

THE ECONOMICS OF LAND-USE CHANGE

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Summary

Land is an aggregate of many different attributes performing many important functions that are not part of market transactions. An analysis of the economics of land-use change has to include the unique character of land. This uniqueness arises from its distinct physical, natural, and institutional properties. Land-use decisions are influenced by three groups of factors. First, physical, biological, and technical factors include the quantity, nature, availability, and characteristics of land resources, which set definite limits on what operators can do in using land resources. These physical properties refer to the raw land. However, what an owner of land really owns is not raw land but real estate. The existence of parcels of land or real estate is a matter of human institutions. Real estate comes into existence and is maintained in its existence as a result of complicated networks of institutional factors, whereas raw land is not. Second, institutional factors set the “rules of the game” in a society, establishing the human-devised constraints and unconscious habits that shape human interactions. Contributing to this institutional setting are cultural, economic, political, religious, social, and traditional factors. Third, economic factors, such as supply and demand, shape present land use. Individuals act within a social setting that is influenced and guided by institutions. Economic analysis of land-use change should not be occupied solely with price signals and shadow prices but has to include historical and institutional factors. Land is as much a social product as it is a physical reality. Interdisciplinarity and plurality is therefore the smallest common denominator.

1. Introduction

An analysis of the economics of land-use change has to include the unique character of land. This uniqueness arises from its distinct physical or natural and institutional properties. Land, like any other commodity, is composed of varying degrees of a pure

natural resource component and a human-made capital component. The natural resource component consists of three innate conditions—soil, climate, and topography—and the capital component results from previous investments in land reclamation, drainage, and soil improvements.

These physical properties refer to the *raw land*. However, what an owner of land really owns is not raw land but *real estate*. The existence of parcels of land or real estate is wholly a matter of human institutions. Real estate comes into existence and is maintained in its existence because of complicated networks of institutional facts; raw land is not.

Institutional factors set the framework influencing (economic) behavior. Contributing to this institutional setting are cultural, economic, political, religious, social, and traditional factors, as well as organizations, which represent manifestations of how things are done in a society. Public regulations, such as community plans, zoning ordinances, rent controls, subdivision regulations, building codes, and laws pertaining to mortgage finance, shape the development and use of real property. Less tangible institutions are customs and traditions, which are the way of thinking and acting specific to an area or within a certain religion and culture.

Anthropogenic land transformation is as old as humanity itself but only in the nineteenth and twentieth centuries have land-cover changes become truly global in scale. They now occur at unprecedented speed. Even though these changes are at the local or regional level, they are repeated frequently and, through patchwork addition, they reach global dimensions. Human activities, rather than natural forces, have become a major force in shaping the environment. Research shows that human-induced changes in land use and cover have significant effects on the functioning of the various cycles, such as the nutrient, carbon, and hydrological cycles, on a regional as well as a global level. Transformed, managed, and directly used ecosystems constitute about half of the ice-free earth. To meet human needs for fibers and foods, wilderness areas have been converted into managed land. Large sections of woodland are used for harvesting wood or have been converted to cropland. Estimates on changes in global land use show that the world wood areas have diminished by 12 million square kilometers (km²) (-19%), grasslands and pastures have declined by 5.6 million km² (-8%), and cultivated land has increased by 12 million km² (+466%) since 1700. Land used for forest products and livestock production constitute the two largest land uses, amounting to some 85% of total land. The sharpest reported growth rate has been in cropland. Settlement areas account for only some 3.5% of total land, shared almost equally between rural and urban areas. Even though built-up land might affect only relatively small areas, their effects may often have considerable long-term implications. Once a patch of land is sealed off and buried under tons of concrete, it is extremely difficult to convert it to other uses, natural or otherwise.

These types of land transformation have been caused mainly by the agricultural revolution and its associated population growth. Land transformation has further accelerated with the onset of the industrial revolution, globalization of the world economy, and further growth of population, lifestyle changes, expansion of technological capacity and infrastructure, and changes of industrial production pattern.

It is interesting to see how the treatment of land in the market economy over the past two to three centuries has been mirrored in economic theory.

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Biographical Sketches

Klaus Hubacek is a researcher and instructor in the Ecological Economics program at the Rensselaer Polytechnic Institute (RPI) in Troy. He has been affiliated with the Land Use Change project at the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria, since June 1999. He has a Ph.D. in Ecological Economics from the Rensselaer Polytechnic Institute (RPI) in Troy. From 1991 to 1996, he worked as a member of the faculty at the department of Environmental Economics and Management at the University of Economics and Business Administration (W.U.) in Vienna. Klaus taught a number of courses in Environmental Economics and was a visiting scholar or instructor at the University of North Carolina in Chapel Hill, the University of Economics in Budapest, the University of

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Jose Vazquez is a researcher and instructor in the Ecological Economics program at the Rensselaer Polytechnic Institute (RPI) in Troy. Since 1998 he has been a visiting lecturer at the State University of New York at Albany. Jose received the Lincoln Institute of Land Use Fellowship in 1998 to study watershed development and tourism in the Lake George watershed region in New York. He has presented results from this and other similar studies at several academic and professional conferences. His main research interests are income distribution, tourism development, and land-use change.

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