Jesuit Contribution to Environmental Protection

Leo D'Souza SJ , St Aloysius College, Mangalore

30 April 2009

Abstract

Jesuits in India have shown their concern for the environment, even before ecology became a public issue, by collection of flora and fauna of the neighbourhood and compilation of well known and highly appreciated floras.

With the awakening of environmental awareness Jesuits have made significant contributions through courses in environment, programmes for environmental awareness, research in biopesticides, biodiversity, ethnobotany, conservation, bioremediation, biotechnology and bioenergy.

The Jesuit Social Service Centres have helped to draw attention to various environmental problems and suggested solutions to these problems.

1. Introduction

Long before the alert on Environment was sounded and became a public issue, Jesuits had made valuable contributions to biodiversity studies and conservation in India. The Jesuits like Fr Anglade, Professor of Philosophy at the Sacred Heart College, Shembaganur, surveyed and listed the flora and fauna of the Palni hills The Jesuit professors also instilled a love of nature in the young men studying to be priests at Shembaganur. They were encouraged to make collections of the flora and fauna of the area on holidays. Father Anglade also prepared drawings and paintings of the plants of Kodaikanal. He also made a scientific study of the dolmens (ancient burial sites) found in the Kodaikanal hills. Fr George Foreau studied the mosses of the Palni hills, had them identified by specialists from France. These collections of Anglade, Foreau and others are housed and still available for visitors at the Museum of the College.

2. Taxonomic Studies and Compilation of Floras

The Jesuits of India have contributed in a large way to the compilation of the floras of various regions.

2.1 Fr Ethelbert Blatter, SJ was a Swiss Jesuit and pioneering botanist in British India. In 1903, Blatter came to India. In early 1904, he joined the Bombay Natural History Society (BNHS) and began to contribute articles. His first article was "The Fauna and Flora of Our Metallic Money. In addition, Blatter traveled extensively in India. His most important contributions from this time were a series of articles written between 1904 and 1909 and titled, The Palms of British India and Ceylon, Indigenous and Introduced. The articles were subsequently published in book form by Oxford University Press. Blatter spent enormous energy both traveling and building an extensive botanical collection; consequently, St. Xavier's College had one of the best herbaria in Western India during those years. In 1925 Blatter retired to Panchgani began to focus more on his botanical studies. His series of papers with W.S. Millard titled, Some Beautiful Indian Trees were published around this time. These papers too resulted in a book of the same name, a classic, still in print. Other books pertaining to India from this time were the two-volume Beautiful Flowers of Kashmir (1927, 1928); The Flora of the Indus Delta (with C. McGann and T. S. Sabnis, 1929); and The Ferns of Bombay (with J. F. D'Almeida, 1932). The following year he was elected Vice-President of BNHS. In 1930, on an expedition to Waziristan, a political agency in the North-West

Frontier Province of British India, Fr. Blatter received the first Johannes Bruehl Memorial Medal of the Asiatic Society of Bengal for "Conspicuous Important contributions to the knowledge of Asiatic Botany.
2.1.1. The Blatter Herbarium today is an internationally recognized herbarium for Taxonomic studies and allied branches in Botany. Established in 1906 in St. Xavier's College, Mumbai, INDIA, it is one of the best herbaria in India holding collections of Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms and flowering plants ranging from the year 1816 onwards. with a total of 3,00,000 plant specimens it is listed in the Index Herbariorum published from KEW - Royal Botanic Gardens.

2.2. Fr Hermenegild Santapau SJ was associated with the National Institute of Sciences of India, the Linnaean Society, London, the Indian Botanical Society, The Royal Asiatic Society of Bengal, The Botanical Society of Bengal, Bombay Natural History Society, Indian Science Congress Association, Phytopathological Society of India, International Society of Pythomorphology, International Association for Plant Taxonomy, International Association of Botanical Gardens, the Royal Agricultural and Horticultural Society of Bengal, etc. Fr. Santapau served on some of the committees appointed by the Council of Scientific and Industrial Research (CSIR), Indian Council of Medical Research (ICMR) and the Indian Council of Ayurvedic Research. Among 216 scientific publications of Fr. Santapau, The Flora of Khandala in the Western Ghats of India,(1953), The Flora of Purandhar, (1958), The Flora of Saurashtra, part I, (1962), The Acacthaceae of Bombay, (1952), The Asclepiadaceae and Periplocaceae of Bombay (1962), The Orchids of Bombay (1966) are well known. In 1954, the Government of India nominated Fr. Santapau as chief Botanist for one year for the revival of the Botanical Survey of India. He served as Director, BSI from 1961-67. He was asked by the Government of India to head the Indian contingent to the tenth International Botanical Congress, Edinburgh, in 1964. He was also an official delegate at the International Standards Organisation meeting in New Delhi in 1964. For his signal services to the country in education and research Fr. Santapau received Padma Shri Award from the Government of India and the Order of Alphonsus X, the Wise Award from the Spanish Government. The First Birbal Sahani Medal was bestowed on him by the Indian Botanical Society in 1964 In a well deserved tribute to the memory of the late Rev. Fr. Hermenegild Santapau, S.J., who died on January 13, 1970, the Prime Minister of India, Mrs. Indira Gandhi, wrote on January 22 : “ In Rev .Fr. Santapau’s death we have lost an eminent scholar who has served education and science for over 40 years. His deep love for India urged him to become a citizen of the country. He had a great knowledge of, and concern for, our plant wealth and wrote intensively on it for experts and laymen. May his memory long continue to inspire all those interested in our flora.”

2.3 Fr Pallithanam SJ was one of the first Indian Jesuit botanists. Though he had done considerable work in field of taxonomy, very little of his work has been published. He and Fr Balam SJ of St Joseph’s College, Tiruchirapalli, have however inspired scores of students to study the Indian flora.

2.4. Fr K M Mathew SJ is “the most productive Indian taxonomist ever”, according to the comment of a referee for his election as a Foreign Member of the Linnaean Society of London. He spent 1,449 days in the field and made 60,644 collections. He had been a member of IUCN’s Species Survival Commission for plants for the Indian subcontinent since 1992. He evolved a modern, illustrated regional Flora of Southern India as a primary programme, since all the three previous Floras (Hooker & al. 1872–1897; Gamble & Fischer 1915–1936; Fyson 1932) were outdated. To improve the botanical knowledge of the region, he extensively carried out field work in four zones. This effort resulted in a four-volume The Flora of Tamilnadu Carnatic 1981, 1982, 1983 & 1988, which contains 1905 plates and 2939 pages of detailed text. A total of 2020 species

was covered in this work. Another contribution is an illustrated Flora entitled the Flora of the Palani Hills in three volumes, which contains 1233 plates and 2144 pages of text. The area he had covered (virtually the entire Deccan Plateau) is today one of the botanically best known regions in India. These volumes have received international acclaim for their comprehensive field coverage, detailed illustrations, updated nomenclature and thorough treatment of each species. Field Floras entitled as Excursion Floras for the same areas, first in English, later in the local language i.e., Tamil, were aimed at delivery of knowledge of plants to ordinary people. The vision was that local people being taught to recognize the plants around them is essential for involving them in nature conservation and eco-restoration, an environmental imperative for the future. Just before his untimely death he was planning for a 6-volume illustrated Flora of North Tamil Nadu, completely revising the Carnatic series and extending to the border of Andhra State for more adequate field coverage. His mammoth publications include more than 12 volumes and 175 research papers. He had completed 21 major research projects funded by reputed international and national agencies relating to Peninsular floristics and Environmental Education. While reviewing his Materials for a Flora of the Tamilnadu Carnatic (1981), Radcliff- Smith (1983) said, " … all in all, this is a most commendable project and the complete work will undoubtedly become a valuable reference, for although by no means covering such a large area as Gamble's 'Flora of Madras', it will nevertheless have dealt with the Flora of the area chosen in much greater depth and detail…." Likewise the review by Radcliff-Smith (1986) of The Flora of the Tamilnadu Carnatic (1983) mentioned, "it demonstrates what is possible when someone with the knowledge, ability, energy, drive and enthusiasm of Fr.Matthew, ably supported by a capable, well trained and also enthusiastic research team, grasps the nettle and single mindedly reaches for a goal which might to others be deemed unattainable". He described four new species, one subspecies, and proposed quite a few new combinations. Strobilanthes matthewiana R.W. Scotland has been published in his honour. He helped many botanists by providing Latin translations for new taxa.

2.5 Fr. Cecil Saldanha SJ has compiled the Flora of Hassan District is a compact work covering the botanically unexplored area of the Western Ghats of peninsular India. Dr. Saldanha and Dr. Nicolson undertook intensive field and laboratory studies on the flora of the area. 1,700 species of vascular plants are being reported. It has 132 original drawings and 20 colour plates. Flora of Karnataka Vol I: This is the first 'flora' with keys, illustrations, descriptions, nomenclatural citations and distribution notes covering the 19 districts of the State. The present and subsequent volumes with over 3,400 species of flowering plants form a basic tool for scientific and sustained utilisation of the higher plants in the state. Flora of Karnataka Volume II: This covers 20 districts of the State. This volume covering 49 (Nos. 65-112) families of flowering plants forms a part of a basic tool for scientific and sustained utilisation of the higher plants in the State.

2.6 Fr V S Manickiam SJ has carried out intensive botanical explorations in the Western Ghats of South India. Under his leadership, various families of South Indian ferns have been subjected to cytological, ecological, micromorphological, phyto-chemical and biotechnological studies. He has published 7 books and about 100 research papers. He participated in several National and International (China, Netherlands, Australia, USA) symposia and organized two National Symposia on ferns and medicinal plants. He was the coordinater for the "All India Coordinated Project on Taxonomy (Pteridophytes & Gymnosperms)". The Centre for Biodiversity and Biotechnology at St Xavier's Palayamkottai was set up by him in 1987. The centre includes a tissue culture unit, a molecular biology unit, a phytochemical unit, a herbarium with 100,000 specimens of ferns and flowering plants, a green house with about 200 species of ferns and flowering plants, a herbal garden with 230 medicinal plants. The Kodaikanal Botanic garden, inaugurated on November 1999, comprises one hundred acres, and here 175 fern species about 50 orchids and about 20 cacti are under cultivation. The garden includes about 30 acres of

subtropical forest and about 10 acres of disturbed forest. The centre has concentrated on the following areas: Cytotaxonomy of ferns of the Western Ghats, Phytochemistry of 100 fern species, tissue culture of 12 endangered ferns, Bioproduction of L-Dopa from Mucuna through tissue culture, Taxonomy of Pteridophyte Flora of the Western Ghats, Polymorphism in ferns, Pteridophytes and Gymnosperms of India, Environmental Education for 1200 school teachers and 35000 school children in five districts of TamilNadu, Angiosperms flora of Tirunelveli Hills (2000 species), multiplication of three tree species of Tirunelveli Hills and Genetic variations of four tree species of Tirunelveli Hills. The centre for Biosystamatics also started by him is primarily for the investigation of the flora of region, namely the Tirunelveli hills and the adjacent plains. The centre will concentrate on the studies related to taxonomical, particularly the molecular aspect and the subsequent classification of flowering plants of the region. Again we intend to do the phytogeographical mapping of the region pertaining to the flowering plants and the conservation of nature and forest resources.

3. Ecology and Environment

3.1 With the growing awareness of the destruction of the environment, quite a number of Jesuit institutions have shown proactive concern for ecology. St Joseph's College Bangalore was one of the first colleges to offer a course in Ecology which trained persons needed in assessment of the environmental parameters. In St Joseph's College, Tiruchirapalli, studies were undertaken in what is today known as bioremediation under Fr Gnanarethinam SJ. This is a study of plants which take up pollutants from the water and soil and hence clean up the environment.

3.2 Tarumithra is a student movement to protect and promote a healthy environment on Earth. Started by Fr Robert Athickal SJ in Patna, India in 1988, the movement has spread into hundreds of high schools and colleges all over India. It has over 2,00,000 members in over 1000 high schools and colleges. Tarumithra has also had several full time volunteers from India and abroad. As part of the Commencement day of the college, the President M. McFarland and the Dean Timothy Austin in the presence of over 6000 students, faculty members and their parents donned Robert Athickal the mantle reading out a specially prepared citation. The citation said, "Tarumitra, through its many projects, has revolutionized the psyches of more than one million people. From a small seed you have planted, a wonderful life-sustaining alliance has taken root and prospered."

3.3 Fr Leo D'Souza SJ and his team at St Aloysius College, Mangalore have carried out a study of the effects of large scale deforestation on soil, flora, fauna of the district. They have also studied the ill effects of afforestation being done with non native trees which causes considerable imbalance to the local environment. In association with the Sociology department of the college he also studied the socio-economic effects of such changes in village life especially with regard to occupation of persons who depend on forest produce for their work and livelihood. Fr Leo D'Souza and his team are also working the biodiversity of local varieties of rice, sugarcane, ragi using molecular markers. They are also engaged in studying the possibility of using plant waste into biofuels.

3.4 Fr Cecil Saldanha SJ was also involved in environmental studies. He was invited by the Government of Karnataka to prepare the " Karnataka State of Environment Reports (both in English and Kannada) for the years 1983-84, 84-85,85-86, 1990 and 1993. Fr Saldanha held several responsibilities and positions. He was Member and Chair person in various State and Central Environmental Commissions in the Government of Karnataka for multidisciplinary environmental impact studies both for resource utilization and industrial development. His book Plants of India, Co-authored with Jyotsna Dhawan has attractive pictures with aesthetic value,

giving us an insight into the biological diversity in the ever green, moist deciduous montane forests on the Western Ghats of Peninsular India. There is an appeal for the conservation of these beautiful and unique plants for the future generations. His other works on environmental issues are Endemic Angiosperms in the Western Ghats , Geology and Soils of Western Ghats, A select Bibliography on Environment of Karnataka, A select Bibliography for Andaman & Nicobar Islands for Environmental Impact Assessment, Managing the Western Ghats (2001), Lakshadeep - an Environment Impact Assessment (1987).

3.5. Fr K M Mathew SJ has done plant biodiversity studies at the Rapinat Herbarium Tiruchirapalli and Environmental awareness programmes through Anglade Institute at Shembaganur for school children and NGO enthusing over 46,000 persons in environmental issues. He was one of the two observers from India deputed by Father General to attend the Earth Summit at Rio. After his death the Anglade Institute under Fr S John Britto SJ has continued to create environment awareness through its Environmental Education Programme. Till 2008, 49825 students, 3088 teachers, 2681 leaders, 4234 activists and 15078 villagers have been trained. Fr S John Britto SJ is also the present director of the Rapinat Herbarium. He holds training programmes for college teachers in the use of biotechnological tools for bioresources conservation and sustainable development. He is also engaged in two network research endevours . 1. Documentation of passport data on rare, endangered and threatened (RET) medicinal plants of Tamilnadu. 2. Assessment of vegetation carbon pool from different forest patches of various districts of Taminadu. The Rapinat Herbarium publishes a bi-annual environmental Newsletter ‘Shola’ . The Botanical Garden attached to Rapinat Herbarium has started a Butterfly garden and introduced butterfly aggregation plants . This helps to maintain natural populations of butterflies within narrow strips of land.

3.6 Fr Lancelot D Cruz SJ of St Xavier’s college, Ahmedabad, has developed People Forest – Laboratory –Industry Linkages for socioeconomic development and traditional medicinal knowledge protection in the Dediapada forests of South Gujarat with the support of the Gujarat Ecology Commission. This involved the setting up of an interactive network of medicine men, the documentation in CD-format of 100 significant medicinal plants, the setting up of 5 enclaves of medicinal plants in the vicinity of five tribal schools and the use of these forests for environmental sensitization of tribal students. The conservation initiatives included the use of plant tissue culture for conservation of threatened ethno medicinal plant species and ex situ conservation carried out at the St. Xavier s College Campus in Ahmedabad. The native plants from Dediapada and their traditional uses as also the demand in the Indian market were studied. A bio-prospecting study to assess the current situation of the native medicinal plants along with a Market Research Study and Business Feasibility Study was done. The project aims to enhance the capacities of the beneficiaries through a series of capacity building workshops on entrepreneurship, administrative functioning, participatory decision making, gender equity, health promotion, water harvesting skills, etc. Through workshops on disease prevention and health promotion the groups will strengthen their local knowledge to prevent illness. The community linkages in the area and the traditional medicine systems will be strengthened through organizing workshops for school children and local groups linked to the setting up of medicinal plant forests in three tribal schools.

3.7 The Entomology Research Institute at Loyola College, Madras, Fr. S.Ignacimuthu has made significant contributions in the field of botanical pesticides for use in the field and in the storehouses. His studies have also revealed the basis of resistance to different genotypes of stored food grains. Fr S Ignacimuthu has written books on environmental awareness for school children and villagers.

3.8 The Entomology Research Unit of St Xavier's Palayamkottai is an internationally reputed centre for reduvid biodiversity for biological crop protection.

3.9 St Aloysius College is having a vermitechnology unit. It has helped to spread the message of using earthworms for management of domestic waste. Dr Hareesh Joshy has enthused several colleges, self help groups, parish communities to take to vermitechnology. He has developed a novel vermibin for the use of households to convert their waste into useful compost.

3.7 Fr Melwyn D'Cunha SJ at St Aloysius College, Mangalore, is studying the association of Cannavelia, a leguminous plant of the coastal dunes with various Mycorrhizal fungi. This association is found to bind the soil and enrich it. He also studies the possibility of using the plant as source of nutrition for animals and humans. In association with the Royal Technical Institute of Sweden, Stockholm he is investigating the ultrastructure of the mycorrhizal spores.

3.8 Fr Vincent Braganza of St Xavier's College, Ahmedabad has developed a biodiversity park of native and exotic trees on the campus. It has an excellent collection of cacti . He has also brought out booklets on environmental issues.

4. Environmental Biotechnology

Several Jesuit Institutions are engaged in application of biotechnology for environmental protection and conservation.

4.1. Fr Saverimuthu Ignacimuthu SJ the former Vice Chancellor of Madras University had been conferred the "Tamil Nadu Scientist Award", popularly known as the TANSA award. It was in recognition of his work in the genetic improvement of edible legumes. A researcher in plant bio-technology, Dr. Ignacimuthu's prime interest had been to identify useful characteristics in the wild genetic resources of legumes that people used in food preparations. His idea was to see if the useful genes in the wild varieties could be introduced into the cultivated varieties, so that they became hardier in some way or became more productive, or even gained a few beneficial characteristics.

4.2. Fr Leo D'Souza SJ trained in plant breeding at the Max Planck Institute of Cologne, Germany, is a pioneer in plant tissue culture in India and has worked out protocols for the large scale in vitro propagation of several forest trees like Ailanthus malabarica, Butea monosperma and Xanthozylum, ornamental trees like Millingtonia hortensis, Lagerstroemia Flos-reginae and a wild fern Drynaria quercifolia. Ayurveda the Indian medicinal system is plant based. The plants used as medicine are dwindling and some are no longer available because of the destruction of their habitat. The team of Fr Leo D'Souza has worked out protocols for micropropagation of two plants Murraya and Vernonia used in Ayurveda. The district has a rare ancient plant, a living fossil Gnetum. This is dying out as it has no commercial use. The team of Fr Leo D'Souza have succeeded in getting somatic embryos of this rare plant. Presently the team has been entrusted by the Department of Biotechnology, Government of India with the task of regenerating a red listed medicinal plant Coscinium fenestratum for its reintroduction into the forest.

4.3. Fr Vincent Braganza SJ Director of Loyola Centre for Research & Development (LCRD), Ahmedabad is involved in research education and extension work in Biology. The Centre is run by the Xavier Research Foundation (XRF), a non-governmental organization (NGO). It specializes in study of micropropagation of medicinal plant.

4.4. Loyola Institute of Frontier Energy (LIFE) under the guidance of Fr Francis Xavier SJ does research work with focus on energy and environment.

5.Social Concern for Enviornment

Concern for the environment is not an option for Jesuits. It is expected to be an integral part of the Jesuit way of life both at the personal and institutional level.

5.1 The Novice masters meeting with Fr V d Bogaert as the resource person, making ecology as part of the syllabus for training of Patna Scholastics is a sign of the Society's concern and response to the problems of environment.

5.2. The Integrated Tribal Watershed Development Programme at Sangamner started by Fr Herman Bacher SJ, Efforts to produce energy efficient equipment for rural areas by Fr Michael Windy at Ranchi and Fr Joe V D'Souza at Pune and the intervention in the Forest Bill for the rights of tribals to forest produce by Fr Walter Fernandes SJ at the ISI , New Delhi are concrete expressions of social concern of Jesuits for the environment.

5.3. Fr K T Chandy SJ has built up an Eco-friendly agriculture, animal husbandry, forestry and aquaculture system that would take care of the increasing needs of the increasing population as well as preserve the ecological systems in India. He started a department of Agriculture and Environmental Education at Indian Social Institute, New Delhi. The main work of the department was to provide training to NGOs working among the farming communities in India. Trainings were at ISI as well as at different location all over India. His interaction with farming communities all over India surfaced a number of ecological and economic problems on which he did "informal research" and evolved 68 new technologies in the field of agriculture, animal husbandry, forestry and aquaculture. He tested them in the field to prove their efficacy and wrote booklets on them all to be used as training materials. He has also written a series of 640 booklets in English and 280 in Hindi on various topics . The English ones are available in a CD. He had evolved his own system of "watershed management training" which the Government India recognized and it recommended his training to all the state and union territory officers in agriculture departments. The "Silo Method of Anaerobic Recycling of Bio-degradable" (SMARBD) is probably the most notable one as it is simplest and cheapest method of waste management available in the world. SMARBD is applicable from home level to the biggest metropolitan city level. Health is related to sanitation and most the most crucial health problems in the villages (cities also) is due to unsanitary conditions. SMARBD is a very suitable for recycling all kinds of biodegradable wastes including hospital wastes and to ensure environmental sanitation and improvement of soil fertility which is very important for the heath of the eco-system.He was actively working also with AFPRO (Action for Food Production) headquarters in Delhi for ten years being in the Governing Body and as Chairman of the Technical Monitoring Committee and also as a trainer to the staff. AFPRO was pioneering in bio-gas and watershed management training and promotion.