



**Munasinghe Institute for Development**  
making development more sustainable (MDMS)

## **Compact Course: Darmstadt**

# **Sustainable Development, Consumption, Production and Climate Change**

offered by the

**Munasinghe Institute for Development (MIND)**

**Course instructor: Professor Mohan Munasinghe<sup>1</sup>**

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<sup>1</sup> Leading world expert and Vice Chair, IPCC-AR4 that shared the 2007 Nobel Prize for Peace

## Compact Course: Darmstadt Sustainable Development, Consumption, Production and Climate Change

**Offered by the Munasinghe Institute for Development**

**Course instructor: Professor Mohan Munasinghe**

This compressed course on sustainable development, consumption, production and climate change of 20 hours is being offered during eight sessions spread over 2 weeks. Individual plug-in modules permit the course to be custom designed to fit specific training needs. It also includes several hours of research seminar time to be provided for university lecturers, researchers, and doctoral students, who are looking for specific research applications of sustainomics. Various versions of the course have been attended by over 1500 participants, including ministers, legislators, senior officials, policy analysts, researchers and university students in many countries (e.g., Brazil, China, India, Indonesia, South Africa, Sri Lanka, UK, USA and other nations), as well as UN agency staff.

### **Coverage, Objectives and Details**

The course provides complete coverage of core theory and many detailed case studies covering a wide range of applications relating to sustainable development – focusing on key areas like sustainable consumption and production (SCP), business sustainability, climate change, energy, agriculture-water resources, primary forests, infrastructure, and extreme events. The course material may be tailored further to suit student needs -- e.g., focus more on SCP and business sustainability or selected sectoral applications.

The course will cover sustainable development comprehensively, paying special attention to developing a transdisciplinary framework called sustainomics, analytical methods, and decision criteria for making development more sustainable -- economically, environmentally and socially. Policy-oriented case studies will illustrate practical applications of the core theory, while classroom exercises will help build problem solving skills and provide experience in analyzing and presenting policy-relevant results to decision makers. The material is self-contained to facilitate the participation of students from a broad range disciplines, but those who have prior preparation in development, climate change, energy, environment, or resource economics will be able to follow the lectures more easily.

Upon successful completion of the full course, participants will be able to:

1. understand the critical issues underlying sustainable development in terms of its economic, social and environmental dimensions;
2. be familiar with the basic concepts and indicators of sustainable development so as to be able to define, frame and resolve issues;
3. assess and present alternative approaches to sustainable development from a decision making perspective, especially in critical sectors and areas like SCP, business sustainability and climate change -- taking into account economic, social and environmental issues;
4. apply the tools of sustainomics (including Action Impact Matrix, sustainable development analysis, multi-criteria analysis, etc.); and
5. identify and undertake research in the field.

A certificate of attendance will be provided upon successful completion.

**Prerequisites:** A basic course in development, climate change, industry studies, business, energy, environment, engineering or resource economics is preferred.

### **Course requirements:**

Active participation in classroom discussions will be encouraged. The course will comprise lectures and illustrative case studies. Small teams of participants will be required to prepare short applications papers (on pre-agreed topics). Each team is expected to present its paper briefly in class, and lead the ensuing discussion.

**Instructor:** Professor Mohan Munasinghe (biodata attached below)

**Course Materials:**

Main text: *Making Development More Sustainable: Sustainomics Framework and Practical Applications* by Mohan Munasinghe (Second Edition, MIND Press, Munasinghe Institute for Development, Colombo, 2010) available on request to all participants – see attachment below. Other materials include readings from two additional text books (“Climate Change and Sustainable Development” and “Aftermath of the Asian Tsunami”), modularized slides, DVDs, and other handouts.

**COURSE OUTLINE (20 hours = 8 sessions x 2.5 hours each)****Day 1: Lectures 1 and 2, 10.00-12.30****Lecture 1: Introduction to SD and Sustainomics Framework**

Getting acquainted, introduction to the course, description of specific modules and topics, course requirements, performance criteria, term paper topics, etc.

Sustainable development challenges, worldwide status and basic facts, future global scenarios

Relevance of Agenda 21, millennium development goals, WSSD targets, etc.

Globalization: internationalization of goods, capital and labour markets

Basic SD concepts: Brundtland report, other definitions, criticisms and practical problems

Sustainomics framework for making development more sustainable: core principles, transdisciplinary approach, analytical methods and decision criteria.

Economic, social and environmental dimensions of SD, and various definitions of sustainability (Hicks-Lindahl, resilience-vulnerability, etc.).

**Lecture 2: Analytical Tools and Methods 1**

Key concepts: poverty, equity, economic efficiency, sustainability of growth.

Multiple indicators of SD

Practical case studies illustrating how to improve the sustainability of growth, at the global, trans-national, national, sub-national, local and project levels.

Integrating economic, social and environmental approaches

Optimality and optimization models, Durability models

Action impact matrix (AIM)

Macroeconomic policies and the environment, Macro-models

Green national income accounting, SEEA, real savings

Sustainable development assessment and evaluation

**Day 2: Lectures 3 and 4, 10.00-12.30****Lecture 3: Analytical Tools and Methods 2**

Analytical methods used in economics: cost-benefit analysis, multi-criteria analysis, decision rules

Issues-policy transformation mapping (ITM)

Economic valuation of environmental and social impacts, internalizing externalities

Role of markets and shadow prices

Applications at the local, sectoral and macroeconomic levels

Typical environmental assessment (EA) procedures

CASE STUDY: SD assessment of a tropical rainforest in Madagascar

**Lecture 4: Climate Change**

Challenges, worldwide status, concepts, definitions, models and analytical methods.

Key scientific issues and options, Circular linkages between climate change and sustainable development

Vulnerability, impacts, adaptation, and adaptive capacity; Mitigation and mitigative capacity

Reconciling the right to SD and need for CC responses - global negotiations and bargaining strategies

Kyoto protocol and post-Kyoto issues – Clean Dev. Mech. (CDM), Joint Implementation (JI), emissions trading

Practical Application - Integrating SD policies and CC response strategies at the national level

Action Impact Matrix (AIM) applied to adaptation and mitigation

**Day 3: Classroom Discussions & Presentations, 10.00-12.30**

General classroom discussions, questions and answers. Relevant presentations by Darmstadt researchers.

**Day 4: Lectures 5 and 6, 10.00-12.30**

**Lecture 5 and 6: Sustainable Consumption and Production (SCP), Millennium Consumption Goals (MCG), Business Sustainability and Policy**

Global resource constraints, crowding out the poor, IPAT  
Sustainable consumption and production, sustainable lifestyles, virtuous cycle  
Millennium consumption goals  
Policy analysis and tools, pricing, labeling, advertising, value/supply chain analysis, etc.  
Business sustainability principles  
Sustainability accounting and reporting, shared value concept  
Country business environment, macroeconomic policies, trade, etc.

**Day 5: Lectures 7 and 8, 10.00-12.30**

**Lecture 7: Sustainable Energy Development (SED)**

Sustainable energy development (SED): challenges, worldwide status and facts, concepts, and definitions.  
Commercial energy – electricity, oil, gas and coal  
Traditional fuels and renewables – fuelwood, biomass, solar, small hydro, wind, etc.  
Integrated national energy planning (INEP) framework and analytical methods  
Applications at the local, sectoral and macroeconomic levels  
CASE STUDY: Integrated national energy planning and pricing policy in several countries  
CASE STUDY: SED analysis of small hydro in Sri Lanka  
Energy sector multistakeholder processes and participation, reform and restructuring  
Energy policy instruments: sustainable pricing, demand management and conservation, command and control

**Lecture 8: Agriculture, Water Resources and Action Impact Matrix (AIM)**

Global status of water resources, agriculture and food security  
Climate vulnerability, impacts and adaptation in developing countries  
Action Impact Matrix (AIM) applied to prioritise vulnerabilities in Sri Lanka  
CASE STUDY: Vulnerability of agriculture and water resources to climate change in Asia – focus on Sri Lanka

**Day 6: Classroom Discussions & Presentations, 10.00-12.30**

General classroom discussions, questions and answers. Relevant presentations by Darmstadt researchers.

**Day 7: Lectures 9 and 10, 10.00-12.30**

**Lecture 9: Sustainable Hazard Reduction and Disaster Management (SHARM)**

Sustainable Hazard Reduction and Disaster Management (SHARM) Methodology  
CASE STUDY: Application of SHARM to the 2004 Asian Tsunami

**Lecture 10: Wrap-up Session & Preparation of Applications Papers**

Review of the course, questions and discussion  
Determining priority issues and formulating problems  
Building trans-disciplinary teams  
Identifying data and applying relevant analytical tools  
Determining policy options  
Presenting results to decision makers

**Day 8: Student Presentations, 10.00-12.30**

Presentation of their results by student teams

## **Brief Biodata of Prof. Mohan Munasinghe – Course Instructor**

[<http://www.mohanmunasinghe.com/default.cfm>](http://www.mohanmunasinghe.com/default.cfm)

Prof. Mohan Munasinghe shared the 2007 Nobel Prize for Peace, as Vice Chair of the UN Intergovernmental Panel on Climate Change (IPCC-AR4). Currently, he is Chairman of the Munasinghe Inst. of Development (MIND), Colombo; Professor of Sustainable Development, SCI, Univ. of Manchester, UK; Institute Professor, Vale Institute of Sustainable Development, Brazil; and Distinguished Guest Professor, Peking University, Beijing, China.

He has earned post-graduate degrees in engineering, physics and development economics from Cambridge University (UK), Massachusetts Institute of Technology (USA), and McGill University and Concordia University (Canada). Prof. Munasinghe has also received several honorary doctorates (honoris causa). Highlights from 40 years of distinguished public service include working as Senior Energy Advisor to the President of Sri Lanka, Advisor to the United States Presidents Council on Environmental Quality, and Senior Advisor/Manager, World Bank.

He has taught as Visiting Professor at leading universities worldwide, and won many international prizes and medals for his research and its applications. Prof. Munasinghe has authored 95 books and over three hundred and fifty technical papers on economics-business, sustainable development, climate change, power, energy, water resources, transport, environment, disasters, and information technology. He is a Fellow of several internationally recognized Academies of Science, and serves on editorial boards of a dozen scientific journals.

**From Mohan Munasinghe – who shared the 2007 Nobel Prize for Peace  
Most Comprehensive Book on Sustainable Development!!**

To order, e-mail <[Mind@Mindlanka.org](mailto:Mind@Mindlanka.org)>, or visit our web site [www.Mindlanka.org](http://www.Mindlanka.org).

**Making Development More Sustainable:  
Sustainomics Framework and Practical Applications**

SECOND EDITION

**Mohan Munasinghe**

Chairman, Munasinghe Institute for Development (MIND), Colombo

**Portuguese and Chinese editions available**

This 650 page second edition is fully updated. It provides a comprehensive, rigorous and practical framework for making development more sustainable by applying the innovative sustainomics methodology. The book is used in university courses worldwide, and applied in many countries. The author explains the key principles clearly, concisely and free of jargon, with mathematical and technical details given in annexes. He also illustrates the methodology using empirical case studies that are practical and policy-relevant over a wide range of time scales, countries, sectors, ecosystems and circumstances. The bibliography is extensive. The book will appeal to a broad audience, including students, researchers, lecturers, policy analysts and public and private decision makers, development practitioners, and concerned citizens.

**Chapters include:** 1. Overview And Summary; 2. Sustainomics Framework; 3. Economics of the Environment; 4. Environmental and Social Aspects; 5. Global Analytical Applications; 6. International Process Applications: Multi-Level, Multi-Stakeholder, Trans-Disciplinary Dialogues; 7. National Economywide Applications; 8. Mathematical Macro-Model Applications; 9. Computable General Equilibrium (CGE) Model Applications; 10. Energy Sector Applications; 11. Transport Sector Applications; 12. Water Resource Applications; 13. Forest and Agricultural System Applications; 14. Resource Pricing Policy Applications; 15. Project Applications; 16. Local Applications: Hazards, Disasters and Urban Growth; Bibliography; Index. Soft cover.

“It’s all here! Sustainomics - everything you wanted to know about sustainable development. It’s all comprehensible. and the eminent author has provided helpful examples from around the world.”

**Prof. Thomas Schelling, 2005 Nobel Laureate in Economics & Professor Emeritus, Univ. of Maryland, USA.**

“This book is unique...comprehensive, concise and clear... brings together a wide range of skills... invaluable resource by a leading world authority on sustainable development. As an award winning researcher, his analysis is rigorous and well-argued. As a senior decision maker and manager with over 35 years of development experience, his advice is eminently practical. As a veteran professor with an enviable publications list, his arguments are lucid and convincing.”

**Prof. Gustave Speth, Dean, School of Forestry and Environmental Studies, Yale Univ. & former Administrator, United Nations Development Program, NY, USA.**

“An impressive presentation of policy-oriented research...effectively mobilizes a wide array of scientific theories, methods and tools for making development more sustainable. In a trans-disciplinary spirit, but with feet firmly on the ground and drawing on economic, ecological and social disciplines, the author presents well chosen and eminently practical case studies. These examples at levels ranging from the global to the local, convincingly demonstrate his approach.”

**Prof. J.B. (Hans) Opschoor, Rector, Institute of Social Studies, & Professor of Environmental Economics, Free University Amsterdam, The Netherlands.**

“Sustainomics is a big idea...it is a gift, and we should do our best to try to use it well. Munasinghe’s grasp is extraordinary. He provides wonderfully clear explanations and enlightening examples of actual development planning analyses... readers will leap with him from concept to application... invaluable to understand how sustainable development really works, and how it can protect environmental, economic and social values.”

**Dr. R. Reibstein, Centre for Energy & Environmental Studies, Boston Univ., USA.**

“Munasinghe summarizes advances in theory and practice of the new analytical framework of sustainomics. Excellent and diverse case studies... well presented analytical tools, real-world applications, and superb bibliography. The author is a long-standing champion of sustainable development... reaching out to values, beliefs, and religion.”

**Dr. A. Seth, Director, World Bank, Washington DC, USA.**