

## What Is Economics?

Economics analyzes and evaluates what people produce and consume; the patterns of trade (what is bought and sold and at what price); and how time is allocated, income is distributed, and wealth is accumulated.

Economics analyzes the behavior of individuals (consumers, producers, and farmers), institutions, nations, and the global economy.

Economic research is both positive (explains behavior) and normative (evaluates outcomes and presents policies to improve the situation).

The key assumption in economics is that individuals are rational and pursue self-interest. People make their own choices and do what is good for them. Economics tries to predict behavior which follows these assumptions under alternative conditions.

Economists put much effort in understanding the behavior of prices and performance of markets. Economists also analyze outcomes under alternative legal systems, property right regimes, and community arrangements. Understanding and comparing performances of alternative institutions is a major interest to economists.

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### Major Areas of Economics

**Microeconomics:** Studies the behavior of individuals (consumers, firms) and their interactions within markets. Provides basic theory to

the more applied field.

**Macroeconomics:** Analyzes the performances of the economy as a whole. Attempts to understand and predict unemployment and inflation rates and the causes of recessions and depression. Provides the foundation for government intervention in the economy.

**International Trade:** Analyzes exchange between nations. Explains patterns of export and import, relative strength of currencies, etc.

**Public Economics:** Analyzes when and how the government should interfere in the economy to finance government. It develops methodologies for assessing public projects and compares the performance of alternative taxing schemes.

**Development Economics:** Studies economies in less-developed countries. Tries to analyze issues of poverty, industrialization, and agricultural reform.

**Industrial Organization:** Studies the behavior of industries with noncompetitive markets. Analyzes the behavior of companies with market power in terms of product development, promotion, pricing, and sales and especially interested in the interaction between firms.

**Game Theory:** A new conceptual approach to study strategic behavior in the economy. It plays a growing role in industrial organization and the branches of economics.

**Econometrics:** Develops methodologies to apply statistical techniques to analyze economic issues. Econometrics is used to provide estimates of economic variable and to test economic theories.

**Other Fields:**

Labor Economics

Law and Economics

Public Health Economics

**Agricultural Economics:** Studies the behavior of the agricultural sector. Issues include:

- a. Farm Management
- b. Agricultural Prices and Trade
- c. Agricultural Policy
- d. Rural Development

***Environmental and Resource Economics:*** Analyzes patterns of use of natural resources—both nonrenewable (oil, minerals) and renewable (forests, fish). Studies issues of environmental quality and pollution control. Investigates management of ecosystems, conditions for resource preservation, and sustainability.

All fields of economics use similar tools and follow the same logic. However, applied fields adjust the theory to the peculiarities of the problems they address.

Our emphasis will be on microeconomics and how it applies to issues of natural resources, agriculture, the environment, and research management.

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### **Economic Research in Agricultural and Natural Resources**

***Positive Research:*** Explains choices and predicts outcomes. For example: studies analyze choices of conservation technology by farmers and estimate the likelihood of adoption of new technologies under alternative policies.

***Quantitative Studies:*** Estimate prices and quantities of food products. Predict impact of policy. Two important concepts in price estimation are supply and demand.

Demand denotes how much people want to buy at a given price. Demand changes with price and income. Quantitative studies also estimate supply of food.

Supply is the amount producers will be willing to sell as a function of price. Supply changes with prices and weather.

Demand and supply estimates are used to predict food prices.

Economics recognizes the importance of risk and uncertainty considerations in the analysis of choices. Studies on risk:

- Show that increase in uncertainty reduces production levels.
- Explain the evolution of alternative insurance schemes to address risky situations.
- Predict willingness to pay to reduce risk.
- Are used to design crop insurance.

**Normative Studies:** Determine efficient outcomes from a societal perspective.

Economic models show that markets may be the most efficient mechanisms to allocate resources under some circumstances (The invisible hand makes all people better when they trade.) However, there are situations of market failure, i.e., when markets lead to suboptimal outcomes.

Cases of market failure:

(1) **Externalities:** Situations when byproducts of production activities affect third parties (example: pollution).

When externalities exist, markets may lead to suboptimal outcome (for example, overpollution). Governments need to intervene and to reduce pollution.

Pollution-reducing policies include: pollution taxes, pollution regulations, and liability laws.

(2) **Public Goods:** Goods that cannot be charged for because of open access and use by many people (examples: basic knowledge, parks). Government needs to provide for this good.

Economists determine optimal provision of such goods considering their benefits and costs. Cost-benefit analysis is used to evaluate water projects, public transportation projects (roads), and educational efforts.

**Policy research** incorporates normative and positive elements.

For example, research on pesticides addresses:

- Pesticide productivity.
- Health effects on pesticides.
- Impacts of alternative policies:

Banning chemicals

Taxing chemicals

Labeling

Policy impacts include the overall economy; consumers, producers, and employment; comparisons of alternative policies

Research on agricultural policy includes:

- Impacts of subsidy programs and price-support policies.
  - Design of alternative mechanisms for privatizing agricultural trade.
- Impacts of GATT and NAFTA on agricultural trade.

International trade considerations are important elements of economic analysis.

There is much evidence that society and the world gain from free trade.

Barriers to trade cause losses and lead to trade wars.

## **Biology and Economics**

Biological knowledge is essential to policy modeling.

Economists need biologists to develop key relationships in many areas, for example:

In *pest control* areas:

- Pest management regime.
- Productivity of pesticides.
- Resistance dynamics.
- Predator/prey dynamics.
- Health effects of pesticides.
- Environmental effect of pesticides.

Incorporation of economics of biology will lead to:

- Design of pesticide taxes.
- Subsidies for biological control, scouting.
- Pesticides tolerance of food.

In the soil erosion area, biologists present:

- Data on soil erosion.
- Performance measure of tillage practices.
- Impacts of cropping practices on soil erosion.

That will lead to subsidies for terracing and optimal crop rotation strategies.

Other areas of policy where biological information is essential for economic analysis:

***Forest Policy:*** When policies lead to

- Optimal rotation and plantation.
- Incentive to private tree owners.
- Privatization design.

***Fishery management:*** In the case of fishery, there is a market failure because of open access.

Economics and fish dynamics lead to:

- Penalty of overfishing.
- Regulation of industry.

***Biodiversity:*** This problem is viewed by some as an inventory management problem. Issues include:

- What species to preserve or what ecosystem to preserve.
- What incentive to provide for preservation.

***Sustainability:*** There are many interpretations:

(1) Increased resilience of environmental systems.

(2) Preservation of biological systems:

- Fish species
- Forests.

Are sustainability and growth compatible? In many cases not. Economic growth has led to environmental deterioration. However, with the right incentive, economic growth and biological sustainability are compatible.

Incentives lead to adoption of conservation and technologies (drip irrigation, Integrated Pest Management) which increase output and improve environmental quality.

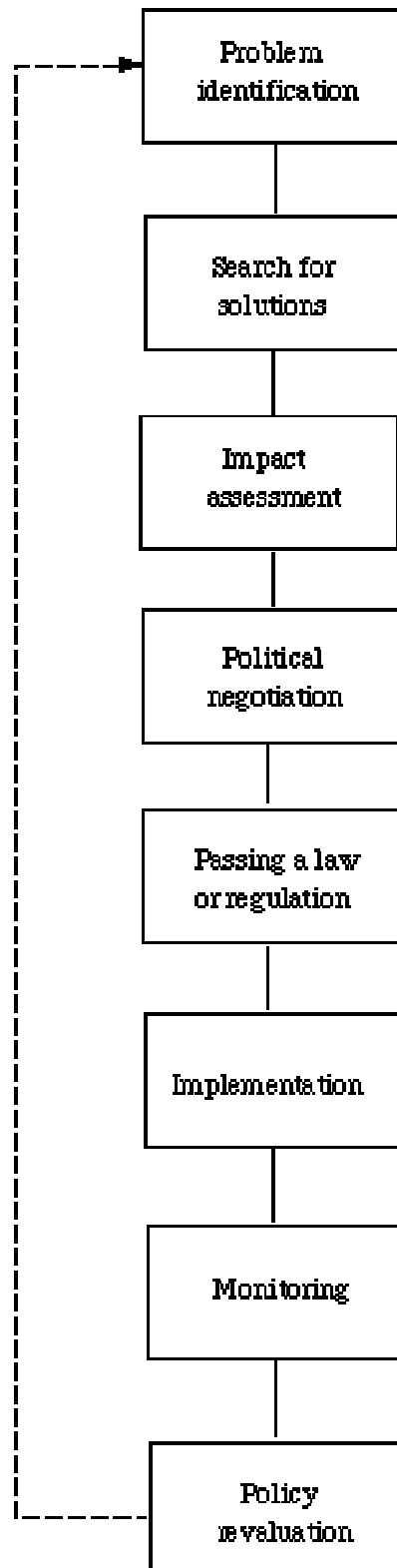
In the past, there were bad policies—no penalties on pollution or environmental damage that led to the decline of environmental quality. Concern for environmental quality led to new policies and regulation that will lead to adoption of environmental policies.

New technologies (biotechnology, computers) and environmental regulation will make agriculture greener.



## Economics in the Policy Process

The dynamics of a policy:



The reality is less neat than this stylized flow chart suggests.

Practitioners and scientists of all disciplines (including economists) are involved in the search for solutions.

Economic analysis is essential in impact assessments and provides key input for political "horse trading" that leads to establishing laws and regulations.

Economic analysis is important in designing implementation and monitoring schemes and assessment of policy effectiveness.

### **The Economics Profession**

Economics is a discipline and a profession. The members of the profession communicate through the newsletters of professional economics associations, at annual economics conferences, and through economics *journals*. "Journals" are *peer-reviewed* periodicals--publications focusing on a specific academic field. "Peer-reviewed" means that other experts in the field review an author's article for correctness before it is published.

#### Principal Economics Journals    Sponsoring Organization

<i>American Economic Review</i>	American Economic Association
<i>Econometrica</i>	Econometric Society
<i>Economic Journal</i>	Royal Society
<i>Journal of Political Economy</i>	University of Chicago
<i>Quarterly Journal of Economics</i>	Harvard
<i>International Economic Review</i>	University of Pennsylvania

Principal Economics Association in the United States:

American Economics Association (AEA)

Principal Annual Economics Conference in the United States:

Allied Social Science Association (ASSA)

**The Subdisciplines of Environmental and Resource Economics**

- Institutional induced innovations lead to the development of new institutions—including economic subdisciplines.
- Today economics can be subdivided into a core of general theories (micro, macro) and several applied subdisciplines (environmental, agricultural, labor, law, etc.). Environmental and resource economics is a subdiscipline of economics that applies economic models to environmental and resource management problems. In doing so, it identifies new types of economic problems and extends the boundaries of economics science.
- Subdisciplines often have their own journals, professional associations, and *sponsors*. Important ones in environmental and resource economics:

<u>Subdiscipline</u>	<u>Journal</u>	<u>Association</u>	<u>Sponsor</u>
Agri. Economics	<i>American Journal of Agricultural Economics (AJAE)</i>	AAEA	USDA
Agri. Economics	<i>World Journal of Agricultural Economics (WJAE)</i>	WAEA	
Agri. Economics	<i>International Journal of Agricultural Econ. (IAEJ)</i>	IAEA	FAO
Environmental Econ.	<i>Journal of Environmental Econ. and Mgmt (JEEM)</i>	AERE	EPA
Environmental Econ.	<i>European Environmental Econ and Mgmt (EEEM)</i>	European AERE	EERE
Environmental Econ.	<i>Land Economics</i>		

- Sponsors, or "Sugar Daddies," are clientele groups that support economics research and provide employment for economics graduates. The applied policy emphasis of environmental and resource economics attracts many clients and employers, including:
  - Private Sector: Developers, Banks, Biotechnology, Chemical and Mining Firms, Law Firms, Utilities, Architects, Consulting Firms.
  - Public Sector: Municipalities--county planning departments. State agencies--Department of Water Resources, California Department of Food and Agriculture, California EPA, Air and Water Quality Control Boards. Federal agencies--EPA, Bureau of Reclamation, Bureau of Land Management, USDA Economic Research Service, U. S. Fish and Wildlife Service, U. S. Forest Service.
  - International Organizations: World Bank, United Nations.
- Various regional economics associations also publish newsletters and professional journals that focus on regional environmental and natural resource economics issues.

### Examples of Regional Journals

Western U. S.	<i>Economic Inquiry</i>	Western
Eastern U. S.	<i>Atlantic Economic Journal</i>	Atlantic

- Environmental and resource economics is quite interdisciplinary, for example:
  - Water economics may require knowledge of hydrology and agronomy.
  - Pesticides research may incorporate agronomical, entomological, ecological, and public health models and knowledge.

As a result, many economists also follow several interdisciplinary journals to keep up with events in other professions that may impact their work.

### Examples of Interdisciplinary Journals

<i>Science</i>	American Academy of Science
<i>Nature</i>	
<i>Water Resources Research</i>	American Geological Union
<i>Natural Resources Modeling</i>	
<i>Journal of Amer. Statistical Assoc.</i>	American Statistical Association
<i>Management Science</i>	Management Science Society

### Other Interdisciplinary Publications

*The Economist, Choices, Resources, Challenge, California Agriculture*