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Vivekananda Institute Of Biotechnology

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Vivekananda Institute of Biotechnology was established in 1991 as a R & D unit of this Ashram with a mission to reach the people at grass root level with relevant Science and Technological interventions. The main objective of this branch is to work in the area of biotechnology for rural development and to develop rural entrepreneurship through biotechnology. This Institute has a vision to build up a modern technology resource centre, an advanced R & D facility, a well equipped training centre and a platform to incubate rural entrepreneur. Council for Advancement of Peoples Action and Rural Technology (CAPART,) Government of India, has recognized this institute as Technology Resource Centre for Sunderban area. It has also been recognized as Post Graduate Research Laboratory of Burdwan University, and Scientific and Industrial Research Organization of DSIR, Ministry of Science & Technology, Govt. of India. This institute has the approval by Central Board of Direct Taxes, Dept. of Revenue, Government of India for income tax exemption under section 35 (1) (ii) of Income Tax Act., 1961.

Biofertilizer Technology:

This is a package of technologies aiming to sustainability of soil fertility and consequent decrease in the cost of agricultural production.

i) Soil testing and fertilizer recommendation:

Proper management of soil is an important issue in biofertilizer technology. With the development of societal method of soil testing, the institute could

reach the farmers level with soil testing facility. The VIB knowledge workers, trained rural youths, are involved in collection and analysis of soil samples. This year, total 1770 soil samples collected from 1700 farmers covering 230 ha of land, were analyzed.

ii) Development of germplasm bank:

For the application of microbial inoculants as biofertilizers in diversified agro-climatic region, a rich germplasm bank is essential and the institute has a good collection of *Azolla*-6, BGA- 510, *Rhizobium*- 25, *Azotobacter*-47, PSM-53, *Azospirillum*- 20 and Vesicular Arbuscular Mycorrhizae- 2. This year, the total number of germplasm increased 8.5%.

iii) Promotion of biofertilizer application:

Different aids have been developed in this year for the promotion of biofertilizer application. These include 3 promotional CDs, a set of 5 posters and 3 booklets. Because of promos, acceptance of microbial biofertilizer is increased. This year, the status of production of different biofertilizers are: *Rhizobium*-2.63 MT, *Azotobacter*- 1.32 MT, PSM- 0.61 MT and *Azospirillum*- 1.22 MT. Thus total 5.78 Mt microbial biofertilizers was produced and distributed. Interested farmers adopted the technology for the field level production of *Azolla* and so that they do not depend on this institute for the same.

Although we are in the process of standardization of production and application of Vesicular Arbuscular Mycorrhizae and its promotion, a Young Scientist project on this subject has been sanctioned by Department of Science and Technology, Government of India and is being implemented.

The program of Rice-Fish-*Azolla* culture was undertaken with a DST sponsored project. The main S&T component of this project is application of *Azolla* in rice field, use of *Azolla* as feed of fishes and release of plant nutrient as excreta of fishes. Different models for Rice-fish-*Azolla* culture in deep water rice system was tested in Sagar block, their techno-economic viability

was analyzed and these models are now for large scale demonstration in 40 villages of Sagar island in the coming *kharif* season.

iv) Promotion of biocontrol agents of pest and disease:

Biological control of pest and disease is an important component of modern day agriculture and to achieve this, a laboratory set up is developed for the maintenance of germplasms of different biological control agents, development of rurally adaptable, scientific and low cost production method. This program was initiated in small scale, with a Young Scientist program, sponsored by DST, Govt. of India.

The status of production and supply of different biopesticides is- *Trichoderma viride*- 1.44 MT, *Pseudomonas fluorescens*- 0.97 MT, *Bacillus thuringiensis* - 0.18 MT, *Metarrhizium anisopliae*- 0.02 MT and *Beauveria bassiana*- 0.31 MT. VIB also started the production of other bio control agents like *Corcyra cephalonica*, *Chrysoperla carnea* *Trichoderma harzianum*, *Pacilomyces lilacinus* and *Trichogramma chilonis*.

In addition to bio-pesticides, botanical pesticide like neem seed kernel extract is also promoted by this centre. Production of neem seed kernel extract and its application were standardized for different crops of this region. The methodology involves collection ripe neem fruits, de-pulping of the seeds and drying in shade, decortications of dried seeds, grinding and sieving of kernel, preparation of aqueous extract, and spraying on the crop plants. Field demonstration with NSKE is going on at different regions of Sunderbans under a project funded by Ministry of Fertilizers and Chemicals, Govt. of India. This year, 37.5 MT ripen neem fruit and 30 Kg dry neem seeds were collected and processed. Total 8.958 MT neem seed powder were prepared and distributed to 2986 farmers for demonstration.

v) Promotion of vermicompost application:

As a result of the awareness building program organized with the support from Khadi village and Industrial Commission, the promotion of

vermicompost has increased dramatically. This year 102 MT vermicompost was produced and supplied to different parts of Sunderban and other regions. For the production of vermicompost we use our adopted model, integration of bio gas production and vermicomposting.

One young Scientist project, sponsored by Department of science and technology, Government of India, on the on standardization of production of application of vermi-wash in Sagar Island is under execution.

Plant Tissue Culture Technology:

Program on Plant Tissue Culture

In the mass production unit of tissue cultured banana plantlets experiments were conducted with an aim to significantly improve the production rate / multiplication of the plantlets under the culture conditions. The laboratory also works on *Dendrobium*. Various hormone concentrations were tested with the MS and VW media for observing the growth of banana and *Dendrobium* plantlets respectively. The optimum hormone concentration and optimum ratio of auxin : cytokinin for the shoot initiation, formation of multiple shoots and production of maximum number of roots were restandardized and incorporated wherever required. These experiments were conducted by the PG trainees who came to our institute for their short term training required for the partial fulfillment of their post graduation degree.

The unit produced around 27,000 banana plantlets, this year. We could supply around 6000 plantlets to the banana growers.

The efforts on the *in vitro* production of papaya plantlets was concluded during this period as we could see the cost of the papaya plantlets produced *in vitro* would be too high because of the different steps required for its acclimatization to the culture conditions and its very slow multiplication rate. The study on the papaya micro propagation however is being continued for the academic and research interest. Selected varieties like Ranchi and Honeydew were seed propagated and the farmers have been supplied 2900 number of seedlings during this year.

Production of nursery plantlets

During this period VIB started supplying ornamentals, flowering plants produced in its own nursery. Around 3000 pieces have been supplied to the interested growers and persons. These included the cuttings of Chrysanthemums, Dahlia, layers of China rose of different colors, bougainvillea, grapes, corms of gladioli and various indoor plants and ornamentals.

Mushroom Technology:

With an aim to supply of nutritious food to the rural people and income generation through mushroom cultivation, the main activities of this section are standardisation of feasible production method, training of rural people on mushroom production, organization of production by supplying quality spawn and organizing market. For the production and supply of quality spawn, germplasm of good strains are maintained here. Total 24 strains of mushroom from four genera, *Pleurotus*, *Volvariella*, *Calocybe* and *Agaricus*, are in the collection here. Total 40,623 pkts of mushroom spawn were supplied to the mushroom producers. This year 0.3 MT and 2.00 MT of fresh mushroom was produced in the institute's unit and institute supported mushroom producers' units, respectively. Under a project sponsored by Dept. of Horticulture and Food Processing, Govt. of West Bengal, VIB has developed a cold chain system for the delivery of fresh mushroom to Kolkata through the milk booths of Mother Dairy. Through this system 4823 pkts (100 g each) of fresh mushroom was supplied. Rest of the mushroom was used for the production of value added product in the food processing division.

Apiculture Technology:

Apiary with local variety of honey bee is one of the sources of income of Sunderban. But the process lacks proper scientific method and so the people do not have desired benefit from this practice. On the basis of this fact, a program was taken up under a DST sponsored Young Scientist project. The main objective of this program is to standardize techno-economically viable method for apiary improving the local varieties of honey bee for the production of honey as well as different bi-products like venom, royal jelly and wax. A local variety of honey bee, *Apis cerana* was selected for this study. Method for

rearing and multiplication of these species has been standardized. One hundred bee hives are maintained at different locations of Sunderben for standardization. One project, under the scheme of KVIC (SFURTY), on the development of cluster of rock bee honey collectors is under consideration.

Other Areas of Activities:

1. Sustainable use of mangrove:

Nypa fruticans (Thunb) is one of the threatened mangrove species from Sunderban region. Like all other palm trees, mangrove palm *Nypa* is considered as a source of sugar in most agro-ecological zones of tropical world. It is reported that average 1300 ml juice can be obtained from a mature plant over 24 hrs and average sugar content of the juice is 12%. This palm tree grows well in mangrove region of West Bengal and Orissa of India and also in Bangladesh. On the basis of this background, a program to standardize the method of tapping of juice from this palm in three seasons of the year is initiated with a Young Scientist project of DST, Govt. of India.

2. Non-conventional energy:

The promotion of non conventional energy resources is one of the most important global issue now. VIB is trying to develop such resources. Three bio-gas plants, two primary plants using night soil and cow dung and one secondary plant using slurry from primary plants, are working at VIB as a model. With the help of WBREDA, Govt. of West Bengal, 50 bio-gas plants were set up at different villages of Sunderbans. A new project for setting up district level energy park at this institute has been sanctioned by WEREDA. DST, Govt. of India has also sanctioned a project to develop a model for energy services for the people of Sunderban.

3. Women's Technology Park (Sagar)

A Women's Technology Park (WTP) is established at Sagar Island funded by DST, Govt of India. The building was provided by Sunderban Development Board, Government of West Bengal. A computer training laboratory and a soil testing laboratory are established here. Seven computers, one printer, one scanner and other accessories were contributed by Society for the Opportunities to Women, Kolkata. The main objective of this program

is to empower the rural women with technologies for their improvement of livelihood. Training and escort services for rural people, especially women, are organized here.

4. Vocational Training & Entrepreneurship Development:

Keeping the objective of to develop biotechnology based rural entrepreneur, organizing vocational training is one of the important activities of this institute. Two types of training are organized:

I) Entrepreneurship Development program (EDP)

- a. A 10-12 week competency based training program on Biofertilizer technology is offered in each year in some batches, 15-20 trainees per batch. This year 2 such batches (27 trainees) have completed such training.
- b. The STED program funded by DST, GoI is completed this year. Total 208 small scale units were developed during this project creating 355 jobs. Training on mushroom production is offered twice in a month. This year, total 126 persons were taken such training in 12 training program.
- c. Four training programs were organized on food processing (production of jam, jelly, sauce and pickle) funded by Department of horticulture and Food processing, Govt. of India. Eighty six women participated. The trainees produced 1555 bottles of such processed foods (323.500 kg) worth Rs 27,425.
- d. An Entrepreneurship Development training program was organized at WTP, Sagar where 28 rural youths participated.

II) Skill Development Program (SDP):

- a. In the computer literacy program in the well organized computer training laboratory of VIB, two training porogrammes were organized in this year. Total 35 students of adjacent area were taken this training. Total 75 rural youths, most of them women, participated in the Computer Literacy Training program at WTP, Sagar.
- b. Under the scheme of Khadi Village and Industrial Commission (KVIC) for awareness and skill development program on bio-manure , 6 awareness camps with total 330 rural peoples and 3 skill development program with 60 persons were

organized. The main objective of this program, called Rural Employment generation Program (REGP), is to establish rural enterprises for the production of bio-manure with bank loan and subsidy by KVIC. Under a program of Murshadabad Institute of Technology, Beharampur, one week training on vermicomposting was organized at WTP, Sagar. Total 46 persons, from different villages of Murshadabad district, participated in this program.

c. Skill development trainings on apiary and betel vine cultivation were also organized at WTP, Sagar. Twenty and 93 persons could develop skills on apiary and beetle vine cultivation, respectively.

4. Vivekananda Centre for Skills (VCS)

Two VCSs, one at Borobainan, Burdwan and othet at Amdanga, North 24 Pgs, were established in this year under the project “Skill and Knowledge for Improved Livelihood and Living Standards (SKILLS)” sponsored by UNDP and DST, GoI.. Thus the total number of VCSs is now 4. The main objective of the centers is to provide training and escort service to the farmers for improved production with greater benefit and sustainability. A well equipped training hall with audio-visual system has been developed in each centre. The farmers may develop their skills in agricultural practices after paying a reasonable fee. Farmers also get escort services at a reasonable price at this centre. Total 40 farmers’ level training was organized at Patharprotima VCS with 20 skills. Total 993 farmers were taken these skill development training. Total 60 skills are identified for farmers’ training program through these VCSs.

5. Summer Training:

VIB offers summer training course for the post graduate students of different universities for partial fulfillment of their M. Sc. Degree. This year 7 such students have completed their dissertation papers through this program.

6. Project from Sir Jamsetji Tata Trust:

Jamsetji Tata trust is one of the allied trusts under the umbrella of Sri Dorabji Tata Trust. VIB has received a Grant of Rs. 121.60 lakhs from Jamsetji Tata Trust towards technology delivery to the poor in Sundarbans region and to improved the livelihood of the farmers. The key deliverables of this project are three identified trades, their curricula, manuals and the 104 trained personal in these selected trades. The expected outcome of the project is enhanced rate of technology absorption at the grass root level and better utilization of natural resources in the target area.