

## Course requirements

- **Essay / short paper** (2000-2500 words): 25%
- **Presentation** (15min + 15min discussion): 25%
- **Oral exam** (based on essay & presentation): 50%


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## Timeline

Date		
18.2.	Institutions	
25.2.	Institutions II	
4.3.	Classical Institutionalism and New Institutional Economics	
11.3.	Property rights and resource regimes, Commons	
18.3.	Doughnut Economics: From Planetary Boundaries to thinking how an economy can be regenerative by design (Claudio Cattaneo)	
25.3.	Application of the doughnut at the city scale with Barcelona as an example (Claudio Cattaneo)	
1.4.	Ecological Resource Economics	
8.4.	Applications: water, forests, fisheries	
15.4.	<Great Friday>	
22.4.	The Water–Energy–Food Nexus in India	
29.4.	Q&A, discussion	
6.5.	Presentations I	
13.5.	Presentations II	
20.5.	Debate, Open Space, Experiment	

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R. QUENTIN GRAFTON,  
WIKTOR ADAMOWICZ, DIANE DUPONT,  
HARRY NELSON, ROBERT J. HILL,  
AND STEVEN RENZETTI

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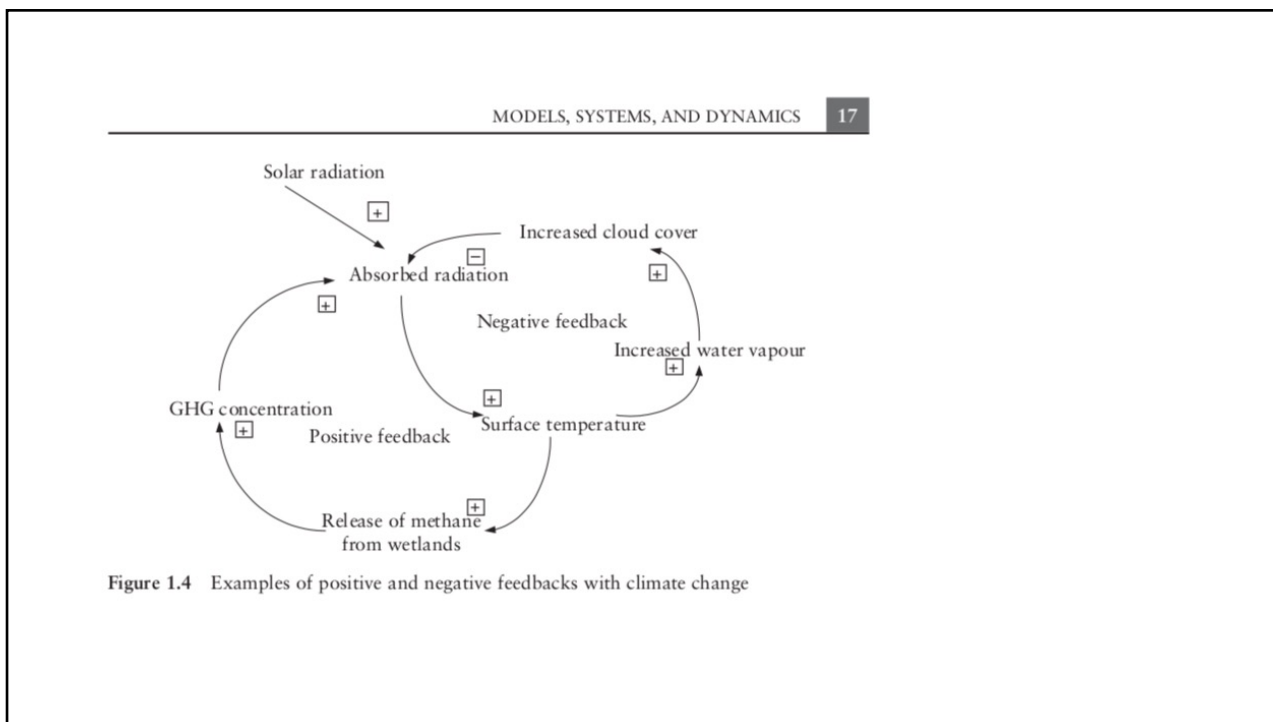
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**THE**

# ECONOMICS OF THE ENVIRONMENT AND NATURAL RESOURCES

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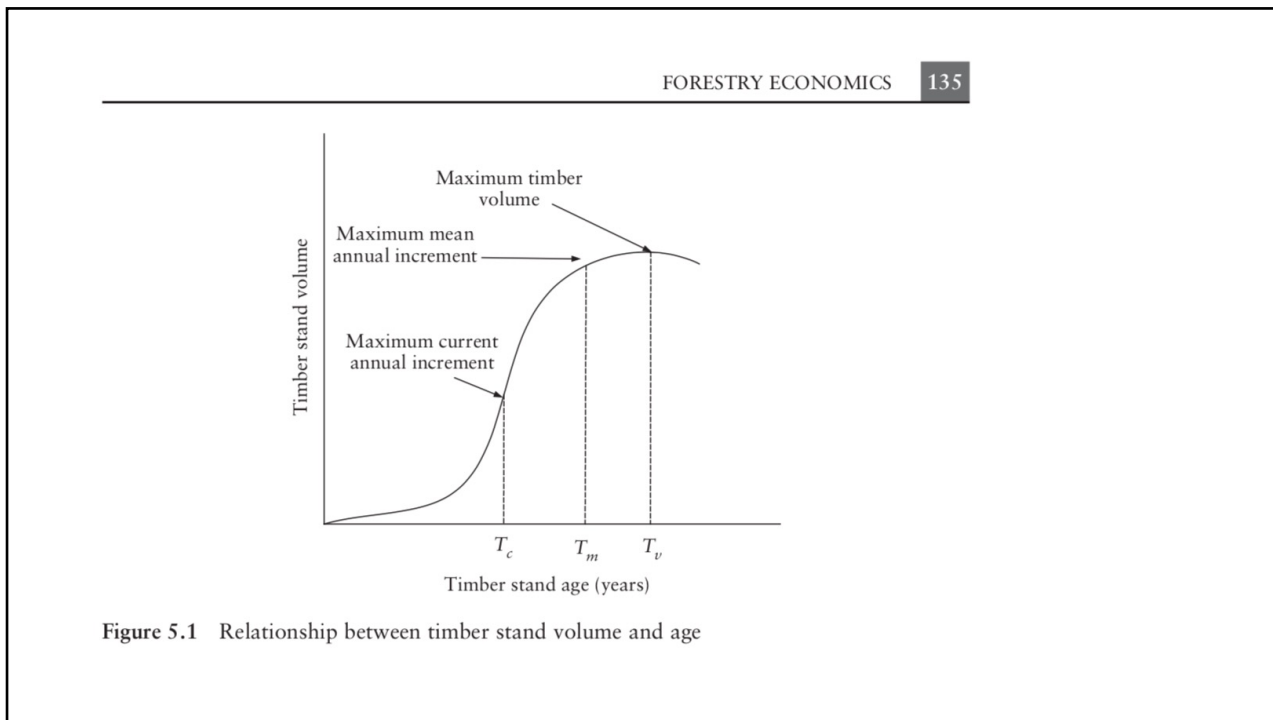


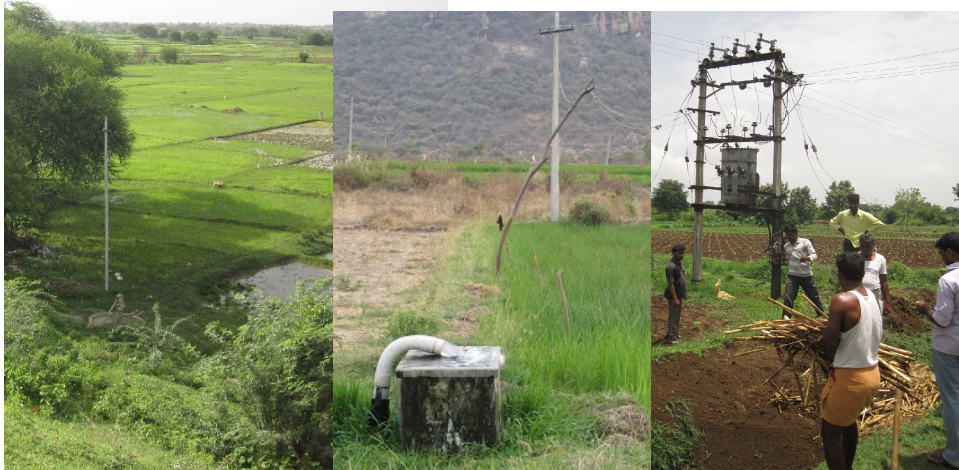
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## Governing the commons



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### The “discovery” of common-pool resource governance

- **Theory:** Market vs. State, Public vs. Private (dichotomies)
- **Challenge:** Global resource over-exploitation
- **Solution:** Privatization or state ownership (framed as “tragedy of the commons”) (Hardin, 1968)
- **Alternative:** Community-based resource management (common property regime) with rules (of access, use, maintenance) (E.Ostrom, 1990)
- **Parallel:** Centralization of public goods versus polycentric governance (V.Ostrom, Tiebout, Warren, 1961)

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### Characteristics of Goods and Services

		Excludability	
		High	Low
Subtract-ability of use	High	Private Goods	Common-Pool Resources (also Open Access R.)
	Low	Club Goods (Toll Goods)	Public Goods (Collective Goods)

- Binary distinction between Private and Public Goods (Samuelson)
- Club Goods (Buchanan, 1965)
- Common-Pool Resources (subtractability rather than rivalry, low-high continuum) (V.Ostrom and E.Ostrom, 1977)

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### Property Regimes

- Property Rights include **Rights and Duties/Obligations** (streams of benefits and costs)

Property Regime	Owner	Owner rights	Owner duties
Private Property	Individual	Socially acceptable uses, control of assets	Avoidance of socially unacceptable uses
Common Property	Collective	Exclusion of non-owners	Maintenance, constrain rate of use
State Property	Citizens	Determine rules	Maintain social objectives
Open Access	None	Capture	None

Source: Hanna et al. 1996

- "Tragedy of the Commons" → "Open Access"  
→ **not** Common Property Regime

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**Elinor Ostrom** received the 2009 Nobel Memorial Prize in Economic Sciences

**"for her analysis of economic governance, especially the commons"**

She entitled her Nobel Address

**"The Polycentric Governance of Complex Economic Systems"**

Available here:

<https://www.youtube.com/watch?v=T6OgRki5SgM>

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### Characteristics of Goods and Services

		Excludability	
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Subtract-ability of use	High	<b>Private Goods</b>	<b>Common-Pool Resources (also Open Access R.)</b>
	Low	<b>Club Goods (Toll Goods)</b>	<b>Public Goods (Collective Goods)</b>



- CPRs ≠ Commons (incl. Public Goods) ≠ Common property regime
- How would you describe the following goods and services?  
Food item; swimming pool; television; cinema; movie screening in a cinema; book (copyright license, commons license); Wikipedia; national social security system; land; water; global atmosphere; biodiversity?

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### Characteristics of Goods and Services

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- Many goods and services provided by ecosystems show characteristics of public goods (PG) or common-pool resources (CPR)
- Low excludability provides incentive to free-ride → May result in over-use (CPR & OAR) or insufficient provision (PG)
- Low excludability may be technically or normatively determined, and may, thus, change over time

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PROPERTY RIGHTS 37

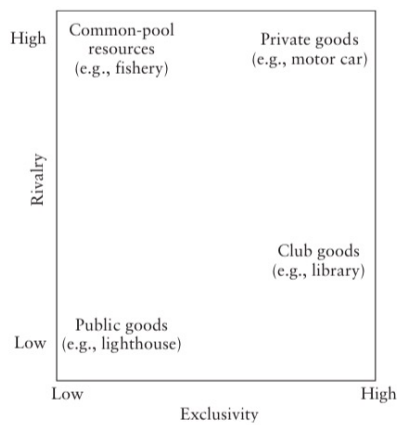


Figure 2.1 Classification of goods by exclusivity and rivalry in use

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## Commons in Czechia

What are common-pool resources in Czechia, and how are they governed?

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## Commons, Climate, and International Relations

- **Why the climate could be a common good, but is still open access**
- **And why the climate problem is not a Prisoner's Dilemma**

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# The problem of social order and the Prisoner's Dilemma story

		Individual A	
		Cooperate	Defect
All others	Cooperate	(I) 10 10	(II) 15 -10
	Defect	(III) -10 15	(IV) -5 -5

Panel I

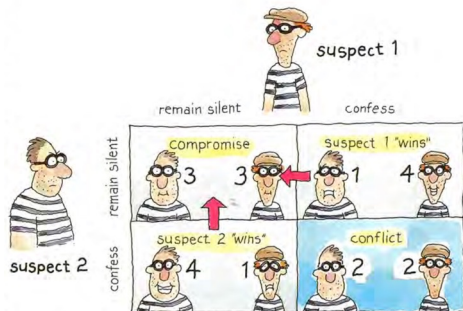
		Individual A	
		Cooperate	Defect
All others	Cooperate	(I) 10 10	(II) 5 -10
	Defect	(III) -10 5	(IV) -15 -15

Panel II

Vatn 2005, p. 27

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## Prisoners' Dilemma (PD)



(Brams, 1993, *American Scientist*)

- Widely used to study cooperation in biology, ecology, philosophy, law, social sciences

*Self-interest produces worse outcome?*



		resource user 1	
		use sustainably	exploit egoistically
resource user 2	use sustainably	3 3	4 1
	exploit egoistically	4 4	2 2

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## CPR management and the PD

*“The two-person iterated PD is the E. coli of the social sciences”*  
(Axelrod 1997)



PD mentioned in >3000 law review articles, other models virtually ignored  
(McAdams 2008)



Common-pool resources are not PDs  
(Runge 1981, Cole and Grossman 2014)

➤ **Research question:**

Is CPR management best represented by PD models?  
(e.g. model simplifications in macroeconomics & financial crisis)



➤ Implications for teaching

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## PD models – a success story

1950

First mentioning of the PD model  
(Dresher and Flood 1950, Tucker 1950)

*“Tragedy of the Commons”*  
(Hardin 1968)

Common-pool resource = PD  
(Dawes 1973)

➤ Privatization or State

*“Cooperation among egoists”:*  
Repeated PDs, TIT-for-TAT  
(Axelrod 1981)

*Governing the Commons*  
(Ostrom 1990)

➤ Beyond market vs. state

2010

- Reciprocity, Fairness, and Folk Theorems of repeated PDs
- Widely used in biology, ecology, philosophy, law, social sciences

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## PD models – a success story?

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Governing the Commons  
(Ostrom 1990)

2010

Assurance Problem  
(Sen 1967)

Isolation Paradox, Assurance  
in CPRs  
(Runge 1981)

Herder Problem =  
Assurance Problem  
(Cole and Grossman 2010)

- Reciprocity, Fairness, and Folk Theorems of repeated PDs
- Widely used in biology, ecology, philosophy, law, social sciences

➤ Axelrod (1981) cited 30.000 times!      ➤ Runge (1981) cited 420 times

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## Assurance Problem (AP)

“Stag Hunt”  
(Rousseau 1755, game-theoretic interpretation by Lewis 1969)

- Strategies depend on **beliefs** about the likely choices of others
- **Expectations** can create self-fulfilling outcomes
- Strategic and resource **uncertainties**

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## Differences between PD and AP

### Prisoners' Dilemma (PD)

		RU <sub>1</sub>	
		C cooperate	D defect
RU <sub>2</sub>	C	3, 3	1, 4
	D	4, 1	2, 2

(Dresher, Flood, Tucker 1950)

- Independent decisions (in one-stage models)
- Cooperation difficult

### Assurance Problem (AP)

		RU <sub>1</sub>	
		C	D
RU <sub>2</sub>	C	4, 4	1, 3
	D	3, 1	2, 2

(Sen 1967)

- Interdependent decisions, jointness of production
- Cooperation possible

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