



Agricultural and Food Policy (4201-410)

Agri-Environmental Policy

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Daily, 14.15 – 17.30, HS 23

Lecture notes and further information:
<http://www.uni-hohenheim.de/apo>



Agri-Environmental Policy in the context of Environmental and Natural Resource Economics



ENVIRONMENTAL and NATURAL RESOURCE ECONOMICS

is the application of the principles of economics to the study of how environmental and natural resources are developed and managed.

- ⇒ **Natural resources:** Resources provided by nature that can be divided into increasingly smaller units and allocated at the margin, e.g. oil, minerals, soils, water, wood, fibres, fish etc..
- ⇒ **Environmental resources:** Resources provided by nature that are indivisible (e.g. ecosystems, landscape, ozone layer).
- ↪ Natural resources serve as inputs to the economic system. Environmental resources are affected by the system (e.g. pollution).

Origin of Resource Policy Issues



Resource Policy Issues arise due to

- **Scarcity** (cf. previous lecture)
- **Difference in values placed on goods**
- **Property Rights**
- **Public Goods** (cf. previous lecture)

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Origin of Resource Policy Issues



PROPERTY RIGHTS

= an individual's power to use, benefit from, and exclude others from using particular resources.

- A *right* is a legally enforceable expectation. It involves an 'assurance' that an activity will be protected by the legal system.
- Property rights can be **private**, **common**, **public** or **absent** (open access).

⇒ But: no right is absolute.

"In a world of scarcity, it is impossible to implement freedom for everyone. One's person freedoms and opportunities are a cost to another. Rights defining opportunities can be understood by looking at the reciprocal relationships of people with incompatible preferences"

(Schmid, A. (1988): The idea of property: A way to think about soil and water uses)

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Origin of Resource Policy Issues



DIFFERENCE IN VALUES PLACED ON GOODS

- ⇒ Example: what is water worth ?
 - Its value depends on its availability and the use to which it is put.
 - Differences in demand create an inherent conflict among interest groups over a limited water supply.
- ⇒ These differences in value permeate resource policy issues.
- ⇒ Example: farmers and ranchers almost certainly place different value on coyotes, wolves, or other endangered species than the wildlife advocates.
- ⇒ Conflicts in values often lead to laws, restricting how resources are used.

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VALUE PLACED ON RESOURCES



- ⇒ **Every resource has value.**
Who determines that value and the constraints placed on the process of value determination are central concerns of resource policy.

MARKET VALUE:

- = the price that a resource will receive in the marketplace
- ⇒ it is determined by the conditions under which a resource is sold (e.g. wetlands may have greater market value if they can be drained and used for agriculture)

NONMARKET VALUE:

- = value of a resource or activity that is not revealed in the marketplace.
- ⇒ an estimate, understanding, or judgement of the non-market value relative to the market value is required for informed policy decisions

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VALUE PLACED ON RESOURCES



NON-MARKET VALUES originate from 3 primary sources:

CURRENT USE VALUE

⇒ involves the benefits derived from consumptive or nonconsumptive benefits or costs derived from a good not valued by the market.

OPTIONAL USE VALUE

⇒ involves the willingness to pay a premium to ensure the future availability of an amenity, even if it is not currently used.

EXISTENCE VALUE

⇒ involves benefits derived from seeing that a resource is available to future generations or that a resource is left undisturbed regardless of its current or optional use value.

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VALUE PLACED ON RESOURCES



TECHNIQUES TO DETERMINE NON-MARKET VALUES:

PROPERTY VALUE

⇒ indirect measure of non-market values by comparing the market value of property having different environmentally relevant characteristics

TRAVEL COST

⇒ tabulating the amount of money spent visiting a site
⇒ provides an indication of the price people are willing to pay for the use of the site

CONTINGENT VALUE

⇒ consumers are asked to place value on certain non-market attributes
⇒ optional use values and existence values can be measured (e.g. consumers willingness to pay to avoid location of a solid waste landfill near their community)

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RESOURCE POLICY CHOICES: WHO PAYS ?



POLICY OPTIONS:

MARKET DETERMINATION

- ⇒ market prices are used to allocate resources;
- ⇒ they reflect only the values of those who are willing and able to pay;
- ⇒ they reflect basic self-interest economic motives of profit and utility maximization.

SUBSIDIES

- ⇒ pay people for engaging in certain specific practices;
- ⇒ also referred as incentive payments or green payments;
- ⇒ the effect of a subsidy is to reduce the marginal cost of engaging in a certain practice so that the marginal revenue from the practice will be higher than the marginal cost.

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RESOURCE POLICY CHOICES: WHO PAYS ?



POLICY OPTIONS (contd.):

TAXES

- ⇒ are designed to internalize the cost of externalities associated with a resource problem;
- ⇒ the effect of the tax is to increase the cost of the input, resulting in its use in reduced quantities;
- ⇒ how effective a tax is to reach its intended objective depends on the elasticity of the demand for the good.

TRANSFERABLE EMISSION PERMITS

- ⇒ Firms are issued permits to emit pollutants
- ⇒ Firms can buy and sell permits

REGULATIONS

- ⇒ are mandated government actions;
- ⇒ compliance is assured through penalties for noncompliance.

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The Polluter-Pays-Principle (PPP)



⇒ principle that those causing pollution should meet the costs to which it gives rise.

The PPP is a principle that is to be used for allocating costs of pollution prevention and control measures to encourage rational use of scarce environmental resources and to avoid distortions in international trade and investment.

The PPP means that *the polluter should bear expenses* for carrying out measures decided by public authorities to ensure that the environment is in an acceptable state. In other words, the cost of these measures should be reflected in the cost of goods and services, which cause pollution in production and/or consumption. Such measures should not be accompanied by subsidies that would create significant distortions in international trade and investment.

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Agriculture and Environment - Environmental Impacts of Agriculture



The main environmental impacts of agriculture may be characterised through the *beneficial* or *harmful* contribution of agricultural activities to:

- **Soil quality**
(erosion, nutrient supply, moisture balance, salinity)
- **Land quantity**
(area of ecological management of agricultural land)
- **Water quality**
(nutrient, pesticide and sediment runoff and leaching, salinity)
- **Water quantity**
(irrigation consumption, use efficiency, water retention capacity, flood prevention)

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Agriculture and Environment

- Environmental Impacts of Agriculture



- **Air quality**
(emissions of dust, odours, ammonia and greenhouse gas, absorption of carbon dioxide)
- **Biodiversity**
(farm and indigenous animal and plant diversity)
- **Wildlife and semi-natural habitats**
(diversity of animal and plant habitats associated with farming)
- **Rural landscape**
(environmental features of areas shaped by farming, including those associated with historic buildings and landmarks; it's more and aesthetic and cultural issue)

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Agriculture and Environment



Agricultural support: what are the linkages with the environment?

- Commodity production linked support often exacerbates pressure on the environment.
 - The more a policy measure stimulates increased production, the greater the pressure on the environment.
- ⇒ A reduction of production-linked support (maybe together with environmentally targeted support) can ease environmental pressure.

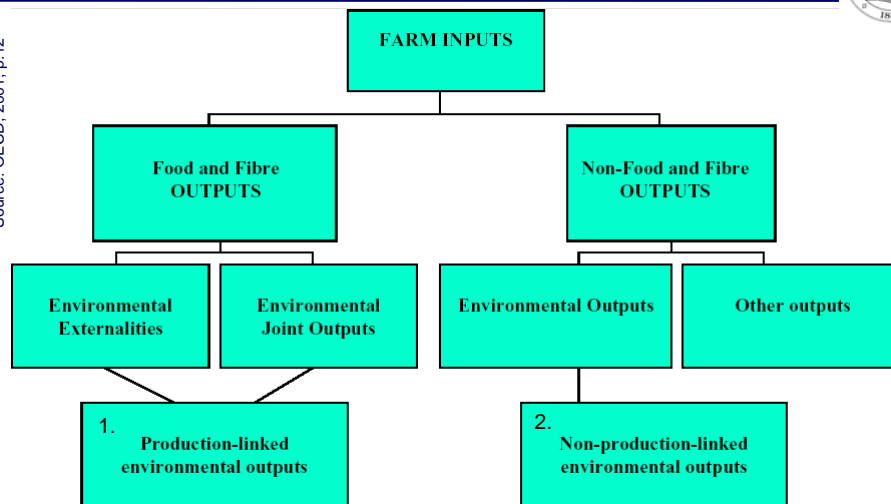
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Agriculture and Environment

- Use of Farm Inputs and Environmental Impacts of Agriculture



Source: OECD, 2001, p.12



1: result from the farmer's decision to produce food and fibre

2: produced from a decision by farmers to produce the environmental output

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Agriculture and Environment

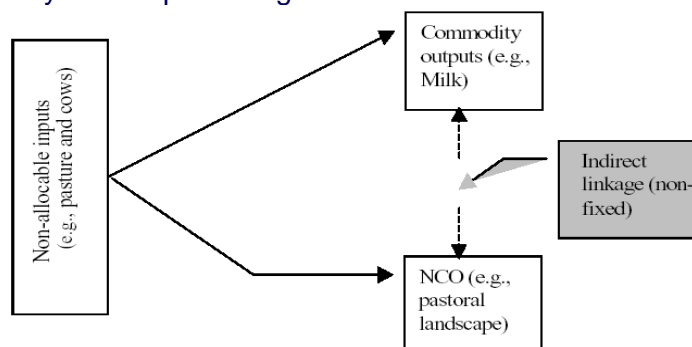
- Use of Farm Inputs and Environmental Impacts of Agriculture



Indirect linkages between non-commodity outputs and commodity production

E.g.: price incentive to produce milk, in order to preserve a pastoral landscape of which grazing cows are an element, could result in a deterioration of the landscape if farmers choose to move to an intensive feedlot system of producing milk.

Linkages with non-allocable inputs may create "indirect" linkages between NCOs and Commodity outputs



Source: OECD (2003): Multifunctionality: The Policy Implications, p.14

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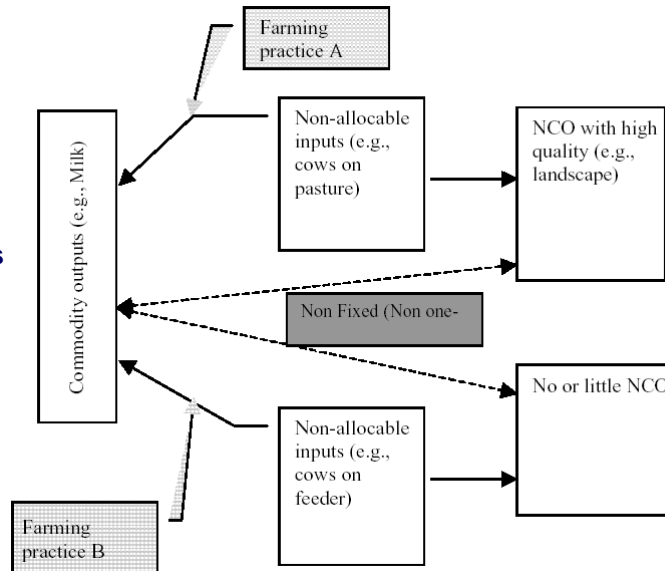
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- Use of Farm Inputs and Environmental Impacts of Agriculture



But:

indirect linkages are not "fixed" because they depend on farming practices



Source: OECD (2003): Multifunctionality : The Policy Implications, p.14

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- General Criteria for Policy Action



General criteria to determine whether there is a case for any policy action to improve environmental performance:

1. Is there **evidence** that there is a **demand** to enhance environmental benefits, and/or a **need to reduce** environmental costs currently generated by farmers?
2. Is it **technically possible and economically efficient** to change current farming practices?
What are the desired environmental **target levels** ?
3. Are current farming practices covered by existing farmers' **property rights**?

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- How to choose appropriate agri-environmental policy measures?



Alternative options to achieve a given environmental objective or outcome may be characterised by the following elements:

- The **environmental target** defined in terms of the level of emissions, farming practices or environmental output.
- The **policy instrument** defined by the type of instrument - incentive (payment) or disincentive (tax).
- The **instrument target** defined by the primary incidence or economic level of application of the instrument.
- The **policy target** defined in terms of the primary incidence or geographical level of application of the policy.

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- Design and implementation of agri-environmental measures

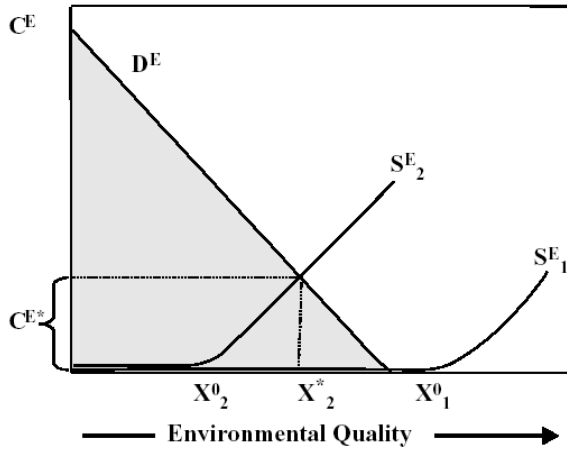


- **Production-linked environmental harm**
When farmers' property rights do not cover the prevailing farming practices → the costs of reducing should be at the expense of the farmers.
- **Production-linked beneficial environmental outputs**
Up to the level where the demand is satisfied at zero additional costs to farmers, there is no reason for any policy action.
- **Some non-production-linked environmental outputs** are amenities linked to farm features. Up to the level where the demand for such amenities is satisfied at zero additional costs, there is no reason for any policy action.
- **Other non-production-linked environmental outputs** are not linked to farm features → satisfied by farmers if appropriate incentives are in place.

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- Agricultural Production and Externality Output



⇒ Economic relationship between agriculture and the associated environmental outcome (externality or output).

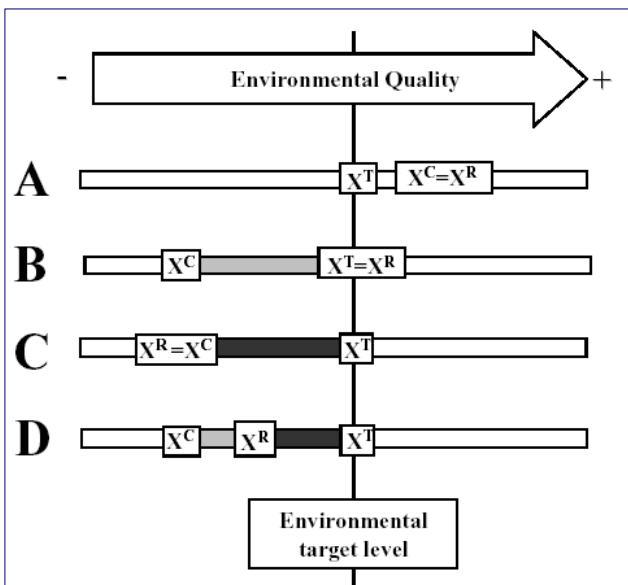
S^E = supply D^E = demand
 X^0 = environmental quality C^E = cost

Source: OECD, 2001, p.47

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- Allocation of Environmental Costs and Benefits



⇒ **Environmental reference levels**

- X^T Environmental target
- X^C Current farm practice
- X^R Reference level
- Environmental Charges
- Environmental Payments

Source: OECD, 2001, p.51

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- Agri-environmental Measures/Schemes in the EU



- Designed to encourage farmers to protect and enhance environment on their farmland.
- It provides payments to farmers in return for a service.
- Eg. EU: Co-financed by the EU and the Member States.
- Designed at national, regional or local level.
- Broad objectives:
 - Reducing environmental risks
 - Preserving nature and cultivated landscapes
- Have to go beyond Good Farming Practice (GFP).

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- Measures related to *productive* land management



- Input reduction
- Organic farming
- Extensification of livestock
- Conversion of arable land to grassland and rotation measures
- Undersowing and cover crops, strips and preventing erosion/fire
- Actions in areas of special biodiversity/nature interest
- Genetic diversity
- Maintenance of existing sustainable and extensive systems
- Farmed landscape
- Water use reduction measures

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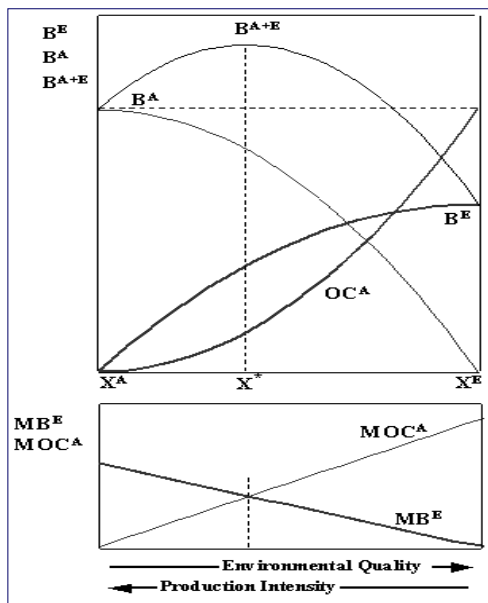
- Measures related to *non-productive* land management



- Set aside
- Upkeep of abandoned farm land and woodland
- Maintenance of the countryside and landscape features
- Public access

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ALLOCATION of RESOURCES to AGRICULTURAL PRODUCTION and the PROVISION of ENVIRONMENTAL QUALITY



B = Benefit
 E = Environment
 A = Agriculture
 X = max. Benefit
 M = Marginal
 OC = Opportunity
 Cost

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