was very new to the rearers and they were not aware about the importance of chawki rearing. Mostly just hatched worms were distributed among the farmers in the area. Very limited quantity of Chawki reared worms were distributed in the area. The Chawki rearing was conducted on the leaf harvested from scattered and un maintained plantation.

2.1.6 Lack of awareness about importance of mountages:- The final steps in silkworm rearing are mounting and cocoon harvesting. The economic parameters of cocoon are affected by wrong mounting, unsuitable mountages, adverse conditions during spinning. Rearers in the area used local mounting material, like dried paddy grass, dried mustard grass, kesh shoots, pinus shootlets etc which degraded the quality parameters of the cocoon like colour of cocoon, size of cocoons etc thereby affecting the marketability of the cocoon crop.

2.1.7 Lack of awareness about cocoon sorting & drying:- The knowledge about the impact of unsorted cocoons i.e, (double cocoons, flimsy cocoons, melted cocoons, urinated cocoons, malformed cocoons) and proper drying of harvested cocoons, was also absent which eventually used to affect the marketability of cocoons.

2.1.8 Lack of awareness about green cocoon disposal:- The concept of green cocoon disposal was new to the farmers of the area. They had to wait for 3-4 months for the marketing of there cocoons and during that time the drying operations carried by them were not of the level as per the reelers point of view. Farmers used to dry cocoons in open sunlight without any knowledge of the duration and the intensity of the sunlight for complete drying of the harvested cocoons. Also the practice of using black cloth was absent among the rearers

2.2 Identification of technological interventions and their diffusion through a package:- Technological package ranging from soil testing to marketing of cocoons was prepared on the basis of the problems identified and through extension communication programmes and printed literature was demonstrated and communicated to the adopted rearers. The different elements in the technology package are:-

2.2.1 Soil Testing :- Soil testing is an important tool for knowing the fertility status and capacity of soils to sustain plant growth. The importance of soil testing have been well known and well recognized through different steps of research like lab testing, on station testing , field trials, demonstrations etc[5]. Soil samples from farmers field were collected and after detailed analysis Soil Health Cards for farmers were prepared and distributed for their ready reference in carrying the field operations for nutrient management of mulberry plantation.

2.2.2 Nursery raising :- Establishment of farm nurseries by smallholder farmers will not only be the source of mulberry germplasm but also could be a source of livelihood generation[6]. In order to inculcate the practice of raising their own mulberry plants simple techniques of mulberry nursery raising were demonstrated to the farmers of the area. Nursery raising through stem cuttings which is most economical among the nursery raising techniques like stem cuttings, bag grafts and root grafts in temperate areas was demonstrated to the rearers.

Along with mulberry wealth it was also communicated to the farmers that the increase in the plant wealth will act as a sink of the harmful dust/smoke created by the cement factories in the area.

2.2.3 Maintenance of mulberry plantation :- Mulberry a perennial crop, its initial proper establishment care should be taken atleast for two years after which through proper management practices mulberry can be maintained for several years in the field. For maintenance and management of mulberry plantation follow-up of recommended package of practices are necessary[7]. In order to demonstrate the importance of different packages of practices and increase the mulberry wealth two year old saplings of mulberry were distributed among the 100 identified rearers along with the printed pamphlets of the recommended package of practices. The different operations mentioned in the pamphlets were also demonstrated in the mulberry field of lead rearers.

2.2.4 Integrated nutrient management (INM):- This concept which is a broad based solution particularly aimed at improving the soil fertility [8] originated after second World War. As reported by [9], organic carbon and soil moisture have a tremendous influence on leaf yield and quality of mulberry plant. As most of the farmers in this area were poor and did not have their own established mulberry plantation to feed 100 dfls for the full rearing cycle, so this concept of maintaining soil fertility of the mulberry gardens through integrated nutrient management was demonstrated and communicated through pamphlets.

2.2.5 Pruning / leaf harvesting techniques:- Pruning is not a substitute for other orchard practices such as fertilization, irrigation, and pest control[10]. As established plantation was absent among the rearers, farmers were motivated to develop their own mulberry gardens and were supplied 2 years old mulberry . In 2015-16 and 2016-17 farmers were invited for the Extension Communication Programmes at CSR&TI, Pampore and they were demonstrated how to prune the trees and how they can increase the number of rearing by following proper pruning. Also it was demonstrated to the farmers that if Chawki rearing is conducted then only the first three four leaves from the top of branch should be harvested. Also for the late age rearing farmers were told to harvest the leaves in a manner that it should not damage the leaf bearing capacity in the following years.

2.2.6 Leaf transportation and preservation techniques:- Demonstrations, audio-visual aids were used to show the rearers about the leaf transportation and preservation techniques. After that it was recommended to have a separate leaf chamber in the rearing room for the preservation of leaves and to use wet gunny cloth to maintain the quality of leaf while storing the leaf in the leaf chamber and during the transportation of the mulberry leaves. Also it was thrusted upon to transport the mulberry either early in the morning or late in the evening so as to lower the moisture loss in the leaves.

2.2.7 Disinfection of rearing house:- Stress was given on prevention rather than control. For room disinfection farmers were demonstrated the use of slaked lime, bleaching powder, Chlorine dioxide for carrying the disinfection activity. Also it was stressed upon to carry out disinfection activity before and after the completion of rearing activities so as to prevent the occurrence of diseases and to secure quality silkworm cocoon crop.

2.2.8 Chawkie / late age rearing technologies:- Chawki rearing with 5000DFLs OF CSR Double hybrids was carried for the first time at CSR&TI, Pampore in order to demonstrate the technicalities of the concept to the field staff of Sericulture Development Department, Kashmir. Also some lead farmers were regularly invited to see the different management practices taken for the care of chawki and late age worms, so that these

management practices would be adopted by these farmers and later applied at the farm level for the production of quality cocoon crop. Demonstration of Chawkie/ late age rearing technologies was planned to show the marked difference between the Chawki carried by the Extension functionaries of Sericulture Development Department Kashmir, late age rearing carried by the farmers and that carried under laboratory conditions at CSR&TI, Pampore.

2.2.9 Use of Bed disinfectants:- Resham Jyothi, Oushad, Resham Keet and Vijetha are some of the bed disinfectants developed for control of secondary contamination of various silkworm diseases[11,21]. Disinfection of silkworm body and elimination of pathogens from rearing room environment are important aspects in prevention of diseases during rearing[12]. Farmers of the area were demonstrated how to use Vijetha, a recommended bed disinfectant in temperate area of Kashmir valley, for carrying out the disinfection of the silkworm rearing beds. Also it was stressed upon to use the bed disinfectants 30 minutes before giving the feed to the worms coming out of moult.

2.2.10 Integrated management of mulberry pest and diseases:- Popularization of IPM practices with emphasis on bio-control method needs a push farmers by intensified extension efforts for wider adoption at the farmer's level[13]. In this direction the Integrated pest and disease management module for temperate developed through a research study carried by [14] at Pampore was distributed among the farmers so as to have a ready reference for management purposes.

2.2.11 Silkworm disease management:- The silkworm *Bombyx mori* is a very delicate insect and is prone to many infectious diseases caused by various pathogenic microorganisms. These microorganisms are not only found in diseased caterpillars but also scattered in the rearing room and on appliances from the carcasses and faeces of diseased caterpillars. Among these disease are Flachherie, Muscardine, Pebrine and Grasserie. However, most popular silkworm disease found in Kashmir valley is Grasserie. This disease occurs during the fouth instar or after third moult. In order to avoid this disease farmers were informed to carry out disinfection of rearing room and appliances, have proper ventilation in the rearing rooms, regular cleaning of the silkworm beds, avoid fluctuation in temperature and humidity inside the rearing room.

2.2.12 Use of Plastic mountages:- Mature silkworms stop feeding after 5th instar and cocoon spinning begins. For spinning cocoons, silkworms require cocoon frames (mountages) as support. The process of moving mature larva on to the cocoons frame is called mounting. Mounting and mountages considerably influence the quality and quantity of cocoons[15, 21]. Local mounting material like paddy grass, dry mustard grass etc were used which affected the quality parameters of the cocoons. In order to maintain good quality of cocoons and to get best competitive price in the market[16] plastic mountages were distributed among the rearers and method demonstration was carried out to show how to transfer the mature larva for spinning of cocoons.

2.2.13 Cocoon harvesting/sorting and drying techniques for dry cocoon disposal:- Harvesting of cocoons in temperate areas is done on seventh or eighth day of spinning. Harvesting should not be done immediately after pupation. Further, harvesting should be done before the moth emerges out[17]. It was communicated to the farmers in the extension communication programmes that proper drying of the cocoons should be carried out if open sun is available atleast for 64 hours with good intensity of sunlight at 8 hours per day.

2.2.14 Popularization of green cocoon disposal:- Marketing facilities for cocoons are not adequate [18]. Adding to the marketing problems of dry cocoons is the number of middlemen and absence of cocoon drying machines in the state[4]. While middle man and commission agents spoil way of marketing, the absence of fixed support prices give rise to monopolistic marketing channel [18]. In order to have a remedy to this problem the green cocoon disposal was popularized by arranging field visits of the farmers to the local silk reeling units, where in through discussion with the staff of these reeling units farmers were assured of the important advantages of the green cocoon marketing.

III IMPACT ON THE COCOON OUTPUT

3.1Ist year data:- At the time of initiation of this programme, the average productivity of the farmers per 100 dfls was 34 kg/100dfls. Due to the technical and technological support in the form of mulberry saplings and disinfection material along with the close monitoring support provided by the experts of CSR&TI, Pampore and field staff of Sericulture Development Department Kashmir the cocoon productivity increased from 34 kg/100 dfls to 38.60 Kg /100 dfls.

3.2 2nd year data:- During 2016-17 farmers were provided plastic rearing trays, plastic mountages in place of local mounting material, disinfectants in the form of Sanitech and Vijetha, digital thermometers for monitoring temperature and humidity, fertilizers for mulberry saplings along with the close monitoring by the experts of CSR&TI, Pampore and field staff of Sericulture Development Department Kashmir, and the cocoon productivity increased from 38.60 kg/100 dfls to 42. 79Kg /100 dfls. The increase in cocoon productivity during these two years provided an additional income of Rs 3000-4000/per farmer/Spring crop.

IV CONCLUSION

From the baseline data and after the intervention in the said villages it is imminent that until and unless there are not area specific technological interventions giving full focus on social, economic, ecological and other factors related to the farmers, even the modern technologies can not show the full potential. Sericulture can reach its peak level, only if mulberry plantations are developed and maintained at farmers level with the timely marketing in a free market. Second and third crop can be added to the cropping calendar if the technological packages are developed in participatory level so as to fine tune crop specific(spring crop , summer crop, autumn crop,) technologies to local agro ecology. The results from interventions made through Institute Village Linkage Programme cannot show quantum jump immediately in the field (i.e, increase in productivity of cocoons/100dfls of silkworm seed and availability of mulberry leaves for full rearing cycle of atleast 100 dfls of silkworms), until the gestation period of some of the interventions completes, like full establishment of mulberry plants for leaf production in the farmers field. As leaf availability at field level is the biggest problem being faced by the sericulture farmers in the temperate region.

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