

Course No. : MPE 142
Course title : **Environment and Economic Development**
Number of credits : 4
Number of Lectures–Tutorials–Practical : 42-14-0
Faculty Name : Nandan Nawn

Course Outline

Objectives:

This course situates ecology and environment in the discourse of ‘development’ and economic growth. Ecology is considered more than just a discipline here, and the environment spans from the very immediate/local to the global one. It introduces the student to the sub-disciplines of environmental economics and resource economics and trans-discipline of ecological economics at the level of frameworks, theories and concepts. Various questions and issues of ‘development’ connected to ecology/environment are explored here. This course is followed by ‘Economics of Environment and Natural Resources’ [MPE 146] where methods of analysis and applications in the sub-disciplines and the trans-discipline are explored.

Format:

The primary teaching pedagogy in this course is lecture-cum-discussions. The students need to attend as well participate in them, timely submit the (non-graded) assignments (to be discussed in the tutorials) and write the (graded) tests.

Requirements:

Each student is expected to attend (not just physically) the scheduled classes, read the prerequisites if any, raise questions and participate in the discussions. This being a foundational course for the M.Sc. Programme in Environmental and Resource Economics, it is all the more important for the students to take active interest in this course.

Evaluation Procedure

2 Minor tests: 25% each
1 Major test (end semester) 50%

Details of course content and allotted time

Topic	Allotted Time (in hours)		
	Lectures	Tutorials	Practicals
1. Introduction to Economics of Environment/ Ecology			
Historical Development of Environmental, Resource and Ecological Economics	2	0	0
The ‘circular’ economy—open and closed systems	1	0	0
Laws of Thermodynamics—entropy	1	0	0
Classification of Resources: the Nature of Resources and the Resources of Nature	2	0	0
Abiotic Resources	2	0	0
Biotic Resources	2	0	0
Non-depleting Capital Stock—sustainability, irreversibility, uncertainty—preliminaries	1	0	0
Discounting the Future, Valuation matters and Ethics— preliminaries	1	0	0
Development, Preservation and Conservation—preliminaries	1	0	0
Buffer	0	1	0
Module total	13	1	0

Preliminary readings:

1. John Hicks, S K Ghosh and M Mukherjee, 1984, ‘Chapter I: Production and Exchange’, ‘Chapter II: Goods and Services’, ‘ Chapter III: Consumption and Investment’ in *The Social Framework of the Indian Economy: an introduction to Economics*, OUP [Electronic copy identifier EED.o.1 Hicks]

[This set of chapters introduces one to the nature, form and meaning of economic system, which is inherently social]

2. W Arthur Lewis, 1955, ‘Chapter II: The Will to Economize’ and ‘Appendix: Is economic growth desirable?’ in *The Theory of Economic Growth*, Routledge, pp. 23-56, 420-435 [EED.o.2 Lewis]

[This chapter from an economic classic includes a section titled ‘resources and response’ which discussed the importance of natural resources and the corresponding human response towards achieving economic growth, 59 years ago!]

3. Partha Dasgupta, 2007, *Economics: a very short introduction*, OUP.

[Of special importance—chapter 1: Macroeconomic History and chapter 7: Sustainable economic development; rest of the book is recommended reading only] [EED.o.3 Dasgupta]

Core texts:

1. David W Pearce and R Kerry Turner, 1990, *Economics of Natural Resources and the Environment*, John Hopkins University Press, Baltimore [Pearce and Turner]
2. Charles D. Kolstad. 2011, *Environmental Economics*, Second Edition, Oxford University Press, New York and Oxford [Kolstad; this is primarily an UG text]
3. Roger Perman, Yue Ma, James McGilvray and Michael Common, 2003, *Natural Resource and Environmental Economics*, Third Edition, Pearson [Perlman et al]
4. Partha Dasgupta and Karl-Göran Mäler, 1995, ‘Chapter 39: Poverty, Institutions, and the Environmental Resource-base’ in Hollis Chenery & T.N. Srinivasan (ed.), *Handbook of Development Economics*, volume 3A, Elsevier, pp. 2371-2463 [Classic paper]
5. Vikram Dayal, 2014, *The Environment in Economics and Development: Pluralist Extensions of Core Economic Models*, Springer [Dayal]
6. Herman E Daly and Joshua Farley, 2011, *Ecological Economics: principles and applications*, second edition, Island Press [Daly and Farley]
7. Jon M Conrad and Colin W Clark, 1987, *Natural Resource Economics: notes and problems*, Cambridge [Conrad and Clark].
8. Ramprasad Sengupta, 2013, *Ecological Limits and Economic Development: Creating Space*, OUP, New Delhi [Sengupta]
9. Robert Costanza, John Cumberland, Herman Daly, Robert Goodland and Richard Norgaard, 2007, *An Introduction to Ecological Economics*, Boca Raton, Florida: St. Lucie Press and International Society for Ecological

- Economics (INSEE), [Costanza et al] also available as an e-book at <http://www.eoearth.org/view/article/150045/>
10. Rabindranath Bhattacharya, eds., *Environmental Economics*, OUP [Bhattacharya]
 11. Gopal Kadekodi, eds., *Environmental Economics in Practice*, OUP [Kadekodi]
 12. Katar Singh and Anil Shishodia, 2007, *Environmental Economics: theory and applications*, Sage, New Delhi [Singh and Shishodia].

Encyclopedia

1. J Shogren, 2013, *Encyclopedia of Energy, Natural Resource, and Environmental Economics*, 1st Edition, Elsevier

Collected Works

1. Robert Costanza, Charles Perrings and Cutler J. Cleveland, eds., 1997, *The Development of Ecological Economics*, Edward Elgar
2. Clive Spash, ed., 2009, *Ecological Economics: critical concepts in environment*, four volumes, Routledge.
3. Joan Martinez-Alier and Inge Røpke, eds., 2008, *Recent Developments in Ecological Economics*, two volumes, Edward Elgar, Cheltenham and Northampton.
4. Kanchan Chopra and Vikram Dayal, eds., 2009, *Oxford Handbook on Environmental Economics in India*, OUP.
5. Charles Perrings, eds., 2008, *Ecological Economics*, four volumes, Sage.
6. Chuck Mason, and Erwin Bulte, eds, 2007, *Environmental Economics: Critical Concepts in the Environment*, four volumes, Routledge
7. Karl-Göran Mäler and Jeffrey R. Vincent, eds., 2003, *Handbook of Environmental Economics*, 3 volumes, Elsevier [Mäler and Vincent]
8. Allen V. Kneese and James B. Sweeney, eds., 1993, *Handbook of Natural Resource and Energy Economics*, 3 volumes, Elsevier [Kneese and Sweeney]
9. John K Kerr, Dinesh K Marothia, Katar Singh, C Ramasamy and William R Bentley, eds., 1997, *Natural Resource Economics: theory and application in India*, Oxford and IBH, New Delhi and Calcutta [Kerr et al]

Note: many of the resources listed above are common between MPE 142, MPE 146 and some other papers.

Module-wise readings

1. Introduction to Economics of Environment/Ecology

- A. Historical Development of Environmental, Resource and Ecological Economics
- B. The 'circular' economy—open and closed systems
- C. Laws of Thermodynamics—entropy
- D. Classification of Resources: the Nature of Resources and the Resources of Nature
 - i) Stock-Flow and Fund-service
 - ii) Excludability and Rivalry
 - iii) Substitutability—Weak and Strong
- E. Abiotic Resources:
 - i) Fossil Fuels—net recoverable energy and estimation of stocks
 - ii) Minerals—recycling and its limitations—quality matters—'garbo-junk' vs pure waste
 - iii) Water—trade-off between Stock-flow and Fund-service
 - iv) Ricardian Land
 - v) Solar energy—stock versus flow—limitations—biomass
- F. Biotic Resources:
 - i) Ecosystem structure, function and services
 - ii) Renewable resource—carrying capacity, critical dispensation, sustainable yield and maximum sustainable yield, minimum viable population—role of uncertainty
 - iii) Waste absorption capacity
- G. Non-depleting Capital Stock—sustainability, irreversibility, uncertainty—preliminaries
- H. Discounting the Future, Valuation matters and Ethics—preliminaries
- I. Development, Preservation and Conservation—preliminaries
 - i) Irreversibility and Krutilla-Fisher algorithm
 - ii) Safe Minimum Standards

Compulsory Readings

- 1. Pearce and Turner, 1-3, 14-15, 20
- 2. Kolstad 1: 3-10, 3-5
- 3. Singh and Shishodia 1-3, 4: 93-102 [this book contains the developments in teaching and research of Environmental Economics in India]
- 4. Daly and Farley, 1-2, 4-7
- 5. RNB, 1 and 3
- 6. Kadekodi, 1
- 7. Dayal, 1

Revising Microeconomics basics

1. Perlman 1-4, 5 (for revisiting the Microeconomics basics), 6, 14-18
2. Ramesh Chand, 1997, 'Chapter 2: Basics of Marginal Analysis' in John M Kerr et al, pp. 37-63
3. John M Kerr, C Ramaswamy and T R Shanmugam, 1997, 'Chapter 3: The Role of Markets in Natural Resource Management' in John M Kerr et al, pp. 65-82
- 4.

History of Environmental/Ecological thought

1. E Kula, 1998, *History of Environmental Economic thought*, Routledge Studies in the history of Economics, Routledge, London and New York
2. E Kula, 'Chapter 1: Development of ideas on natural resources and the environment' in *Economics of Natural Resources, the Environment and Policies*, Chapman & Hall, pp. 1-41.
3. Clive Spash, 2009 'The Development of Environmental Thinking in Economics' in Spash 1, pp. 62-85
4. Inge Ropke, 2004, 'The early history of modern ecological economics', *Ecological Economics*, 50, pp. 293-314
5. Juan Martinez-Alier with Klaus Schlüpmann, 1987, *Introduction to Ecological Economics: Energy, Environment and Society*, Oxford, England and Cambridge, Massachusetts: Blackwell Books.
6. Cutler J Cleveland, 1999, 'Biophysical Economics: From Physiocracy to Ecological Economics and Industrial Ecology' in J. Gowdy and K. Mayumi, Eds. *Bioeconomics and Sustainability: Essays in Honor of Nicholas Georgescu-Roegen*, Edward Elgar Publishing, Cheltenham, England, pp. 125-154.
7. Cutler J. Cleveland 1987, 'Biophysical economics: historical perspective and current research trends', *Ecological Modelling*, 38, pp. 47-73

Overview essays/chapters:

1. Amartya Sen, 2001, 'Foreward' in J M Harris, T A Wise, K P Gallagher and N R Goodwin, eds., *A Survey of Sustainable Development: social and economic dimensions*, Island Press [J M Harris et al], pp. xxi-xxiii
2. Partha Dasgupta, 2009, 'The Place of Nature in Economic Development', Working Paper No. 38-09, South Asian Network for Development and Environmental Economics (SANDEE), Kathmandu, Nepal
3. J M Harris and N R Goodwin, 2001, 'Volume introduction' in J M Harris et al, pp. xxvii-xxxv
4. J M Harris, 2001, 'Overview Essay: Economics of Sustainability: the sustainability dimension' in J M Harris et al, pp. 3-14.

5. 'Chapter 2 The Historical Development of Economics and Ecology' and 'Section 3.1—3.4 of Chapter 3: Problems and Principles of Ecological Economics', in Costanza et al.
6. Clive Spash, 2009, 'Introduction—Foundation' in Spash 1, pp. 29-35
7. Nilanjan Ghosh, 2013, 'Ecological Economics, Sustainability, and Global Change: The Role of Markets', Presidential Address, the Seventh Biennial Conference of the Indian Society for Ecological Economics (INSEE), Tezpur University, Sonitpur, Assam, December 5. Accessed at <https://docs.google.com/viewer?a=v&pid=forums&srcid=MTMxNDc4OTY4MDY0NjgoODIxMDIBMDMxOTgwMjA3ODY4NzIwOTE2MTEBsgZXVocoQl9hMm9KATAuMQEBdji&authuser=0>
8. Ahmed Hussain, 2013, 'Chapter 1: The Natural Environment and the Human Economy: the Neoclassical Perspective', 'Chapter 2: The Natural Environment and the Human Economy: the Ecological Perspective', 'Chapter 11: Biophysical Limits to Economic Growth: Malthusian perspectives', 'Chapter 12: Biophysical Limit to Economic Growth: the Neoclassical perspective', 'Chapter 13: the Economics of Sustainability' in *Principles of Environmental Economics and Sustainability: an integrated economic and ecological approach*, Third Edition, Routledge.
9. C Ramasamy and T R Shanmugan, 1997, 'Chapter 4: Spatial Allocation of Natural Resources' in John M Kerr et al, pp. 83-104
10. Douglas Lober and C P Gracy, 1997, 'Chapter 5: Allocation of Natural Resources over Time: risk, uncertainty, and discount rates' in John M Kerr et al, pp. 105-120
11. John M Kerr, 1997, 'Chapter 8: Market Failures in Natural Resource Management' in John M Kerr et al, pp. 185-222

Additional Readings:

1. Robert U. Ayres and Allen V. Kneese, 1969, 'Production, Consumption, and Externalities', *The American Economic Review*, 59 (3), pp. 282-297 [it is a classic paper]
2. Falcon, Andrea, 2014, 'Aristotle on Causality', in Edward N. Zalta (ed.), *The Stanford Encyclopedia of Philosophy*, accessed at <<http://plato.stanford.edu/archives/spr2014/entries/aristotle-causality/>>.
3. Joan Martinez-Alier, 2002, 'Chapter 2: Ecological economics: 'taking Nature into account'' and 'Chapter 3: Indices of (un)sustainability, and neo-Malthusianism in *The Environmentalism of the Poor: A Study of Ecological Conflicts and Valuation*, Edward Elgar, pp. 16-38.
4. Clive Spash, 2009, 'General Introduction: Ecological Economics—a subjective opinion', in Clive Spash, ed., Clive Spash, ed., 2009, *Ecological*

- Economics: critical concepts in environment*, four volumes, volume 1
Routledge [Spash 1], pp. 1-18
5. 'Part I: Economics of Sustainability: the environmental dimension' in J M Harris et al., eds., pp. 14-45 [Contents excerpts from 4 classic articles listed next]
 6. R Costanza and H Daly, 1992, 'Natural Capital and Sustainable Development', *Conservation Biology*, 6 (1), pp. 37-46
 7. G Munda, 1997, 'Environmental Economics, Ecological Economics and the concept of Sustainable Development', *Environmental Values* 6, pp. 213-33.
 8. Talbot Page, 1997, 'On the Problem of Achieving Efficiency and Equity, Intergenerationally', *Land Economics*, 73 (4), pp. 580-596
 9. M A Toman, 1994, 'Economics and "Sustainability": balancing trade-offs and imperatives', *Land Economics*, pp. 399-413.
 10. Uno Svedin, 1991, 'The Contextual Features of the Economy-Ecology Dialogue' in Carl Folke and Tomas Kåberger, eds., *Linking the Natural Environment and the Economy: essays from the Eco-Eco Group*, Kluwer Academic
 11. Sengupta 1, 4, 8-14 (only as a supplement for state of resources in India)
 12. Richard B Norgaard, Astrid J Scholz and Sarah Fleisher Trainor, 2001, 'Values, valuation and valuing processes' in Ekko C Van Ierland, Jan van der Straten and Herman Vollebergh, eds., *Economic Growth and Valuation of the Environment*, Edward Elgar, pp. 151-169

Advanced Readings

1. Partha Dasgupta and Karl-Goran Maler, eds., 1985, *The Environment and Emerging Development Issues*, two volumes, UNU/Wider Studies in Development Economics, Clarendon Press, Oxford.
2. Geoffrey Heal, 1986, 'The Intertemporal Problem' in Daniel W. Bromley, ed., *Natural Resource Economics: Policy Problems and Contemporary Analysis*, Kluwer Nijhoff, pp. 1-36
3. Daniel W. Bromley, 1986, 'Markets and Externalities' in Daniel W. Bromley, ed., *Natural Resource Economics: Policy Problems and Contemporary Analysis*, Kluwer Nijhoff, pp. 37-88
4. Partha Dasgupta, 2001, *Human Well-being and the Natural Environment*, OUP.
5. Alan Randall and Michael C Farmer, 1995, 'Benefits, Costs and the Safe Minimum Standard of Conservation' in Daniel W Bromley, ed., *The Handbook of Environmental Economics*, Blackwell Handbooks in Economics, pp. 26-44.

2. Frameworks connecting ecology/environment and economy/society

A. The Economic Perspective

- i) Market as a provider of information on resource scarcity
- ii) Substitution among the factors and technological advances
- iii) Optimum level of pollution as externality
- iv) Potential for market bargains in externality—Coase theorem
- v) Renewable Resources
 - ξ MSY, 'Fundamental Rule of Renewable Resource Exploitation'
 - ξ Extinction of species
- vi) Exhaustible Resource
 - ξ 'Fundamental principle of exhaustible resource use'—Hoteling's rule
 - ξ Resource prices and backstop technology
- vii) Application and evaluation: measuring and mitigating natural resource scarcity

B. The Ecological Economics Extensions

- i) The Basic Market equation
- ii) The Production Function and the Utility Function

C. Market Failures and Coase Theorem

D. Market Failures and Biotic Resources

E. Market Failures and Abiotic Resources

Compulsory Readings

1. Sengupta 2
2. Pearce and Turner Chapter 4-5, 16-19
3. Hussain, part I and IV
4. Paul Ekins, 2001, 'Key issues in Environmental Economics' in Ekko C Van Ierland, Jan van der Straten and Herman Vollebergh, eds., *Economic Growth and Valuation of the Environment*, Edward Elgar, pp. 90-133

To add Sus Dev in Ding Cs.

3. Inclusive Wealth and Green National Accounts

A. Genuine Savings

Compulsory Readings

1. Sengupta 3
2. Kolstad 20
3. Daly and Farley Macroeconomic Concepts: GNP and Welfare
4. Perlman 19
5. Partha Dasgupta, 2001, 'Chapter 9: Wealth and Well-Being' in *Human Well-being and the Natural Environment*, OUP, pp. 139-156 [preliminary: Chapter 1: The Notion of Well-Being, Chapter 2: Why measure Well-being?, Chapter 3: Constituents and Determinants of Well being, Chapter 5: Current Quality of Life in Poor Countries, Chapter 6: Intergenerational Well-being; advanced reading: Appendix] EED.3.A.5 Dasgupta
- 6.

Overview essays:

1. Robert Costanza, John Cumberland, Herman Daly, Robert Goodland and Richard Norgaard, 1997, 'Section 3.5 of Chapter 3: Problems and Principles of Ecological Economics', in *An Introduction to Ecological Economics*, St. Lucie Press and International Society for Ecological Economics (ISEE)

Technical preliminaries:

1. Anthony M H Clayton and Nicholas J Radcliffe, 1996, *Sustainability: A systems approach*, Earthscan [selected chapters, esp '1: Introduction', '2: General Systems Theory', '3: Complex Adaptive Systems', '5: Ecosystem Economics', '8: Discounting and Investment']

Additional Readings:

1. David Pearce and Giles Atkinson, 1995, 'Measuring Sustainable Development' in Daniel W Bromley, *Handbook of Environmental Economics*, Blackwell Handbooks in Economics, pp. 166-181
2. Salah El Serafy, 1997, 'Green Accounting and Economic Policy', *Ecological Economics*, 21, pp. 217-229
3. Salah El Serafy, 2001, 'Steering by the right compass: the quest for a better assessment of the national product', in Ekko C Van Ierland, Jan van der Straten and Herman Vollebergh, eds., *Economic Growth and Valuation of the Environment*, Edward Elgar, pp. 189-210
4. David Pearce, Kirk Hamilton and Giles Atkinson, 2001, 'Valuing Nature' in Ekko C Van Ierland, Jan van der Straten and Herman Vollebergh, eds.,

- Economic Growth and Valuation of the Environment*, Edward Elgar, pp. 211-224
5. Sylvie Faucheux and Martin O'Connor, 2001, 'Natural Capital, the greened national product and the monetization frontier' in Ekko C Van Ierland, Jan van der Straten and Herman Vollebergh, eds., *Economic Growth and Valuation of the Environment*, Edward Elgar, pp. 225-274
 6. K Hamilton and M Clemens, 1997, 'Chapter 2: Are we saving enough for the future?' in *Expanding the Measure of Wealth: indicators of environmentally sustainable development*, World Bank, Washington DC, pp. 7-18.
 7. Kirk Hamilton, 2010, 'Wealth, Saving and Sustainability' in Geoffrey Heal, ed., *Is Economic Growth Sustainable?*, Palgrave Macmillan and International Economic Association
 8. Partha Dasgupta and Karl Goral Maler, 2009, 'Environmental and Resource Economics: Some Recent Developments' in Kanchan Chopra and Vikram Dayal, eds., *Handbook of Environmental Economics in India*, OUP, New Delhi.
 9. GoI, 2013, 'Green National Accounts in India: a framework', Report of Expert Group [Chair: Partha Dasgupta], National Statistical Organization, Ministry of Statistics and Programme Implementation, Government of India.
 10. Ahmed Hussain, 2013, 'Chapter 14: Green Accounting and Alternative Indicators of Sustainability' in *Principles of Environmental Economics and Sustainability: an integrated economic and ecological approach*, Third Edition, Routledge.
 11. Kenneth J Arrow, Partha Dasgupta, Lawrence H Goulder, Kevin Mumford and Kirsten Oleson, 2010, 'China, the US, and Sustainability: Perspectives based on Comprehensive Wealth, in Geoffrey Heal, ed., *Is Economic Growth Sustainable?*, Palgrave Macmillan and International Economic Association
 12. Paul Burrows, 1995, 'Nonconvexities and the Theory of External Costs' in Daniel W Bromley, *Handbook of Environmental Economics*, Blackwell Handbooks in Economics, pp. 243-271

Advanced reading:

1. Roefie Hueting and Bart de Boer, 2001, 'Environmental Valuation and Sustainable national income' in Ekko C Van Ierland, Jan van der Straten and Herman Vollebergh, eds., *Economic Growth and Valuation of the Environment*, Edward Elgar, pp. 17-77

4. Economic Growth and Environment/Ecology

Preliminary

W Arthur Lewis, 1955, 'Appendix: Is economic growth desirable' in *The Theory of Economic Growth*, Routledge.

A. Economic Growth and 'Sustainability'

Readings:

Michael A. Toman, John Pezzy and Jeffrey Krautkraemer, 1995, 'Neoclassical Economic Growth Theory and "Sustainability"', in Daniel W Bromley, *Handbook of Environmental Economics*, Blackwell Handbooks in Economics, pp. 139-165

B. Environmental Kuznets Curve

Readings

David I Stern, 1998, 'Progress on the Environmental Kuznets Curve', *Environment and Development Economics*, 3, pp. 173-196

C. Trade and Environment

Readings

1. Brian R Copeland, 2010, 'How does trade affect the environment?' in Geoffrey Heal, ed., *Is Economic Growth Sustainable?*, Palgrave Macmillan and International Economic Association.
- D. Economic Growth, Green Growth, De-growth, Low Carbon inclusive Growth, Just Growth
- E. Physical Accounting (and Dematerialisation), Energy Accounting, , Social Accounting Matrix

General Readings:

D Worster, *Nature's Economy: A history of ecological ideas*

Helmut Haberl, Fridolin Krausmann, and Simone Gingrich, 2006, 'Ecological Embeddedness of the Economy: A Socioecological Perspective on Humanity's Economic Activities 1700-2000', *EPW*, November 25

Anil Agarwal, ed. 1991, *The economy of balance* (selected chapters, esp part I), CSE

Jairam Ramesh, 2010, 'The two culture revisited: the environment-development debate in India', *EPW*, 55 (42), pp. 13-16

Divya Karnad, Meghna Krishnadas, Tarun Nair, 2013, 'Budgeting for Nature: Economic Growth and Ecosystem Conservation in India', *EPW*, 58 (25), pp. 22-26

Asheem Srivastava and Ashish Kothari, 2012, *Churning the Earth: the making of global India*, Viking.

Joshua Farley, Jon D. Erickson, and Herman E. Daly, 2005, *Ecological Economics: A Workbook for Problem-Based Learning*, Island Press.