

Economics of Natural Resources

ECO 6143 (Fall 2007)

University of Ottawa

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Professor:

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We analyze some of the main problems regarding the exploitation of natural resources. The objective is to gain a better understanding as to why agents take decisions that lead to sub-optimal uses of natural resources. The role of the state and political-economic issues are discussed. The course is intended to be relevant to both developed and developing countries.

We first consider static models of resource use. This provides a simple framework to analyze basic institutional arrangements and some policy implications.

Dynamic models of natural-resource use are considered in the second part. We consider explicitly the cases of fisheries and non-renewable resources, such as mineral and oil deposits. Extensions to other resources, such as water, forest, game, or pastures, may be introduced. Some policy measures are discussed.

In the final part of the course, we analyze in more details how institutions affect decisions to use resources.

Evaluation: There will be two mid-term tests and one final exam counting for 20% and 40% respectively. The final exam is cumulative.

Although a course in natural-resource economics can be somewhat technical, it remains a course in economics as a social science. Much emphasis is thus put on interpreting the results and discussing their implications for society and economic policy. *The evaluation will reflect this.*

The ability to interpret and discuss results can only be properly achieved through long-term maturation of ideas. Students are thus expected to be up-to-date in their weekly material. To this end, exercises will be assigned every week. An *individual hand-written* copy is to be submitted the following week *in person* during the class break. Solutions will be provided but individual copies will not be corrected. It goes without saying that class attendance is mandatory. Assiduous attendance and assignment completion will make up for the last 20%.

N.B. My **Office hours** are on Tuesdays 15h00-17h00 (please double-check the course's website for eventual changes of hours). Students are expected to consult the courses' web page on a weekly basis for up-to-date information regarding assignments, mid-term dates, office hours changes, etc.

THEMES¹

0. Introduction

A. Static Analysis of Resource Exploitation

1. **Review:** Elements of Game theory
 - References: (Varian 1992, 15.1 to 15.4)
2. Land use, Land Value, and the Concept of Rents
 - References: (Hartwick and Olewiler 1998, ch 3)
3. Resources, Population, and Malthusian Growth
4. Exclusive Property and Free Access
 - Read: (Dasgupta and Heal 1979, ch 3, except section 6) (Gordon 1954, Hardin 1968)
 - References: (Eggertsson 1990, chap 4)(Hartwick and Olewiler 1998, ch 3)(Smith 1968, Brooks, Murray, Salant and Weise 1999, Hardin 1968, Cheung 1970)
5. A General Equilibrium Analysis of Rural Privatization: Efficiency and Distributional Considerations
 - Read: (Cohen and Weitzman 1975)
 - References: (Samuelson 1974)
6. The Anti-Commons
 - Ref (Buchanan and Yoon 2000, Heller 1998)

B. Dynamic Models of Resource Exploitation

1. Resource Depletion, Scarcity, and Sustainability
 - References (Perman, Ma, McGilvray and Common 2003, ch 2 and 14)(Hanley, Shogren and White 1997, ch 8)
2. Elements of Capital Theory
 - Ref (Hanley et al. 1997, ch 7)(Clark 1976, chapter 3)(Nicholson 1992, chapter 24)
3. Introduction to optimal control and the maximum principle
 - Read: (Chiang and Wainwright 2005, chapter 20)
 - References: (Perman et al. 2003, ch 14 and website)(Chiang 1992)

¹Themes, references, and their timing are subject to change.

4. The Economics of the Fishery

(a) Steady-State Analysis

- Read: (Perman et al. 2003, ch 17, sections ??)
- References: (Hartwick and Olewiler 1998, ch 4)(Pearce and Turner 1990, ch 17)

(b) The Industry Supply Curve

- References: (Hartwick and Olewiler 1998, ch 4)

(c) Dynamics and Present-Value Maximizing

- Read: (Perman et al. 2003, ch 17)

(d) Regulation of the Fishery

- References: (Perman et al. 2003, ch 17)(Hartwick and Olewiler 1998, ch 5)(Conrad and Clark 1987, section 2.8)(Baumol and Oates 1988, p. 237-38)(Weitzman 1974)(Dasgupta and Heal 1979, sections 1 to 3)

5. The Economics of Non-Renewable Resources

(a) A basic two-period model

(b) The T-period problem in discrete time

(c) The social optimum with rising prices

(d) The competitive mineral industry

(e) Continuous-time analysis

- Read: (Perman et al. 2003, ch 15)
- References: (Hartwick and Olewiler 1998, ch 8)(Pearce and Turner 1990, ch 15)

6. The Economics of Forest and Water Resources (*if time permits*)

C. Property Regimes, Transaction Costs, Conflict and Cooperation

1. **Review:** Elements of Game theory

- Read: (Varian 1992, 15.4 (mixed strategy) to 15.6, 15.10, 15.11)

2. Coase's Insights

- Ref (Coase, 1960; Coleman, 1990, chap. 3)

3. Privatization with Exogenous Transaction Costs: Reconsidering Efficiency

- References: (Samuelson 1974, Cohen and Weitzman 1975, de Meza and Gould 1992)

4. Endogenous Enforcement, Conflict and Resource Exploitation
 - Read: (Mendelsohn 1994, Hotte 2001, Hotte 2005)
5. Common Property Resources and Cooperation
 - Read: (Stevenson 1991, Seabright 1993)
 - References: (Ostrom 1990, chap 1, 2 and 3)(Baland and Platteau 1996, chap 4, 5 and 6 (NB Electronic version at library)) (Coleman 1990, chap 9 and 10)(Eggertsson 1990, chap 2 and 3)(Ostrom 2000)(Dayton-Johnson and Bardhan 2002)
6. Evolution of Property Regimes
 - Read: (Fitzpatrick 2006)
 - Ref (Sethi and Somanathan 1996)(Eggertsson 1990, chap 8)(Coleman 1990, chap 11 and 12)(Deiniger 2003)
7. Population Growth and Renewable Resources
 - Ref (Brander and Taylor 1998, André and Platteau 1998, Brander 2007)

References

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