Annamalai Subramanian, Ph.D.

Professor of Marine Environmental Studies, Center for Marine Environmental Studies (CMES), Ehime University

Dr. Annamalai Subramanian, Professor, Marine Environmental Chemistry at the Center for Marine Environmental Studies, Ehime University, Japan was born in India. After graduation (B.Sc. - 1969) in Chemistry at the Madurai Kamaraj University, India he received his Masters (M.Sc.- 1974) and Doctoral (Ph.D. - 1982) degrees from Annamalai University, India. He has also obtained a second Doctoral (Ph.D. - 1988) degree from the Department of Environment Conservation, Faculty of Agriculture, Ehime University, Japan. He has served as an Assistant Professor (1976 – 1988), Associate Professor (1988 – 1994) and Professor (1994 -2003) at the Centre of Advanced Study in Marine Biology, Annamalai University. At present he is working as a Professor of Marine Environmental Chemistry at the Center for Marine Environmental Studies (CMES), Ehime University, Japan from May 2003. He has obtained fellowship awards from the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT) and the Japan Society for Promotion of Science. He is specializing on the problems of Persistent Organic Pollutants (POPs) and Heavy Metals for more than 30 years. He has authored more than 100 published papers and 10 book articles on pollution. He is the co-editor of few scientific manuals and seminar proceedings. He has co-authored a book on Bioindicators of POPs with Dr. Shinsuke Tanabe, published jointly by Kyoto University Press, Japan and Transpacific Press, Australia. Apart from handling several research projects on POPs in India, he has conducted scientific studies for the United Nations University, Tokyo, Japan, the Toyota Foundation, Japan and the STAP/GEF. He is now a Roster Expert of UNEP for assessing projects on POPs.

Contamination by Persistent Toxic Substances (PTS) in the Indian Environment

India still remains a generic giant by its widespread usage of several chemicals in its agricultural, disease control and industrial uses. Our effort in the last two decades on the Persistent Toxic Substances (PTS) like DDTs, HCHs, PCBs, CHLs, HCB and trace metals in India has revealed their widespread contamination in the environment and biota. Our past efforts centered around the levels of these chemicals in samples like water, soils, sediments, fish, mussels, birds, human milk, etc. In recent years we have been concentrating on some other chemicals such as dioxins and related chemicals (DRCs) in the environment and biota including human in and around the municipal waste dumping sites in the suburbs of major cities like Chennai, Kolkata, Mumbai and Delhi and also in some rural control sites in India. Most recently we are carrying out works on the occurrence of oragnohalogen compounds like brominated

flame retardants (polybrminated diphenyl ethers and hexabromocyclododecanes) and also the trace metals in the electronic waste (e-waste) sites in the e-waste processing facilities, backyard e-waste processing sites and also in the city area of Bangalore and Chennai.

Our past studies showed that Indian environment and wildlife including human tissues are contaminated by the oragnochlorine chemicals such as DDTs, HCHs, PCBs, CHLs and HCB also revealing region specific and temporal variations. Further, we also found that the municipal dumping sites of India are acting as comparatively prominent sources of DRCs to the global environment. The two BFRs that were analyzed in our recent study, the PBDEs and HBCDs were found to be higher in the soils that were collected from the backyard e-waste processing area than in the e-waste processing facility and the control sites. At the same time, some of the trace elements, used in the various components of the electronic equipments were higher in the urine and hair of the individuals working in the e-waste processing areas. While our past and recent data on various contaminants provided much valuable information on the status of pollution of many chemicals in India, a representative tropical country, it also reveals the fact that there remains a lot to be understood. Certainly our monitoring data on all these persistent chemicals were of much value to the scientists working on modeling and also on genetic responses of wildlife when they are exposed to these and similar chemicals.

Having this in mind, in the forthcoming years of GCOE our group will be continuing the efforts on the monitoring of all the above chemicals and also some other new compounds which may become the chemicals of concern in future with respect to environmental and animal health to the scientists working on related environmental sciences. We will be undertaking sampling trips to various Indian cities, rural areas, municipal dumpsites, e-waste sites, marine areas, etc. to collect samples and will analyze all the above chemicals. We will also measure the fate and distribution some other new chemicals of concern, which the scientific community would like to know. Such data are indispensable and imperative to the scientists working on other related lines of environmental sciences for comparison with their *in vitro* and *in vivo* experimental studies. Further, these specimens will add to the valuable archive of samples at

es-BANK, Ehime University.

We will be working further on the other goals of GCOE, such as man-power development in developing countries, training and exchange programs of students and senior scientists through the ambitious programs like "Network of Asian Environmental Scientists", "Network for Academic Exchange Program with Foreign Research Institutes" and "Training Program for Young Scientists". For the success of these programs we already have a Memorandum of Understanding (MOU) signed with Annamalai University, India and the efforts for signing a MOU with E-Parisara (P) Ltd., an e-waste recycling facility in Bangalore is underway. We already have contacts with scientists in Anna University, Chennai and Madras University, Chennai. Such networks will be extended. The network among the scientists of all the above institutions and GCOE members will be strengthened by mutual contacts, exchange, conduct of seminars, training programs, etc.