Ecological Economics in Global Change

Outline of Lectures
15 hours course by Prof. Jozef M. Pacyna
Date of lecturing: 4 – 9 April, 2013

1. **Definition of Global Change of the Environment**

Description of the Earth System functioning, major compartments of the Earth System, their genesis, definition and dating of the age of the Earth System, the Earth System in equilibrium.

2. **Major Drivers of Global Change**

Population and population density, growth of population, fertility rate, education and population growth, poverty and population growth, energy demands, production and consumption, population and energy relationships, mineral and living resources management.

3. **Ecological Economics: Basic Concept**

Monetary valuation of ecosystems, cost of pollution control, cost-benefit analysis, cost-efficiency analysis, development of economic and environmental scenarios, definition of indicators of the social impacts of environmental contamination and chemical and biological recovery of the environment, employment rate indices. Life Cycle Analysis (LCA) and its various applications.

4. **Control of Environmental Pollution and Cost-Benefit Analysis**

Best Available Technology approaches, technological and non-technological solutions to control environmental pollution, pre-treatment methods of control: fuel washing and fuel substitution, primary techniques to control pollution at its generation point, secondary measures to treat the exhaust gas.

5. **Application of Ecological Economics in Climate Change**

Relationship between greenhouse gas production and consumption and population growth, future scenarios of climate change – modeling approaches, carbon budgets on global, regional and local scale, use of renewable energy sources, cost estimates for various scenarios of climate change.

6. **Application of Ecological Economics in Acid Rain**

Regional change of the environment, formation of precipitation, sources and budgets for sulfur and nitrogen compounds, acidification of precipitation, examples of acid rain impacts on aquatic and terrestrial ecosystems, past trends and future scenarios of acid rain in various continents, cost estimates for each scenario, environmental benefits from acid rain reduction.

7. **Application of Ecological Economics in Coastal Zone Management**

Various types of coastal zone, coastal zone value, human impacts on coastal zone, major socio-economic and natural drivers of change of coastal zone functioning and structure, future scenarios of coastal zone change, coastal zone management, cost benefit analysis for various scenarios of coastal zone change.

8. **Application of Ecological Economics in Reduction of Inorganic and Organic Contaminants**

Heavy metals: sources, emissions, environmental and human health impacts, modeling of heavy metals transport and migration through the environment, future scenarios of releases to the environment. Persistent organic pollutants: as for heavy metals. Cost-benefit analysis of reduction of environmental contamination by heavy metals and persistent organic pollutants.

9. **Monitoring of the Environment: Economic Aspects**

Purpose and various types of monitoring: environmental levels, compliance with norms, compliance with control strategies, examples of monitoring systems, equipment used for monitoring of the atmosphere and the ocean, biological monitoring, historical record of environmental contamination through the analysis of ice cores and tree rings, cost benefit analysis for major monitoring programs within international conventions and programs.

10. **Application of Ecological Economics in Implementation of Environmental Policies**

Development of international agreements on reduction of environmental pollution, examples of international Conventions, examples and protocols, performance of pre-feasibility studies, development of integrated environmental assessments in connection with industrial, agriculture and environmental investments, major granting agencies and their role in improving our knowledge about the environment, description of major EU Directives relevant to the protection of the environment with focus on Air Quality Directive and Water Framework Directive, economic aspects of implementation of international agreements on reduction of environmental pollution, including the implementation of EU directives.

Termin	Dzień tygodnia	Godzina	Miejsce
04.04.2013	Czwartek	9.15 – 12.00	Sala 300 GG
05.04.2013	Piątek	9.15 – 12.00	Sala 300 GG
08.04.2013	Poniedziałek	9.15 – 12.00	Sala 300 GG
09.04.2013	Wtorek	9.15 – 12.00	Sala 300 GG