

POSTGRADUATE INSTITUTE OF SCIENCE UNIVERSITY OF PERADENIYA



M.Sc. in Environmental Science 2008/2009

1. INTRODUCTION

We live at a critical time of environmental change and deterioration which makes it important for everyone of us to realize and understand the environment in which we live, and to take whatever action we can to safeguard it. Various activities of the fast growing human population are mainly responsible for the environmental deterioration. Recently, the human population growth rate has increased dramatically. The world population which was only 2 billion in 1930 reached 6.6 billion by the end of June, 2007, and would probably double by 2050. Natural resources are getting depleted and degraded owing to agricultural and industrial utilization, with one-third of the world's natural resources consumed within the last twenty five years.

Besides using natural resources at an ever increasing rate, the growing human population overloads the fragile biosphere with thousands of synthetic chemicals polluting the environment. The accumulation of solid waste further aggravates this situation. Pollution, which changes the characteristics of the environment, increases as the human population increases. Also, as countries develop economically the per capita usage of resources, and hence the per capita contribution to pollution, increases. Technological development also tends to exacerbate the degree of pollution. Thus, the population increase in a developed country increases pollution levels much more than the same population increase in a developing country does. The inevitable result of pollution, whatever the source or type, is to place the environment under ever increasing stress, which seriously affects the humans and other organisms that live in it. Biodiversity is being depleted at an alarmingly fast rate. Besides the several thousand species that may have become extinct in the recent past, about 60,000 species are already in danger of extinction. Therefore, it is important for every one of us to make all attempts to reduce pollution, and for every country to restore, as much as possible, the polluted natural resources. Systematic and scientific resource utilization and management will become increasingly important in the future. Thus, there is a growing and urgent need for a deeper understanding of the environment.

The M.Sc. programme in Environmental Science is designed to provide this understanding to young science graduates, who would have to take up the responsibility of conservation and management of environment in years to come, so that future generations would have a relatively safe environment to live in. The programme has a multidisciplinary approach and would draw expertise in different relevant disciplines to provide a good knowledge of important environmental issues.

The programme will deal with global environmental problems, such as global warming, ozone layer depletion, acid rain and photochemical smog, in general and those in Sri Lanka in particular. Sri Lanka, now that it has ratified a number of international conventions and formulated a number of national policies related to environment, such as the National Environmental Policy, needs personnel with a sound background in the disciplines involved, with specialized training in Environmental Science, to deal with

problems involving environmental degradation, particularly with reference to pollution and its management. This is particularly so in the Ministry of Environment and the Central Environmental Authority, organizations that are mainly responsible for the formulation and implementation of the policies related to the environment in the country, and in the local government bodies. This M.Sc. programme is designed to provide that expertise as well.

2. PROGRAMME ELIGIBILITY

Applicants for admission to the programme must have successfully completed a B.Sc. degree in Science or any other equivalent qualification acceptable to the Postgraduate Institute of Science, University of Peradeniya.

The medium of instruction and examinations of the programme will be English. Therefore, candidates should possess an adequate knowledge of English language.

3. PROGRAMME FEE

Local candidates	Rs 80,000/-
Candidates from SAARC countries	US\$ 2,600/-
Candidates from other countries	US\$ 5,200/-

Programme fee shall be paid in two instalments (*50% at the registration and the balance 50% within six months from registration*). Other payments including registration fee, medical fee, library subscription, examination fee and deposits (science and library) should be paid according to the procedure stipulated by the PGIS.

4. PROGRAMME STRUCTURE AND DURATION

This programme consists of course work and a research project. Course work will be conducted over two semesters during weekends and on some weekdays. The duration of the programme is about 18 months including the 6-month research project. In order to proceed with the research project, a student shall obtain a pass grade in each course and attain a final GPA of not less than 3.0 for 24 credits of coursework. If a student obtains passes in all courses and a GPA in the range of 2.75 to 2.99, then he or she shall be eligible for the 'Postgraduate Diploma in Environmental Science' but not for the M.Sc. degree. Such students may not proceed to the research project. After successfully completing the research project within the given time period, a student shall be eligible for the award of the M.Sc. Degree.

ENS 401 is compulsory for those without a biology background, while ENS 402 is compulsory for those without a biostatistics background. The preliminary courses are not considered in computing the GPA. Prior to taking the compulsory courses and optional courses, a student shall successfully complete the preliminary courses and pass the respective examinations. Those who have done biology (or zoology and botany) or biostatistics at the undergraduate level may be exempted from the respective preliminary courses.

Programme Summary

Course Code	Course	Lecture hrs.	Practical/Field Work hrs.	No. of Credits
Preliminary Courses				
ENS 401	Introductory Biology	20	20	2
ENS 402	Bio-Statistics	20	20	2
Semester I				
Compulsory Courses				
ENS 511	Planet Earth: Geological Environment, Atmosphere and Climate	24	12	2
ENS 512	Biosphere Organization and Functioning: Ecosystems and Populations	24	12	2
ENS 513	Biodiversity, Human Population Dynamics and Man's Impact on Environment	24	12	2
ENS 514	Air and Sound Pollution	24	12	2
ENS 515	Water Resources and Water Pollution	21	18	2
ENS 516	Land Pollution and Solid and Hazardous Waste Management	21	18	2
ENS 551	Research Methodology, Scientific Writing and Seminar	15	Seminar	1
Semester II				
ENS 521	Environmental Problems and Disasters in Sri Lanka and Their Alleviation	24	12	2
ENS 522	Environment Management and Sustainable Development	24	12	2
ENS 523	Legal Protection of Environment	15	–	1
Optional Courses				
ENS 531	Energy Resources, Use, Concepts and Alternatives	15	–	1
ENS 532	Agriculture and Toxic Chemicals	24	12	2
ENS 533	Industrial Waste Management	21	18	2
ENS 534	Environment Monitoring and Sampling techniques	15	30	2
ENS 535	Wetlands and Their Exploitation	21	18	2
ENS 536	Marine Resources and Marine Pollution	21	18	2
ENS 537	Environmental Geology	21	18	2
ENS 538	Environmental Health	15	–	1
ENS 539	Environment and Farming Practices	21	18	2
ENS 540	Cleaner Production	10	10	1
Research Project				
ENS 599	Research Project	6 Months		6

ENS 4XX - undergraduate level courses

ENS 5XX - postgraduate level courses

Students are required to obtain 6 credits from optional courses.

5. PROGRAMME CONTENTS

ENS 401 - Introductory Biology (2 credits)

Plant kingdom and plant classification; Animal kingdom and animal classification; Binomial nomenclature; Important plant taxa and Phytosociology; Important animal phyla such as Protozoa, Cnidaria, Platyhelminthes, Annelida, Arthropoda, Mollusca, Echinodermata, and Chordata; Classes of vertebrates; Class Mammalia and its various orders; Fossils and extinct animals; Organ systems of animals; Elements of genetics, embryology, organic evolution and zoogeography.

ENS 402 - Bio-statistics (2 credits)

Need and Purpose of sampling; Estimates and parameters; Precision of estimates; Methods for sampling locations and times; Simple and stratified random sampling; Systematic sampling; Sample size determination; Sampling Theory: Sampling distributions of Means, Difference of means, Proportion, Variances; Scale of measurement of data; Hypotheses testing: Point estimates and confidence interval estimates, Difference of means, Proportions, Variances; Type I and Type II Errors; Parametric tests (Concerning Means, Proportions and Variances); Nonparametric tests; Analysis of count data and contingency tables; Design of experiments; Analysis of variance for single factor and factorial experiments; Mean comparison.

ENS 511 - Planet Earth: Geological Environment, Atmosphere and Climate (2 credits)

Earth in the Solar System; Structure of the earth; Lithosphere and its composition; Plate tectonics; Hydrosphere: Earth's water resources, Hydrological cycle; Rocks and minerals and weathering processes; Soil profiles; Formation of mineral deposits; Depletion of mineral resources; Geology and mineral resources of Sri Lanka. Composition and structure of Atmosphere; Earth's radiation balance; Wind structure; Effects of orography; Dynamic equilibrium within the atmosphere, biosphere and hydrosphere; Climate of Sri Lanka.

ENS 512 - Biosphere Organization and Functioning: Ecosystems and Populations (2 credits)

Biosphere structure; Biogeographic regions and major biomes; Bio-species, populations and communities; Ecosystem structure; Habitat and niche; Energy flow and nutrient cycling (biogeochemical cycles); Trophic levels and Food webs; Productivity; Adaptation of species to their habitats and available resources; Limiting factors and ranges of tolerance; Population Ecology: Age structure; Survivorship curves and life-tables, Population growth and carrying capacity, Population dispersal and regulation, Life history strategies, Interaction among organisms, Species richness; Natural and man-made ecosystems; Mature and immature ecosystems; Major natural ecosystems of the world (aquatic and terrestrial); Major ecosystems of Sri Lanka.

ENS 513 - Biodiversity, Human Population Dynamics and Man's Impact on Environment (2 credits)

Biodiversity and its present decline; Biodiversity in the past; Biodiversity hotspots; Indigenous and exotic species; Endemic, Endangered and Threatened species; IUCN Red List of threatened species; Keystone and Umbrella species; Viability of populations and species extinction; Habitat fragmentation and biodiversity loss; Sri Lankan biodiversity; Establishment and management of reserves and protected areas; *in-situ* and *ex-situ* conservation; Biodiversity and nature protection in Sri Lanka; people-wildlife conflict in Sri Lanka. Human population dynamics; Man's position and his impact on earth; Overpopulation and environmental degradation; Worldwide population trends; Land use; Urbanization.

ENS 514 - Air and Sound Pollution (2 credits)

Types, Sources and Effects of air pollution; Classes of air pollutants; Urban air pollution; Air pollution in developed and developing countries including Sri Lanka; Global warming and its possible effects on the climate; **Kyoto Protocol**; Carbon dioxide as a function of seasonal ice-cap variation; Ozone layer depletion and its effects; Acid rain and its effects on ecosystems; Air quality standards; Photochemical smog; Emission control from automobiles and industry; Emissions from automobiles and industry and current methods of control; Effects of atmospheric pollution on plants, materials and human health; Indoor air quality. Sound and noise; Loudness; Measurement of noise levels; Decibel scale; Effects of noise including physiological and psychological effects; Noise control criteria and approaches for noise control; Noise control in industry; Sound screens and their effect on atmospheric dispersion of pollutants; Public policy and legislation on noise control.

ENS 515 - Water Resources and Water Pollution (2 credits)

Aquatic environment and water resources; Properties of freshwater and sea water; Lotic and lentic waters; Man-made lakes and other aquatic facilities; Water pollutants; Types and sources of organic pollutants; Eutrophication and Algal toxins; Biological oxygen demand, Chemical Oxygen Demand; Run-off from agricultural land and roads; Sediment pollution; Seepage from mine tailings and land-fill

operations; Ground-water pollution; Heavy metals in water and Chemical speciation; Thermal pollution; Effects of water pollution on biota; Indicator organisms; Water purification; Sewage treatment; Water quality parameters and standards, chemical and ecological water pollution control.

ENS 516 - Land Pollution and Management of Solid and Hazardous Waste (2 credits)

Soil and land pollution; Accumulation of solid waste; Solid waste cycles; Microbiology involved in the methods of solid waste disposal, composting and sanitary land filling; Economic, aesthetic and environmental problems pertaining to solid waste deposit; Thermal incineration; Toxic effects; Recycling; Energy from refuse and sewage. Industrial pollution control; Management of solid wastes, and other types of waste such as biomedical, chemical and hazardous waste; Waste water treatment (of both domestic and industrial waste water); Domestic waste management; Agricultural wastes as a source of raw materials; Natural and man-made radiation; Measurement of radiation, Radiation dose, Biological effects of radiation; Radioactive wastes and their disposal.

ENS 521 - Environmental Problems and Disasters in Sri Lanka and Their Alleviation (2 credits)

Sand and gem mining; Unscientifically planned plantations and cultivations; Deforestation; Clearing of coastal vegetation; Invasive species; Shrimp farming; Coral destruction; Harassment and destruction of wildlife; Constructions that undermine natural landscape and obstruct natural water flow; Landslides; Earthquakes; Thunderstorms, Cyclones and Tornados; Tsunamis; Meteorites; Sea erosion; Flooding and Flash flooding; Droughts; Natural and Human-caused fires; Power plants; Oil spills; Improperly designed fishing harbours; Huts, shanties and associated health problems; Warfare and Ecoterrorism.

ENS 522 - Environment Management and Sustainable Development (2 credits)

Basic principles of management; Management of terrestrial and aquatic resources; Sustainable development; Renewable and Non-renewable Resources; Environment management and ISO 14000 series of quality standards; Participation of people of peripheral communities and other stakeholders in management planning; Conflicts among stakeholders in management; Importance of traditional practices in management; Using management plans for decision making; Sustainable development and conservation of resources; Land use policies and legislation; State, Provincial Councils and Local Authorities, NGOs, private sector and others in management of natural resources; Management for multiple uses; Education and Research in conservation management; Resource development and Environmental Impact Assessment (EIA) in Sri Lanka.

ENS 523 - Legal Protection of Environment (1 credit)

Environmental policy, Constitutional provisions for environmental protection and management; Environmental protection by the Provincial Councils; Principles and concepts of environmental law; Practice and enforcement of environmental law in Sri Lanka; Introduction to the Act and Statutes related to environment conservation and management. Legal instruments in environmental protection with special reference to Environmental Protection Licensing (EPL) Scheme, Load based license fee concept etc. Public participation in environmental policy-making; International conventions and protocols related to environment; Environmental ethics; Environmental education; Environmental watchdogs.

ENS 531 - Energy Resources, Use, Concepts and Alternatives (1 credit)

Energy development and consumption; Fossil fuels; Fossil fuel deposits and their depletion Biogas; Use of solar, wind, geothermal and ocean energy (both wave and thermal); Conservation of energy; Hydro and Thermal power plants and environmental pollution; Thermal pollution; Energy transportation; Fuels for the future; Nuclear energy its advantages and problems; Constraints on efficient energy usage imposed by thermodynamics; Environmental impact of energy use.

ENS 532 - Agriculture and Toxic Chemicals (2 credits)

Food resources and World food problem; Agriculture and its impact on the environment and man (Irrigation, Mechanization, Chemical fertilizers, Pesticides, High yielding varieties, GM foods); Under-utilized food and feed sources; Crop disasters; Effects of grazing patterns, wood-gathering and farming practice on the natural ecology; Economic factors in pest control; Improper use of pesticides and laws

relating to use of pesticides; Alternatives to synthetic pesticides; Natural pest control methods; Bioaccumulation and biomagnification; Biochemical, toxicological and other health effects of toxic chemicals on humans and other animals (oxides of carbon, nitrogen and sulphur, ozone, cyanide and pesticides); Carcinogenic and mutagenic effects of chemicals; Acute toxicity; Sublethal effects; Synergetic effects; Tolerances; Transformations; Environmental factors affecting toxicity; Control and treatment of environmental toxicity.

ENS 533 - Industrial Waste Management (2 credits)

Special constraints of microbiological systems; Fermentor & Bioreactor design; Sterilizer design; Wastewater treatment (Ponds, Activated sludge, etc.). Physical Treatment Processes (Screening, sedimentation, etc.); Theory of Air Pollution Control (Particle/gas dynamics); Design and specification of Air Pollution Control Systems (Mechanical collectors, filters, scrubbers, electrostatic precipitators); "Air quality management" and 'Best available Technology' approaches: US and UK experience. Paper making from bagasse, activated charcoal from coconut shells, amorphous silica and cement from rice-husks; Cleaner Production Technology and Membrane Technology; Hazardous waste techniques and management; Sludge treatment and disposal.

ENS 534 - Environment Monitoring and Sampling techniques (2 credits)

The financial cost of environmental monitoring; The need to obtain a representative sample and the effective choice of a monitoring site; Monitoring in conjunction with modelling to minimise waste and cost of environmental monitoring; Low-cost tools. Measurement of atmospheric parameters; temperature, wind speed and direction, inversion height, etc.; Air quality monitoring: sampling preservation, monitoring techniques and methodology (analysis of carbon monoxide, nitrogen oxides, sulphur dioxides, hydrocarbons, particulate matter). Measurement of water parameters; Sampling, preservation, monitoring techniques and methodology (determination of pH, conductivity, oxygen, anions and cations, fertilizer and pesticide residues, microorganisms), Instrumentation and methods of analysis using advanced techniques such as atomic spectroscopy; electro-analytical methods; Neutron activation analysis; X-ray fluorescence; Gas and liquid chromatography; Ion chromatography; The GIS, its capacity and application.

ENS 535 - Wetlands and Their Exploitation (2 credits)

World Wetlands; Riverine, Lacustrine, Reservoir, Estuarine, Swampy and Coastal habitats; Wetlands and Wildlife; Threats to wetlands and Conservation of wetland flora and fauna of Sri Lanka; Environmental and health problems arising from wetland farming practices and wetland pollution; Irrigation systems and environmental problems associated with them; Salinization and desertification; Ancient and Recent Irrigation Systems of Sri Lanka; Multi-purpose reservoirs and their environmental impact; Water-based tourism and its environmental effects; Reclamation of wetlands; Wetlands and Fisheries; Capture and Culture fisheries, Socio-economy of people dependent on wetlands.

ENS 536 - Marine Resources and Marine Pollution (2 credits)

Marine resources including off-shore oil deposits; 200-mile economic zone; Marine habitats and marine biodiversity in intertidal zone, coastal sea, open ocean and deep sea; Primary productivity; Sea grasses and Sea weeds; Mangroves and Salt-marshes; Major invertebrate groups, fishes, reptiles, birds and mammals in the sea; Coral and other reefs; Fishing and Whaling; Over-exploitation of marine resources; Marine pollution and oil spills; Maritime civilian and military transport and its effects on the sea, lagoons and harbours; Introduced marine pests; Important Sri Lankan marine flora and fauna; Inshore and offshore fishery and Mariculture of shellfish in Sri Lanka; Desalination; Salt and chemical production.

ENS 537 - Environmental Geology (2 credits)

History of earth and Geologic time; Understanding geological change; Earthquake, their prediction and control; Volcanic processes and hazards; Landslides; Glaciers and glaciations; Surface water and floods, River flooding; Groundwater and water supply, Groundwater contamination; Coastal processes, Oceans and coasts; Deserts, soils and desertification; Minerals and their use; Geology of mineral resources; Minerals and sustainability; Diamonds and other gemstones; Gold mining; Energy resources and alternative energy sources.

ENS 538 - Environmental Health (1 credit)

Global perspectives in environmental and occupational health; Recognition, Assessment, and Control of environmental & occupational hazards; Basic principles of environmental transmission of infectious agents; Human health risk assessment for chemicals in the environment; Types of air and water pollutants that could contribute to disease; Indoor air pollution caused by cooking and heating with solid fuels such as dung, wood, crop waste or coal; Outdoor air pollution, Automobile emissions, Tobacco smoke and Human health; Environment and Infectious Diseases; Water-borne diseases; Respiratory diseases such as Pneumonia and other acute lower respiratory infections, Chronic obstructive pulmonary disease and Lung cancer; Heart diseases; Urbanization and disease.

ENS 539 - Environment and Farming Practices (2 credits)

Agricultural practices in Sri Lanka, Environmental effects of Artificial Fertilizers; Insecticides, herbicides, fungicides and rodenticides; Environmental effects of Livestock, Dairy, Fish, Shellfish and Integrated farming and their mitigation; Agricultural pests; Diseases of livestock and fish; Environmental effects of processing of agricultural, dairy, livestock and fish yields; Farm by-products; Farm waste management; Environment-friendly farming practices; Organic farming; Crop rotation; Post-harvest preservation of agricultural, livestock, dairy and fish products; Food additives.

ENS 540 - Cleaner Production (1 credit)

Cleaner Production and its advantages; Waste audit procedure: preassessment, material balance, synthesis, Economic evaluation of alternatives. Waste audit; process data, environmental data, financial data; Searching for cleaner production options, waste reduction options and action plan, databases, selected examples, life cycle assessment; Calculations for actual examples.

ENS 551 - Research Methodology, Scientific Writing, and Seminar (1 credit)

The nature and concepts of research, types of research and tools of research, Research design and conceptualization, Operationalization measurement and causality, survey research and data collection techniques, strategies for data analysis and their applications, Scientific writing and writing research reports, scientific papers and dissertations; Preparing presentations; Preparation of bibliography; Information gathering through internet and use of electronic resources.

Each student is required to present a seminar based on review of literature on a current development in the area of Environmental Science.

ENS 599 - Research Project (6 credits)

The candidates shall carry out a research project of 6 months duration on an environmental issue, approved by the Board of Study in Environmental Science (BSES) and the PGIS, and under the supervision of a competent person(s) approved by the BSES and the PGIS. A candidate may propose a research topic on his/her own to be considered by the BSES. The project may be carried out at any department of the University of Peradeniya or at any other institution where facilities are available, subject to the approval of the BSES and the PGIS. However, in the latter case, in addition to an external supervisor at the work place, the work has to be supervised by an internal supervisor of University of Peradeniya, both supervisors approved by the BSES and the PGIS. At the end of the research project each candidate shall present his/her results in the form of a written project report in the format approved by the PGIS. The project report shall be evaluated by a competent examiner. Project shall also be presented in the form of a seminar to a panel approved by the BSES and the PGIS.

6. COURSE EVALUATION

Course evaluation will be as stipulated in the current PGIS Hand Book.

7. TEACHING PANEL

- Prof. J.M.R.S. Bandara, Dept. of Agricultural Biology, Univ. of Peradeniya.
B.Sc. (Cey.), Ph.D. (Lond.)
- Prof. K.G.A. Dahanayake, Dept. of Geology, Univ. of Peradeniya.
B.Sc. (Cey.), Ph.D. (Nancy)
- Prof. Mangala de Silva, Dept. of Zoology, Univ. of Peradeniya.
B.Sc. (Cey.), Ph.D. (Edin.)
- Prof. P. K. de Silva, Dept. of Zoology, Univ. of Peradeniya.
B.Sc. (Cey.), Ph.D. (Lanc.)
- Dr H.A. Dharmagunawardena, Dept. of Geology, Univ. of Peradeniya.
B.Sc. (Perad.), M.Phil (Perad.), Ph.D. (Copenhagen)
- Prof. M.A.K.L. Dissanayake, Dept. of Physics, Univ. of Peradeniya.
B.Sc. (Cey.), M.Sc., Ph.D. (Indiana)
- Dr Udeni Edirisinghe, Dept. of Animal Science, Univ. of Peradeniya.
B.Sc.(Cey.), M.Sc. (Perad.), Ph.D. (Perad.), LL.B. (Open Univ. Sri Lanka)
- Dr G.W.A.R. Fernando, Dept. of Physics, The Open Univ. of Sri Lanka, Nawala, Nugegoda.
B.Sc. (Perad.), M.Phil. (Perad.), Ph.D. (Mainz)
- Dr G.B.B. Herath, Dept. of Civil Engineering, Univ. of Peradeniya.
B.Sc. (Eng.), Ph.D. (Japan)
- Prof. O.A. Ileperuma, Dept. of Chemistry, Univ. of Peradeniya.
B.Sc. (Cey.), Ph.D. (Arizona)
- Prof. B.S.B. Karunaratne, Dept. of Physics, Univ. of Peradeniya.
B.Sc. (Cey.), Ph.D. (Warwick)
- Dr D.G.G. P. Karunaratne, Dept. of Chemical and Process Engineering, Univ. of Peradeniya.
B.Sc. Eng (Perad.), Ph.D (Lisben)
- Dr G.K. Manuweera, Office of the Pesticide Registrar, P.O. Box 49, Peradeniya.
B.Sc. (Perad.), M.Phil. (Perad.), Ph.D. (Missouri)
- Dr M.M.A. Navaratne, , Dept. of Chemistry, Univ. of Peradeniya.
B.Sc. (Perad.), Ph.D. (Hawaii)
- Dr N.A.A.S.P. Nissanka, Department of Crop Sciences, Univ. of Peradeniya.
B.Sc Agric. (Perad), Ph.D. (Guelph, Canada)
- Dr L. Nugaliyadda, Department of Agriculture, University of Ruhuna.
B.Sc. (Perad.), M.Sc. (UPLB, Phil), Ph.D. (New Castle, UK)
- Mr J. P. Padmasiri, 58/4 Aniwatta Road, Kandy.
B.Sc. (Perad.), M.Phil. (Perad.)
- Dr G.A D. Perera, Dept. of Botany, Univ. of Peradeniya
B.Sc. (Perad.), D.Phil. (Oxon)
- Dr H.M.T.G.A. Pitawala, Dept. of Geology, Univ. of Peradeniya.
B.Sc. (Perad.), M.Phil. (Perad.), Ph.D. (Mainz)
- Prof. H.M.D.N. Priyantha, , Dept. of Chemistry, Univ. of Peradeniya.
B.Sc. (Perad.), Ph.D. (Hawaii)
- Dr S. Samita, Department of Crop Sciences, Univ. of Peradeniya.
B.Sc Agric. (Perad), MPhil. (Perad), Ph.D. (Edin)
- Dr A. Senaratna, Dept. of Geology, Univ. of Peradeniya
B.Sc. (Perad.), PgDip (London), M.Sc. (London), Ph.D. (Mainz)
- Dr D.R.I. B. Werellagama, Dept. of Environmental Engineering, Univ. of Peradeniya
B.Sc., M.Sc. (AIT), Ph. D. (Japan)
- Dr R.L. Wijayawardena, Dept. of Physics, Univ. of Peradeniya.
B.Sc. (Perad.), M.Sc., Ph.D. (Sunny)
- Dr S.K. Yatigammana, Dept. of Zoology, Univ. of Peradeniya.
B.Sc. (Perad.), M.Sc. (Perad.), Ph.D. (Queens)

OUTSIDE EXPERTS

Mr B.S.C. Gamage, 283, Nidahas Mawatha, Thalangama North.

B.Sc. (Col.), M.Sc. (Perad.), Attorney-at-law

Mrs S. Ileperuma, Asst. Librarian, Science Library, Univ. of Peradeniya.

B.Sc. (Perad.), MLH (Col.)

Mr W.A.D.D. Wijesooriya, EIA Division, Central Environmental Authority, Battaramulla.

B.Sc. (Kel), M.Sc , ITC (The Netherlands)

8. PROGRAMME COORDINATORS

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