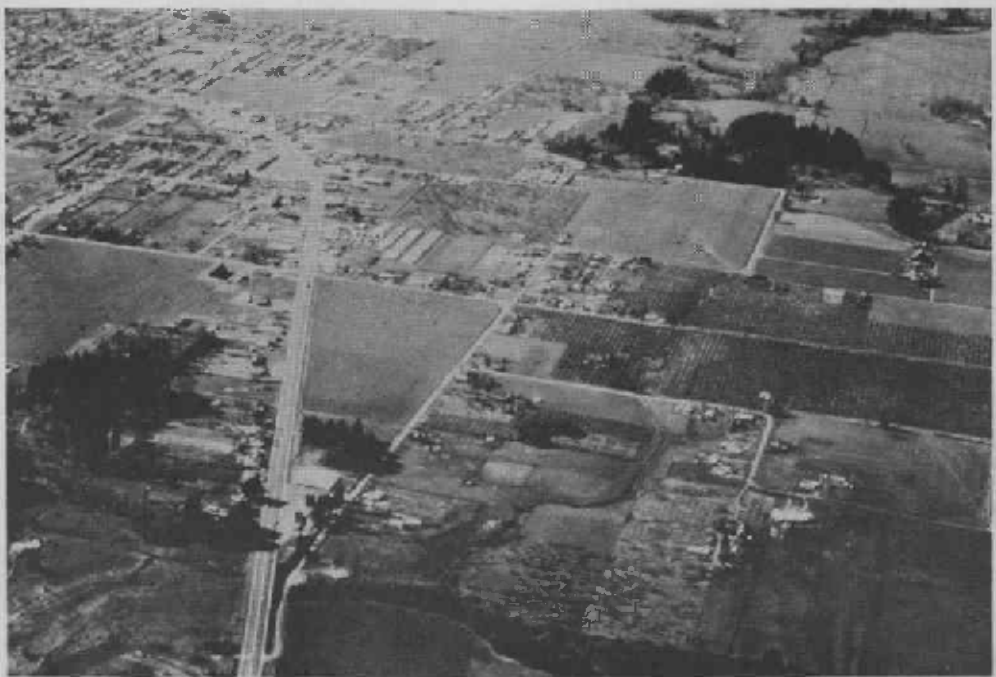


6105
E55
no. 469
cop. 2



Economic Issues in Land Use Planning



WESTERN RURAL DEVELOPMENT CENTER
WRDC Special Report No. 3
OREGON STATE UNIVERSITY
AGRICULTURAL EXPERIMENT STATION
Special Report 469

Economic Issues in Land Use Planning

Edited by

Donald M. Sorensen and Herbert H. Stoevener

WESTERN RURAL DEVELOPMENT CENTER

WRDC Special Report No. 3

OREGON STATE UNIVERSITY
AGRICULTURAL EXPERIMENT STATION

Special Report 469

APRIL 1977

Contents

Economic Research on Land Use Planning: An Introduction	3
DONALD M. SORENSEN and HERBERT H. STOEVENER	
Relevance of Economic Research for Public Land Use Decisions	9
JAMES C. BARRON	
Some Economic Perspectives of Land Use Planning	23
JAMES B. FITCH and HERBERT H. STOEVENER	
Methods for Evaluation of Economic Impacts of Large Scale Developments ..	51
THOMAS E. DICKINSON	
Property Rights, Scarcity, and Economic Rent: Some Considerations for Land Use Planning	65
GORDON C. BJORK	
Transferable Development Rights: Some Problems in Evaluation	79
RICHARD T. CLARK	
"Transferable Development Rights" as a Means of Influencing Land Use Patterns	89
SIDNEY ISHEE	
Recent Land Use Patterns and Implications for Future Research	103
MELVILLE McMILLAN	
Research Issues and Results Pertaining to Preservation of Agricultural Land: California Experiences	123
DAVID E. HANSEN	
Speculation, Land Conversion and the Public Costs of Sprawl: Some Directions for Land Use Policy Research	133
BRUCE A. WEBER	

Economic Issues in Land Use Planning

INTRODUCTION

Do not misunderstand me, but understand me fully with reference to my affection for the land. I never said the land was mine to do with it as I choose. The one who has the right to dispose of it is the one who has created it. I claim a right to live on my land and accord you the privilege to live on yours.

Chief Joseph
Nez Perce Indian Leader

The American Indians' attachment to the land was a deep, emotional tie rather than one secured by property rights. They instinctively viewed themselves and the land as integral parts of a larger whole. Yet with the arrival of the white settlers, the Indians were forced to negotiate and accept the Anglo-American concept of land use based on individual ownership and use.

From the colonial period until the mid-twentieth century, land use policy in the United States was shaped by the view that land was simply another form of private capital. The institutions of private property and the market provided the framework within which land use planning was largely determined by prerogatives of individual land owners. The commodity view of land has served as a powerful force for economic growth of the nation; however, it has become increasingly apparent that economic growth has not been an unmixed blessing. Market failures or "externalities" associated with land use, while not a new phenomenon, are creating heightened public awareness that land no longer can be viewed as merely a commodity for exchange in the market. Society has become increasingly active in creating institutions which will augment or replace market processes in land use allocation. Increased pressures to develop land use legislation and study proposals that will help foster a creative balance between environmental protection and economic development have occurred and are likely to continue for some time into the future. Increased public involvement in land use planning carries with it complex political, social, philosophical,

and economic ramifications. Increased public involvement reflected through enacted and proposed federal and state land use legislation lends urgency to the need for research into these complexities. The challenge to the social scientist is compelling.

Recognition of this challenge by the Western Agricultural Economics Research Council's Committee on Natural Resources provided impetus to the workshop effort upon which these papers were based. In early 1974, it was proposed that a workshop would enhance the capacity of the agricultural economics profession in the western U.S. to do research in land use planning. It was believed that current involvement of agricultural economists in land use research was not commensurate with the research interest in the subject by the profession and with the expressed needs of at least some of its clientele groups. The workshop was planned through a collaborative effort of the Committee, the Department of Agricultural and Resource Economics of Oregon State University,¹ and the Western Rural Development Center.

Participants at the workshop, held at Battelle Institute's Seattle Research Center, December 16-18, 1974, included members of the Natural Resource Economics Committee, the Interregional Resource Economics Committee, the Battelle staff, and the Western Public Policy Education Committee. The focus of the workshop was economic research on land use planning, specifically upon conceptual and measurement issues in the evaluation of efficiency and distributional aspects of public direction of land use. Participants were provided an opportunity to share professional perspectives on these issues. Structure of the workshop provided for intensive workshop sessions, utilizing the papers in this publication as points of departure. The papers were subsequently revised and are presented in this report.

Barron's paper serves as an introduction to the workshop presentations. Barron argues that a new research perspective is required to make economic analysis relevant in the context of public land use decision making. He further suggests a framework for conceptualizing economic research issues by differentiating among land use policy, land use planning, and land use implementation. Lack of agreement on an objective function, special nature of the decision making process, heterogeneity of decision makers, and increased power of resource users vis-a-vis

¹ The workshop benefited from a National Science Foundation research grant to Oregon State University, "Equity Considerations and Compensation Techniques as Related to Increased Public Control of Land Use" (ESR 74-19412).

resource owners set land use economic issues apart from other natural resource economics issues. Hence, some developmental directions for economic research are suggested which require scientists to work within the context of public decision making processes where education and research roles necessarily merge. Recognizing the inherent difficulties, Barron nevertheless challenges the researcher or educator to "be sensitive to the fact that people are in process of problem definition" and to "adapt his behavior to cope with a situation that is sometimes ambiguous and tentative."

Fitch and Stoevener further specify appropriate areas of economic analysis relative to public land use control. These authors examine planning and public control of land in relation to the market allocation of land uses, pointing out that planning is not a panacea for alleviating all the difficulties associated with the market. Planning, not unlike the market, is confronted with problems of adequate information and uncertainty, hence is necessarily an incremental, learn-as-you-go process. Fitch and Stoevener also discuss the question of economic justification for different land use policies, focusing specifically upon the problems of valuation and specification of a rationale for identifying benefits and costs. In the third part of their paper criteria for evaluating alternative land use controls are examined. These include (1) effectiveness in achieving planning objectives, (2) relative distribution of associated benefits and costs, (3) organization and administrative costs, (4) degree of directness and indirectness of controls, (5) political and legal acceptability, and (6) impact of provision of other public services. The final section of the paper evaluates some alternative control devices available for achieving public land use goals.

Dickinson proposes development of a "package" concept for using input-output analysis in combination with the cost-revenue framework to assess both private and public economic impacts of any single development, group of developments, or alternative sites for development. He presents the conceptual framework, methodology, and limitations appropriate to each type of impact study and suggests development of an integrated methodology incorporating measurement of both private and public economic impacts.

The Bjork, Clark, and Ishee papers provide perspectives in regard to the concept of property rights in land. Bjork provides insights into the nature of some of the important problems in property rights and scarcity as they relate to land use control. Externalities comprise one set

of problems arising from land use. Traditional institutional mechanisms, private property and the market, have been structured to maximize development incentives of individual landholders by enabling them to internalize benefits and externalize costs. Bjork argues that some of our current "externalities" problems arise from failure to modify concepts of property rights to reflect contemporary technology and values rather than from malfunctioning of the market. A second set of problems involves "rents" based on property rights in land. He expresses concern that public land use control measures avoid arbitrary and unexpected effects. Following presentation of arguments for and evaluation of arguments for land use planning, Bjork concludes with an examination of a single "site" tax as a means of resolving problems identified in the paper.

The Clark and Ishee papers examine property rights from the perspective of possible separation of the potential developmental rights from other rights in land. They introduce and explain a number of proposals for the transfer of development rights, an idea receiving increased attention as a possible means of land use control. Clark specifically analyzes the evaluation problem for transferable development rights (TDR) from a conceptual basis. He raises critical questions for any given TDR scheme regarding its (1) effectiveness for achieving a given objective as a predetermined land use plan, efficient land use, or an influence on private decision making; (2) distributional effects, i.e., who benefits and who bears the costs; (3) administrative problems in carrying out a TDR program; and (4) maintenance of a viable market for developmental rights.

Ishee reviews conventional methods for influencing private decision making with regard to land use, e.g., public purchase in fee simple, purchase of easements, zoning, and taxation. He devotes a major portion of his paper to describing and evaluating a proposed system for marketing development rights, setting forth a hypothetical illustration. Ishee examines the effects of the TDR program on the market value of development rights and on individual landowners. He also describes a land use game developed to provide insights into operation of a hypothetical TDR program. Before a TDR system is adopted on a wide scale, Ishee recommends further study and experimentation to determine its effectiveness in "bringing private decision making in harmony with public desires."

McMillan, Hansen, and Weber each examine issues relating to the preservation of open space and prime agricultural lands. McMillan

describes recent trends in the urbanization of America in relation to land use and open space demands. He presents an extensive discussion of the problem of evaluating urban park and open spaces, given that esthetic benefits derived therefrom are not allocated through the market. He concludes with an examination of institutional arrangements and their continuing evolution for accommodating open space needs in urban areas.

Hansen reports tentative empirical results emerging from his study of the impacts of the use-value taxation program (California Land Conservation Act, CLCA) on preservation of agricultural land in the rural-urban fringe. Evaluation of program effectiveness is based on the level of incentives provided as measured by annual tax saving and discounted total benefits of participation and on the responsiveness of landowners to these incentives. Landowners participating in the program realized a substantial tax saving; however, this is not viewed as a sufficient condition for establishing an effective land use control device where development pressures are strong. Those landowners participating in the CLCA program were found to be strongly committed to agriculture and believed potential development of their land was several years away. Hansen's findings leave him rather pessimistic about the effectiveness of use-value taxation as a land use control device in the rural-urban fringe. Despite a significant level of benefits from participation in the program, general over-optimism concerning future land prices appeared to encourage only a small enrollment of land in this transition area.

Weber also focuses his review of the literature on issues in the rural-urban fringe by discussing three questions related to urban sprawl and the land conversion process. He considers the impact of sprawl and speculation on public services, costs, and housing supply conditions; outlines a rather comprehensive view of the complex process of land conversion, identifying key actors in the process; and discusses alternatives to traditional zoning for containing urban sprawl. Potential benefits and likely difficulties from utilizing urban service boundaries and marginal cost pricing of public services to contain urban sprawl are examined.

The economics of public land use planning encompass a wide spectrum of problem areas, only some of which are discussed in these papers. It is hoped that discussion of the included topics will stimulate further conceptual and analytical development. Economic issues arising

from public intervention in land use planning provide a unique challenge to the economist. At the heart of the land use controversy is the question of values. The sharing of meanings and values leading to some sense of community may bring about significant institutional changes. Rather than attempt to maximize or minimize some value for individual decision makers, the economist is confronted with the problem of working with an ill-defined or non-explicit social objective function. As such, application of some traditional analytical tools becomes difficult. Economists are going to have to become increasingly involved with other social scientists and community members in formulating and articulating the values regarding land use.

In addition to the individuals and organizations already mentioned, we are indebted to others. We would like to single out three of them for special recognition: Dr. L. M. Eisgruber, Head of the Department of Agricultural and Resource Economics, Oregon State University; Dr. G. B. Wood, formerly Director of the Oregon Agricultural Experiment Station; and Dr. R. J. Hildreth, Managing Director of the Farm Foundation. Without their counsel and support, the complexities of our institutional structure might well have made the workshop and this report impossible.

DONALD M. SORENSEN and HERBERT H. STOEVENER

Relevance of Economic Research for Public Land Use Decisions

James C. Barron*

ECONOMICS, being the science of allocating scarce resources to satisfy human wants, should have no problem handling land use issues since land is one of the trinity of economic resources. Indeed, much of our intellectual heritage from Ricardo, Mill, Smith and others is derived directly from analysis of land and its economic output. Agricultural economics owes its identity as a profession to this tradition and to its emphasis on natural resources. A rich body of theory and many applications to specific problems already rest in our bag of tools. Why, then, do we hold conferences to identify land use research needs and act, implicitly at least, as if this is a new field of endeavor?

Economic research can be relevant for public land use decisions, but in many ways it is a new area of research which will require new approaches, innovative analyses, and some tedious and messy groundwork with inadequate data. At the same time there are ample opportunities to use existing knowledge, perhaps in new ways. To add to the economist's problems, public land use decisions involve far more than economics.¹ Law, political science, philosophy, sociology, psychology, geology, architecture, soil science, and others are involved in a full analysis of land use issues. Economic research must do more than identify and answer economic questions in land use; it must seek to integrate the economic questions with other facets of the decision making process.

The purpose of this paper is to place economics in perspective for public land use decision making and suggest a framework in which eco-

¹ While economics may play an insignificant role in some land use decisions, there certainly will be economic consequences about which economists can say a great deal—size, incidence, or distribution of effects. Land use decisions involve choices among alternative uses, which clearly puts economics at the center of the action.

* Associate Agricultural Economist, Washington State University.

conomic research can be relevant. The discussion is limited to *public* land use decision making, which I define as those decisions confronting a community or group of individuals, firms, and public entities. This is in contrast to private land use decisions of an individual or firm which involve no externalities or collective good properties. The community may be as small as a rural village or as large as the nation, with any intermediate combination. A special case that has attributes of both public and private land use decision making is publicly owned land. A major reason for increasing interest in land use is that fewer and fewer private decisions are entirely free of external effects; thus, the objective is to devise a public decision making system that can identify and serve the public interest.

HIERARCHY OF LAND USE DECISIONS

The term "land use" can be interpreted narrowly such as the decision to zone an area for houses or commercial use, or it can be taken broadly to encompass the entire set of space relations within which economic activity takes place. The narrow view is too limiting to be of much interest to researchers and the broad view presents difficulties in finding a handle to grasp. Hence, we must seek ways to break the land use issue apart in order to make economic research relevant to high priority problems. I find it useful to differentiate among land use policy, land use planning, and land use implementation.

Policy

Land use policy is the set of rules or guidelines that sets limits on what is to be done, how it is to be done, and by whom it is to be done, with respect to public decisions on land use. Policy does not prescribe the decisions themselves, but provides the framework within which the decisions are made. Any level of government can become involved in the development of land use policy, but the actions of one may have a constraining influence on others.² Some policy is constitutionally established (" . . . nor shall private property be taken for public use without just compensation."), but most policy for land use is set by legislative bodies.

Obvious examples of legislative policy actions are acts enabling planning, authority for public land managing agencies, and the many

² The cries of support for local control illustrate the concern that state or federal policy may preclude certain local autonomy.

variations of differential assessment laws in some states. Policy is particularly evident in the breadth of the mandate given to the planning agency or in guidelines laid down in specific laws. Policy is often hidden, embedded in institutions, and sometimes appears in unintended ways. A more subtle set of policy questions revolves around property rules, market institutions, and intergovernmental relations. The forces of custom, cultural change, and normal tugging and hauling within society induce changes in institutional policies, but they generally get legitimized by some direct or indirect legislative action.³

Policy is not synonymous with goals or objectives, although some explicit or implicit goals may be included in the policy. Federal and state legislation that would change the rules for land use decision making commonly include something about "good" or "efficient" or "sound" land use, but the interpretation of these into workable objectives is left to the planning process established by the policy.⁴

Planning

Land use planning is the process that takes place within some given policy (rules) to identify problems, specify community objectives, analyze alternative solutions, and decide on courses of action. Planning, to be effective, requires widespread participation by individuals, organizations, and interest groups.⁵ It requires much information and there has to be a decision making process that utilizes information efficiently and reaches decisions in a reasonable time period. Again, any level of government may engage in land use planning; the possibilities for conflict are obvious, but they should be resolved in the policy arena. Federal and state agencies are now doing land use planning for land they manage, sometimes in concert with and sometimes in conflict with local jurisdictions. Through a long list of environmental and economic

³ A long-time gap may exist between a recognized need for policy change and its ultimate legislative statement.

⁴ The definition of policy used here is more restrictive than is commonly used.

⁵ Effective planning is akin to beauty; it lies in the eye of the beholder. Much planning has been done without widespread public participation, but it often results in lack of support precisely because it excluded those being planned for. Clawson suggests that even though it is time consuming and difficult, participation may be well worth the effort if we adopt the criterion of plans implemented rather than plans prepared. See Marion Clawson, *Suburban Land Conversion in the U.S.*, Johns Hopkins Press, 1971, p. 179.

development programs, federal and state agencies also are engaged directly in planning for land use, although it is sometimes not recognized. A few states have moved directly into the planning process via new legislation (policy) and more are bound to follow.

Implementation

The last step is implementation of the decisions reached in the planning process. It consists of public action taken to put into effect strategies to influence or control land use in the public interest. Too often it is assumed that once planning decisions are reached and agreed upon (seldom unanimously), the problem is solved and no longer needs attention. Implementation of land use decisions requires continued monitoring to assure that the plan is in fact accomplishing the stated objectives. In addition it is important to know what unintended consequences, either positive or negative, result from various objectives so that modifications may be made. Implementation also involves decisions; it is not a mechanical process but an ongoing one, often moving incrementally, always tentatively, and is subject to review as new knowledge or new political coalitions are brought to bear.

The three land use functions—policy, planning, and implementation—do not directly correspond to the legislative, executive, and judicial separations of government, but some general patterns appear. Policy matters may originate in the executive section, but the decision receives its ultimate sanction through the legislative process, whether that be the county commissioners or the U.S. Congress. Planning is mostly an executive function spread among assorted bureaus, agencies, and offices. At the local level the primary actor is usually the planning office, but a curious difference exists at the county government level. There the board of commissioners is both the executive and the legislative branch. Sometimes it is difficult to tell which role they are playing, and in land use issues they alternate between policy making and planning. Implementation is also an executive function, but the judicial branch is increasingly being called upon to decide on controversy over land use implementation.

While they are obviously interrelated, there are significant differences between land use policy, planning, and implementation which have implications for economists. Economic research is easiest for implementation, most glamorous for policy, and most difficult, frustrating, and messy for planning. Unfortunately it is in the planning box where

the key public land use decisions must be made, and if economic research is to have much utility it has to respond to those needs. Let me hasten to add that there are some important economic questions in both policy and implementation which are as yet unresolved, but I think the major unmet challenge is in planning. The paucity of workable analytic approaches means that every community must slog through the process of land use planning for themselves using whatever information and analysis they can find or provide.

WHY IS PUBLIC LAND USE DECISION MAKING DIFFERENT?

Economic research has been applied usefully to a variety of natural resource puzzles and is now faced with unraveling some knotty problems in land use planning. If, in fact, public land use decision making is a new area of research or poses different kinds of problems than have been encountered before, it will help to more clearly define those differences. Much of what follows is related primarily to the land use planning function, but most is also applicable to policy and implementation issues.

There is no generally accepted objective function in land use planning. Without something to minimize, maximize, or optimize, the economist has a problem. In past research efforts on agricultural policy there was at least some agreement that such things as farm income, efficiency, adequate food supply, or maintenance of the family farm were targets to shoot for. Water policy and planning research had the benefit/cost criterion with respect to net national income. In public policy areas closer to land use, the public land managing agencies had sustained yields and carrying capacities. Economists contributed significantly to each of these issues, but now we can look back and quickly identify the objective functions which were important.

In land use planning the community decides what the objective function shall be and how to reach the objective. One reason why agreement is hard to reach is that land use decisions encompass nearly all aspects of the economic and social system. They determine the where, what, and how of economic activity and those decisions affect everyone. Public land use decisions, while expected to serve the public interest, often strike directly at one or more private interests, and the affected parties naturally wish to protect their interests.

A sophisticated gravity flow model can specify an efficient pattern of spatial relationships to minimize transport costs, but it will be mean-

ingless to the property owner contemplating a possible sale of his farm to the Boeing Company. The landowner's objective function may be quite obvious, but his action could unalterably disrupt the community's land use objectives. This is a question planners and citizens must deal with.

Several possible objective functions can be postulated. Maximizing income from land is an obvious first choice, but increasing numbers of people are arguing that this is inappropriate. Instead, they suggest that land is a precious resource which should not be exploited as a simple economic commodity and question the notion of economic growth. Land use raises problems of externalities, collective goods, and joint products that clutter up the analytical framework.⁶ The economist can always add constraints to his objective function and can accommodate multiple objectives, but the nebulous nature of the constraints and the non-quantifiable aesthetic objectives cause great difficulty.

Another aspect of land use planning related to the search for an objective function is the special nature of the decision making process. The decisions are made by local people (community, county, region) rather than by some distant arm of the federal or state bureaucracy. Water planning agencies, for example, have not until recently made much effort to involve local residents in the major decisions.⁷ Land use planning is quite different, however, because instead of dealing with a few major project decisions, it must concern itself with an interminable list of small decisions and a continuing process of adjustment to change over time. Each decision appears small in the aggregate, but they are tremendously important to the individuals affected by them. For this reason local people are very reluctant to relinquish control over those decisions to an impersonal bureaucracy.

As a consequence of the land use planning decision process, the market for results of economic research consists of local people—planners, elected officials, interest groups, and concerned citizens. Abstract

⁶ Conceptually these are no different than problems in water planning. When it comes to land use, however, the complexity is increased because more people are directly involved, spatial dimensions are broader, and the institutional setting is more complex.

⁷ The clamor for public involvement in water planning is changing the traditional alignments of power. A redistribution of power toward local influence is taking place. In contrast, land use responsibility has always rested primarily at the local level.

models or generalities do not impress them; indeed, the opposite is likely to be true. There is no standard level of professionalism or technical skill in this market audience as there is likely to be in federal or state agencies. Since the decision makers differ in philosophy, education, income, value systems, and political pressures, they find difficulty in agreeing on an objective function, and hence economic research results may be dismissed preemptorily. While economic researchers may have to devote much effort to model building and theorizing on land use, specific applications will be necessary before the information is useful for decision making.

Another complication in the decision process for land use is that resource users as well as resource owners want in on the action. Here is an excellent example of all three problems mentioned above—externalities, public goods, and joint products. For many years the users of public land—loggers, hunters, campers, hikers, miners—have been involved in management planning for federal and state owned land, but private landowners remained generally free of such pressures. Interest is not confined to conservation and environmental protection groups; a wide range of citizens are pressing for a voice in land use planning. Some economic complications arise in this mixture of resource users and owners through such questions as, what is the market for land? What is the product? Who is the consumer or producer? How is the product exchanged? For example, the resource user may be mainly concerned about non-economic products or services of land, while the owner is interested primarily in economic outputs.

In this section, four aspects of land use planning have been identified that set it apart from other natural resource economics issues: (1) Lack of agreement on objective function; (2) the special nature of the decision making process; (3) the decision makers are many and heterogeneous; and (4) resource users are gaining increased power in the planning process relative to resource owners.

SOME TENTATIVE DIRECTIONS FOR ECONOMIC RESEARCH

We already know some important things about the economics of land use, but we have about a decade of research and education ahead of us to build and deliver a body of knowledge in a form that is relevant to public decision making. Rather than one or two grandiose efforts to come up with the "right" answers, we need to build systematically by

taking the more important questions first and integrating as we proceed. While this sounds good, it will be terribly messy and frustrating to practice. For one thing, the more immediate and pressing problems will have to be dealt with even though they may not fit neatly into the research design. The decision makers cannot wait 10 years for results and will require information throughout the process. If their needs are ignored in the short run, we certainly cannot expect them to welcome our results in the long run. Moreover, there is no assurance that it will not be too late to use the body of knowledge 10 years hence.

The distinction between research and extension will become more and more blurred. The researcher simply will not be able to afford the luxury of doing his work in isolation from the land use planning process. He will have to get out where the decision making process is taking place in order to understand what information is needed and how his research will be used. The extension educator also will become more of an applied researcher if he has not done so already.

Basic and applied research are commonly understood, but a third type may be more critical to land use needs. Developmental research is that which deals with incorporating the knowledge and skill arising out of basic and applied research into the decision making process. It goes beyond applied research by considering the broad range of factors that influence the decision process and the actual adaptation of applied research to problems. This combination of research and education will further merge the roles of research and extension. It will not result in many journal articles, but will be useful to planning decisions.

Policy

Property rules and the implications of redistribution of rights among individuals, public entities, and between individuals and public entities will continue to be important.⁸ Property is not entirely an eco-

⁸ For starters we should be familiar with the following:

Gene Wunderlich, "Property and the Social Contract: Related to Liberty and Land Use Controls," in *Economics of Natural Resource Problems in the West*, Report No. 4, Western Agricultural Economics Research Council, 1973, pp. 1-20.

Gene Wunderlich and W. L. Gibson, Jr., eds., *Perspectives of Property*, Institute for Research on Land and Water Resources, Pennsylvania State Univ., 1972, especially the articles by Wunderlich, Dunham, Tarlock, McKean, and Samuels.

Eirik Furubotn and S. Pejovich, "Property Rights and Economic Theory," *Journal of Economic Literature*, December 1972, pp. 1137-1162.

conomic phenomenon; it is often discussed in political and philosophical terms. Nevertheless, there are crucial economic questions arising out of alternative property rules. One of the specific issues is the separation of use rights from development rights to land and the economic consequences of alternative schemes to do so. We have long been accustomed to thinking of property in land as a bundle of rights, any one of which may be separated from the others through the market. As new demands for land emerge and land becomes (relatively) more scarce, public decision will have an increasing effect on the distribution of property rights and the values attached to them.

A second property issue revolves around compensation. Virtually all of the opposition to land use planning or to a restructuring of the planning process is based on the fear that some rights will be lost or the land will be reduced in value with no compensation to the holder now or in the future. Such fears are not unfounded. There are precious few instances where economic changes do not create losers as well as gainers. While it should be obvious to economists, if not to the general public, compensation is a one-time thing. If the twin problems of separation of property rights and compensation can be solved once, they are solved permanently. In other words, if the public purchases development rights from a farmer, the rights will not have to be purchased again from his heirs or the next owner.

A second policy issue is the distribution of responsibility for land use among governmental entities. It is sometimes asserted that the federal government has no land use policy—an absurdity quickly dispelled by a long list of federal actions stretching from the Louisiana Purchase through the Homestead Act to the Environmental Policy Act of 1969 and the more recent water quality act amendments. The United States may not have an integrated or comprehensive land use policy, but there are a lot of miscellaneous pieces.

The implications of federal programs for state and local government decision processes for land is a valid area for research. Within a single state there are many possible divisions of responsibility which can influence the planning process and the decisions themselves. We need to know more about these relationships, not all of which are economic. Most proposals for new land use legislation at both the state and federal level provide for two things—additional power for government to control land use and a redistribution of power away from local gov-

ernment.⁹ This is based on the assumption that local government has failed to do an adequate job, but we need to know which one of the possible alternatives to the existing system would do the job better. It is not enough to merely assert that a state bureaucrat is more competent, wise, or trustworthy than a local bureaucrat.

While it may not fit entirely in the policy arena, another big issue is the market institution and its performance in allocating land. We know surprisingly little about land markets in the rural-urban fringe where land use is changing rapidly.¹⁰ The product being exchanged is not the land itself but the services of land. A given property can provide a variety of services, each with its own market, and we do not know how well the market performs its function. Market information is inadequate in most cases and we do not know very precisely the shapes of the demand and supply curves. In converting a farm to a residential subdivision, there are several steps and likely to be several market transactions, each with different supply and demand conditions. We have an uneasy feeling that the market is imperfect; we even know what some of them are, but we are still short of a full understanding which could lead to greatly improved public decisions on land use.

Other policy issues include all of the institutional changes that might affect land use, especially the distributional consequences. Federal policies that play a role include income tax deductions for mortgage interest and taxes, FHA credit terms, housing programs, tax credits to industry to induce investment, relocation, or pollution control. In our modern society we have already accepted many of the existing institutional structures as the conventional wisdom even though few of them are more than a single generation of age. The institutional issues are not only national in scope. State and local governments have a range of options for institutional reform or change. If the problems of land use policy, planning, and implementation are going to require basic changes in attitudes, behavior, and economic activity, there is a need for research by economists and other scientists to explore alternative forms of existing institutions and to build new ones.

⁹ The rationale is that local officials are more likely to wear blinders which prevent them from seeing the broad public interest and that they are more susceptible to the blandishments of developers.

¹⁰ See Alan Schmid, *Converting Land From Rural to Urban Uses*, Johns Hopkins Press, Baltimore, 1968, and Marion Clawson, *Suburban Land Conversion in the United States: An Economic and Governmental Process*, Johns Hopkins Press, Baltimore, 1971.

Planning

Suggestions for research on land use planning have to be hedged somewhat, because I have argued earlier in this paper that the agenda is largely set by the decision makers and the process itself. Some possible questions arise, however.

Since there is some dispute over the appropriate objective function to use in land use planning, economists can examine various alternatives and trace the consequences of different choices. There are obvious conflicts between rapid economic growth and environmental preservation, but there are compromises along the intervening continuum. What are the trade-offs? Who benefits and who loses? Answers to these questions could help sharpen the issue and lead to more informed dispute even if there was no agreement on an objective.

Planners and others often fall into the trap of assuming that the outcome of effective planning will be beneficial to everyone and seem surprised that not everyone agrees with them. The losers—actual and potential—may suffer economic, psychic, aesthetic, or political losses. Economic research might at least begin to demonstrate the nature and extent of economic impacts, both positive and negative, as a result of certain feasible outcomes of the planning process. Devising compensation schemes also would be helpful.

A great difficulty is caused by generalizing results from one community to another. When it comes to planning for MY community or region, I know more about it than some expert from another area. The challenge to researchers is to look for key variables or relationships which reoccur in several places.

A specific suggestion for research to aid the land use planning process would be the development of a simulation model for a region over time. The model must simultaneously be simple enough for non-economists to understand it and learn from it and also complex enough that it can realistically portray land use impacts. The model should allow for the introduction of various land use changes and be able to trace the consequences on employment, population, changes in economic structure, public service demands, tax revenues, and environmental quality. The economic aspects are emphasized here, but they are not the only important considerations; perhaps other disciplines should participate in the model building.

The model should be able to answer questions such as: (1) If we preserve 2,000 acres of farmland rather than building houses on it,

what will the economic effects and public service needs be for the next 50 years? (2) If a new road is built from A to B, what will the population distribution be in 5, 15, or 25 years? (3) What difference is there if a school or hospital is placed at D rather than E? If these and other questions can be handled in a model which can be easily adapted to different regions, it would be a great help to planners, educators, elected officials, and citizens.

Implementation

There is no lack of land use strategies already in place which have not been fully evaluated. Differential assessment of agricultural land, which has probably received the major share of attention, has been found lacking as a means of preserving agricultural land. It may, however, have been more successful for other objectives such as providing more equity in the tax system.

Other possible approaches such as regional tax sharing, transfer of development rights, public purchase, and acquisition of easements will be used more extensively in the future. Economists will analyze the results to determine if the expected objectives are being realized. Developmental research will become more important as we seek new ways to put into use the results of basic and applied research.

APPLICATION OF ECONOMIC RESEARCH

When all factors are considered, some doubt is cast on the ability of the traditional content and delivery system of the land grant university to respond effectively to land use policy and planning problems. One of the research tasks is to improve that content and delivery system.

While most people are willing to give lip service to the desirability of cooperative efforts between research and extension, this cooperation is still difficult to obtain. Extension has been far ahead of research on land use issues, and the extension field staff have been well ahead of the state staff on land use planning. State extension staff have been more oriented to land use policy issues, but in an inadequate way. The research establishment is now becoming much more involved in land use and is beginning to provide analytical results complementary to educational programs. If ever there was a major set of issues well suited to joint efforts by research and extension, land use is it!

If researchers do not understand and appreciate the peculiar requirements for delivering land use information to decision makers, their results will not be as useful as they might otherwise be. The traditional extension model is one of picking up the results of research and transmitting the information to users through news articles, speeches, slide sets, radio programs, or newsletters. The vast majority of information going through the extension delivery system is directed at individuals or firms who are able to directly utilize it to improve their living conditions, profit statement, or hobbies. An objective function is assumed to exist, group decision making processes are unnecessary, information can be tailored to a specific set of users, and there is no major problem of identifying the user. None of these conditions exist for land use planning as described in this paper.

Instead of being an information broker, the educator must take on much more of the role of process facilitator. Problem definition might be done quickly and efficiently by the educator or researcher, but this would not be of much use to the many decision makers in land use planning because they must learn how to define the problem themselves. There are many differences in values, knowledge, and understanding which must be explored, accepted, and accommodated. Until a consensus is reached, however imperfectly, results of economic research cannot be incorporated into the decision process.

Once the problems are stated, understood, and accepted, it is possible to consider alternative methods of solving them, and it is here that research can play an important role. Do not be misled, however, into thinking that research is the only element for decision making. Agreement on the problem by no means guarantees or even suggests that similar agreement will be readily forthcoming on solutions. Facts alone are not enough; participants in the decision process have various biases, experiences, and perceptions of the world which can lead to honest differences over the meaning of the facts at hand. To further complicate the problem confronting the educator (and researcher), the clientele group does not remain fixed. New individuals or groups enter the decision making process while some original participants leave for one reason or another. Therefore the process cannot proceed smoothly according to a set schedule; the newcomers must be brought up to date. In that process even the problem definition may change if the new participants do not agree with the earlier consensus and have the influence to change things in their direction. The researcher or educator can be

caught in an embarrassing situation of responding to a problem which already has been redefined by the decision makers, thus making the researcher's efforts irrelevant. The researcher or educator must understand and be sensitive to the fact that people are "in process" of problem definition, and he must adapt his behavior to cope with a situation that is sometimes ambiguous and tentative.

The delivery system for land use confronts a set of questions and problems which only by sheer coincidence may be the same set the researcher is interested in and capable of analyzing. Many information needs do not require research at all, but merely a search for or reshuffling of existing information to answer a different problem. Timing also can be important. There is nothing harder to explain to a group of citizens asking a researchable question than the fact that some months (years?) will go by before a project can be written, funded, and carried out. A burden rests on both extension and research to anticipate issues and be timely. The best analytical results ever produced are worth little once the decision has already been made.

FINAL COMMENT

The separation of land use issues into policy, planning, and implementation is not the only classification scheme, but I believe it offers some help to economic researchers. These are overlapping areas and many issues require sharper definition. My major conclusions are that researchers should devote relatively more attention to the planning and decision process; land use is different than previous public policy research areas; the traditional content and delivery system needs significant modification; research and extension can cooperate effectively on land use and reduce the distinction between them; and the range of questions is broad and complex enough to keep quite a few of us busy for the next decade.

Acknowledgments: This paper was prepared under project 0197, Agricultural Research Center, Washington State University. Walt Butcher, David Holland, and Don Sorensen provided helpful comments on an earlier draft, but they cannot be held accountable for any remaining inadequacies.

Some Economic Perspectives of Land Use Planning

James B. Fitch and Herbert H. Stoevener*

... any system of land use planning will work only if it satisfies each and every link in a chain of interconnected tests. It must be politically feasible; it must make sense economically; ... and, it must hold up in court.

Bosselman, Callies, and Banta.
The Taking Issue, 1973, p. 318.

WHAT ROLE should economists and economic science play in the allocation and control of land resources? While the use of land has far-reaching economic implications, economic rationale often appears to go unheeded in the growing activity associated with public land use control.

The purpose of this paper is to clarify the role of economics in this increasingly critical area. First, we put planning and public control into perspective relative to the market allocation of land uses. Here it is argued that planning is not likely to have all the answers to difficulties associated with the market. Next, the question of economic justification for different land use policies and for use of both direct and indirect control devices is discussed. This section deals with the problem of valuation and specifies a rationale for identifying benefits and costs. Third, a survey of the various economic tools and incentive devices available for achieving public land use goals indicates a substantial overlap among the legal, political, and economic criteria by which the alternatives may be evaluated. Emphasis is placed on viewing all three sets of alternatives in economic terms.

I. THE MARKET, PLANNING, AND PUBLIC CONTROL

A "quiet revolution" is occurring in the country's methods for allocating its land resources (Bosselman and Callies, 1971). Public control is increasingly being exercised over land use prerogatives long considered to be rights of the individual landowner. Land use and conversion

* Assistant Professor and Professor, respectively, Department of Agricultural and Resource Economics, Oregon State University.

formerly were determined mostly by the market mechanism. Now, more and larger public bodies are being instituted to regulate and exercise control over the use of land. A growing number of incentive devices, including a variety of service pricing, tax, subsidy, and compensation schemes, are being proposed as measures to aid in achievement of public land use objectives.

Zoning, one of the oldest and most easily recognized planning devices in the United States,¹ was originally instituted in New York City as a means of eliminating conflicting land uses along Fifth Avenue (Roberts, 1974, p. 4). This was clearly a case where the unregulated real estate market had produced troublesome externalities between activities of adjacent but dissimilar firms. With passage of time, zoning more often has come to be used in attempts to provide public goods such as open space and preservation of community identity and character. Currently, it is being proposed as a means of providing yet another public good, clean air. Samuelson (1954) has produced a clear understanding of the difficulties of adequately producing public goods through the private market mechanisms. Thus, one of the motivations for resorting to planned land use is a clear contention that the market mechanism is not well suited for efficient allocation of land resources.²

The land market in the United States has long been influenced by many public programs and policies which have had profound impacts. Such programs usually were not designed to produce land use patterns which would be desirable by today's standards. They range from the donation of federal public lands to railroads and states, to federal housing policies, to a multitude of federal, state, and local programs for the provision of public services, including roads, sewers, and other utilities.³ Raup, for example, has pointed to the influence which federal policies favoring low-priced energy and ownership of single, detached family houses have had in producing urban sprawl and consumption of open

¹ To some people, zoning and planning are separate entities since there is separate legislation enabling zoning in most states (Roberts, 1974, pp. 31-32). As viewed here, however, zoning is a form of plan implementation. Unfortunately, in many cases, it appears that the activities of local zoning and planning commissions are separate and not coordinated.

² Another rationale for claiming market inadequacy in land use is given by McMillan in his paper for this workshop (1974, pp. 8-16). In final analysis, his argument is yet another version of the public good argument.

³ Clawson (1971, 1973, 1974) provides useful summaries of various government programs and their influence on land use.

space.⁴ A second motivation for public land use planning, then, is to rationalize and, in some cases, counteract effects of other public programs and policies.

That it can be demonstrated conditions are not perfect for efficient allocation under the market mechanism is insufficient justification for planning, however. Planning may take a wide variety of forms, from incentive devices designed to correct the market mechanism to more direct and extensive governmental controls. In a world where government agencies can obtain a wide variety of information about preferences, technology, and resources, a system of corrective charges, taxes, and subsidies can be designed which would result in Pareto-efficiency (Kneese, Ayres, and d'Arge, 1970, pp. 74-107). In this way, an imperfect market would be corrected. However, it is doubtful that there are many cases where such information can be obtained at a cost which is less than the benefits to be derived from the resulting increase in efficiency. In cases where government agencies take more direct control of the land resource allocation process, the same high information cost difficulty must be faced.

Some theorists have noted that planning, like market allocation, requires certain ideal conditions if it is to function well. Bauman (1967), in fact, speculated as to the nature of such conditions. His list included the following. First, there must be perfect hierarchic control in the political structure if actions required to implement the plan are to be carried out. In particular, the planning agency must be able to bring needed resources into use, or have the power to direct that resource use be changed or curtailed. Second, planners, like agents in the ideal market, must have perfect knowledge if they are to make correct decisions. They must be rational and not harbor (or at least exert) values which run contrary to those of their clients, the public. Finally, there must be social homogeneity, meaning that the society whose needs are being planned for does not consist of subgroups which have conflicting interests (Bauman, 1967, pp. 111-114). One does not have to look far in a society like ours to conclude that the conditions for perfect planning, like those for a perfect market, do not exist.

Ours is a pluralistic society, not homogeneous. Our politics are the politics of special interest groups. This is quite evident in the case of land use control. A brief review of state and local land use planning

⁴ Phillip M. Raup. Seminar presented to the Department of Agricultural Economics, Oregon State University, May 1974. Also, see Delafons (1969, p. 34).

documents⁵ reveals goals as diverse as the following, often existing side by side:

- Manage and control urban growth, and confine it to the "most suitable" lands.
- Control population distribution.
- Preserve and create recreational opportunities.
- Preserve open space and scenic beauty landscapes.
- Preserve agricultural land, especially "prime" agricultural land.
- Lower pollution levels.
- Protect critical natural areas, such as wetlands.
- Provide decent, safe housing at affordable prices.
- Preserve community environments and life styles.
- Preserve energy resources and bring about more efficient energy use.
- Provide more rational transportation systems.
- Provide adequate economic base and employment opportunities.

Efficiency in resource use and an equitable distribution of the resultant income and wealth seldom are stated explicitly, but these two goals also can be assumed to apply.

A number of goals relating to each of several interest groups can be identified in the preceding list. Godwin and Shepard (1974, pp. 14-15) discern three more or less separate groups in the land use policy area, consisting of (1) "The developers, land speculators, builders, savings and loan organizations, and other allied groups who wish to maintain their present control over land use planning," (2) "[the] coalition of environmental interest groups," and (3) "Those groups interested in preserving the size and/or 'quality' of their neighborhood or town." It is evident that all of the various groups' goals cannot be achieved simultaneously.

This is a quandary for which planning has no objective solution. It is analogous to the distribution-interpersonal-comparison quandary of welfare economics. Godwin and Shepard (1974, p. 18) suggest that, in the land use case, one solution to the problem may come in the political arena, if two of the interest groups find a basis for forming a coalition against the third. If there is, in fact, to be a significant re-orientation of land use control via the planning mechanism, they find that it would be necessary for groups two and three to band together against group one

⁵ See, for example, the review contained in Bosselman and Callies (1971). Most of the objectives in the list cited above have been included in the draft version of goals adopted recently by Oregon's Land Control and Development Commission, the body charged with overseeing the implementation of the state's 1973 Land Use Control Act (LGRD, 1974).

—an outcome which they find highly unlikely. This points to the critical nature of the political linkage in the planning process.

In an idealized model of planning, planning officials translate broad goals into specific objectives and then determine the allocation of resources (i.e., actions) required to meet the objectives. Even in a dictatorship, the nature of available controls is seldom such that obtaining compliance is effortless. In countries such as the United States, where individual rights are jealously guarded, controls available for use in plan implementation are severely restricted. This is especially true in land use planning because of the strength of private property rights in our legal system. Even public land ownership, which is especially prevalent in the West, does not guarantee a high level of compliance with planning directives. Conflicts frequently arise between federal land administrative agencies and state and local planning authorities.⁶ Inter-agency jurisdictional politics thus constitute another obstacle to effective control.

Nevertheless, attitudes are slowly changing in favor of more direct public control of land use and against many traditional notions of property rights, meaning that planning agencies gradually are getting more control power which they require to implement plans. The case for compensating holders of usurped property rights rests largely on the need for expanded control. While the compensation issue has extensive legal and political dimensions, it has critical economic dimensions as well. These will be discussed later in this paper. Of course, there are options to direct control. Incentive devices such as taxes and subsidies are examples of indirect controls which are available for plan implementation.

Probably the greatest barrier to efficient land use, under either planning or market allocation, is a lack of relevant information. Recall that perfect information is a requirement of the ideal planning model as well as for the perfect market. Information available to planners is not adequate. Goals stated in planning legislation, as exemplified by the list given above, are ill-defined, meaning that, for many, there are as yet no commonly accepted indicators or measurements of achievement. In many cases, it may be impossible to establish relative values or trade-off

⁶ Some thoughts on circumventing these and similar problems with public administrative bodies are presented in a recent study by Bish and Ostrom (1973). They indicate the need for new institutional game rules which provide incentives for interagency negotiations.

weights,⁷ even when acceptable indicators are available. Lack of information or uncertainty about the future is said to greatly affect the market for land. It provides a basis for speculation. In some cases, indecisiveness and lack of control in land use planning may have contributed to uncertainty and speculation. Yet, uncertainty about the future greatly affects planning, too. In order to preserve adequate amounts of farmlands, for example, one must have information about their future value, and this is highly uncertain. The same may be said about future economic value of land used for any type of production.

If the planning mechanism is to function at all, it must do so amid uncertainty. Friedmann (1967, pp. 34-37) underscores the importance of recognizing that socio-economic planning must operate as a cybernetic or feedback process rather than as a "blueprint" process.⁸ He proposes the "informational model of planning," which is iterative, in contrast to the "blueprint model," which is predeterminedistic. The contrast between the two concepts is illustrated in Figure 1.

The informational model of planning gives explicit recognition to the uncertain world in which planning agencies must function. Planning is recognized as an incremental, learning-by-doing process. This makes sense for land use planning, which is a political and legal institution as well as one with economic functions. Recognizing its incremental nature indicates something which political scientists have long known—most political processes proceed along incremental lines (Dahl and Lindblom, 1953). Economists, too, have recognized the value and sense of incrementalism where information on the best procedure is scarce. Hirschmann (1967), for example, has pointed to the value of the incremental approach in development planning.

Legislation enabling land use planning at the local level has existed in most states for several decades. Yet land use planning, in general, is a largely unproven device for achieving many of the broad social goals which currently are being listed in state planning legislation. That planning can effectively lower pollution levels, work toward more efficient use of energy resources, or help provide more rational transportation

⁷ This is tantamount to stating that valuation and relative weighting must typically be left to the political arena.

⁸ Land use planning frequently is discussed as if it were a means of developing a blueprint for the future. This is particularly true of zoning schemes. It is perhaps more than coincidental that a recent proposal for farmland preservation in New Jersey was developed by the Blue Print Commission on the Future of New Jersey Agriculture.

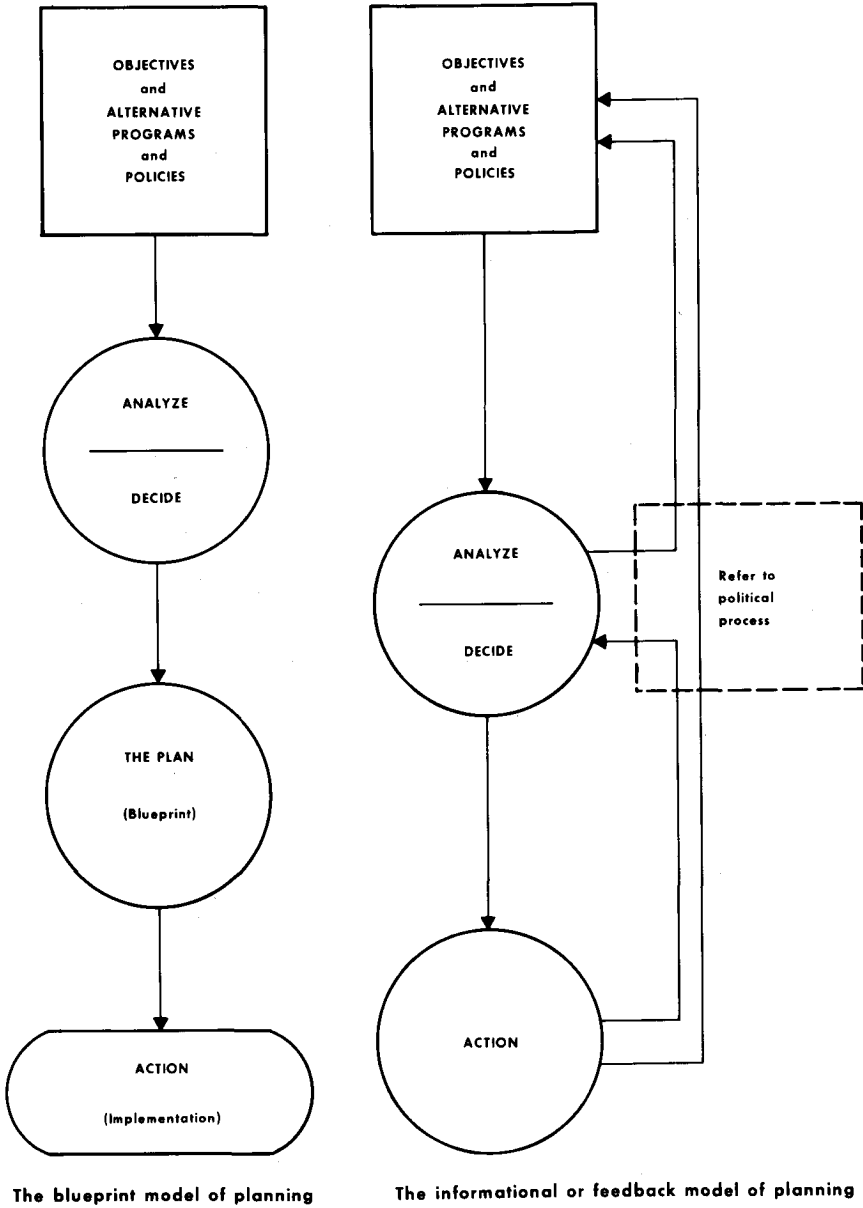


Figure 1. Two concepts of planning.

systems is a matter of conjecture. It is especially on trial with respect to these issues. Success will require search, trial and error, and learning from the process itself.

II. THE MEASUREMENT OF BENEFITS AND COSTS

The terms "goal" and "objective" are often used interchangeably. For the present discussion, it is useful to make a distinction. Here a goal is a broad statement or description of a public good, say lower pollution levels. Goals typically are stated in such a manner that they offend the least number of people possible. They lack explicit definition and avoid answering the crucial question, "how much?" Each broad goal typically can be broken down into a number of more explicitly defined objectives. Ideally, objectives do say "how much." An objective falling under the goal area "lower pollution levels," for example, might be "fine particulate matter in the atmosphere not to exceed X parts per million."

When a planning system is instituted in an area as complicated and interrelated as land use, impacts will at first be difficult for all of the participants to perceive. The quality of available information can be improved as time passes. Impacts may be expressed in a multitude of terms or forms of measurement, ranging from those of the physical sciences to those of the social sciences.

Based on a review of the literature, one would conclude that the contribution of economics to the evaluation of objectives in land use planning is as yet in its infancy. It is not entirely possible to state how economists will proceed to contribute to land use planning in the future. But one can speculate that certain similarities may evolve in land use planning to those in the case of planning water resources, where we now have some three decades of performance to review.

The principal technique used for evaluation in planning water resource use has been benefit-cost analysis. What distinguishes water resource planning from land use planning is that the water-related *public investment* project served as a natural focus for analysis in the case of the former. It appears that no similar focusing device exists for land use planning. Nevertheless, the idea of sizing up various land use objectives by estimating impacts in terms of benefits and costs is appealing. Some will argue that benefit/cost analysis as applied in the water resources field provides a poor prototype as a framework for analysis in land use planning, because of the excessive emphasis on monetary benefits and costs in traditional benefit/cost procedures. Certainly, at least

part of the rationale for land use planning arises from the concern with nonmonetary effects. There is, however, no reason why benefit/cost procedures need such a narrow focus.

A number of the goals of land use planning are environmental in nature. Economists already have made a variety of encouraging starts in measuring benefits associated with the environment. Air quality is a case in point. Differing degrees of air quality have been shown to affect property values and health, as well as recreational activity and benefits.⁹

Other studies have measured benefits associated with open space, scenic beauty, and recreation in economic terms. The value of open space has been measured in terms of higher property values for lots located adjacent to park lands, for example.¹⁰ Randall (1973) described a variety of techniques used to measure the dollar value which various groups place on "environmental improvements" in the Four Corners area of the Southwest.

Extensive work has been done in measuring economic benefits of outdoor recreation. It remains to be seen if and how this work can be adopted to the evaluation of public policy outputs in land use planning, especially with regard to the open space preservation goal. Much of the methodology developed during recent years derives demand functions with travel costs serving as a proxy for the price of outdoor recreation. It has only limited usefulness in the evaluation of recreational opportunities in or near urban centers. Knetch (1974) recently reviewed the methodology in this area.

Frequently, more indirect approaches to assessing benefits may be required. Population distribution is a case in point. One way to measure economic benefits associated with different types of population distribution is to measure efficiencies which different distributions create in the provision of government services. Work currently being conducted by Godwin and Fitch at Oregon State University offers hope of produc-

⁹ Jaksch and Stoevener (1970) measured the impacts of air pollution on property values in a small Oregon coastal town, for example, and then related air pollution to medical costs in the Portland area (1974). Vars and Sorenson (1972) developed a method of relating a ban on open field burning to increased recreational benefits.

¹⁰ As noted in McMillan (1974, p. 12).

ing new results in this area, particularly with respect to the effects of population growth.¹¹

Hirsch (1970, p. 83) has provided a useful survey of available empirical evidence on the economies of size for a wide variety of public services. Another approach has been to assess people's preferences for the optimal size of town (Tweeten and Lu, 1974).

Studies of the type noted above make no pretense of measuring all economic benefits associated with achievement of various land use goals. They are just the beginning of a long, slow process of information gathering. For some land use goals few, if any, attempts have been made to measure benefits. One would expect that maintenance of stable, well-established communities would have economic benefits which could well be measured by their effect on property values, for example. The idea behind preserving agricultural lands is to provide for some needed future productive capacity. It may be possible to estimate such a value, if it exists.

Economists have learned to use a number of mathematical programming techniques which can be helpful in assessing the impact of alternative land use configurations. Day (1973, p. 165) used linear programming to estimate optimal levels of a number of alternative approaches to floodplain management. His model estimated the economically optimum "combinations of spatial and temporal urban floodplain use, site elevation through land fill, and flood-proofing of buildings."

Input-output (I-O) analysis has long been a valuable tool in economic planning and may be used to generate information about the desirability of alternative land use mixtures for economic activity. One straightforward application is to use a regional I-O table to deduce the implications of different mixtures of export industries for employment generation. A number of recent breakthroughs have resulted in tying matrices of environmental impact coefficients to the standard input-output matrices. These followed from the original efforts of Leontief (1970) and Isard (1972). The technique involves multiplication of the standard Leontief inverse matrix by the environmental matrix to produce a matrix of total (direct plus indirect) environmental impacts as-

¹¹ In this research, local government services expenditures in seven different categories are explained by a regression relationship which includes population size, population density, degree of urbanization, and rate of population change as explanatory variables. Results are in preliminary form, but significant relations have been established in a number of instances.

sociated with the various economic activities. In this manner, Roberts and Rettig (1975) were able to determine several types of total air and water impacts for key industries in Clatsop County, on the Oregon coast.

Most of the impact measures described above may be included in the benefit category. Measurement of the costs associated with achieving various goals and objectives may be equally problematic.

Costs associated with land use planning may be broken down into two categories: (1) Costs of organizing for and administering land use controls, which will be discussed in the following section dealing with control alternatives; and (2) social opportunity costs associated with restricting land use.

In principle, many of the opportunity costs would be measurable in terms of their effects on land values. For example, if land is zoned for open space when it might have been used for industrial purposes, then its market value drops. The drop in market value reflects a decrease in the present value of the anticipated stream of returns which would accrue to the land, due to restriction to the less intensive use. But does the drop in value actually reflect some opportunity which is lost to society? Only if the market price is a true social price, and on this point, there is room for doubt. There are some interesting measurement problems here. If the zoning restriction affects the supply of developable property and if the demand for such properties is fairly inelastic, then the restriction would bring about higher level prices elsewhere, and it would be difficult to distinguish between a social cost and what is only a transfer.

Numerous authors, including Schmid (1968), Castle and Rettig (1972), Hillman and Martin (1973), and Bishop (1973), have pointed to factors which tend to cause unrestricted market prices for land to exceed its value in use. Land serves a number of functions in addition to its direct physical use as a productive input. It has unique value as an asset, for example, since it frequently appreciates in value more rapidly than the general price level of goods and services.¹² Thus, it is generally perceived to be a safe hedge against inflation. Furthermore, real property in land is more readily accepted as collateral for loans than are other types of property. Land is further a valued consumption good to

¹² Castle and Rettig (1972, p. 208) point out that "While wholesale prices rose 17 percent, and retail prices rose 30 percent, from 1955 to 1968, the average per acre value of private land rose 166 percent."

many in that it offers them a sense of security and distance and, thus, privacy from others. Note, however, that it is easy to argue that these factors which add non-direct-use value to land also perform vital social functions. Thus, based on these factors alone, it would be difficult to argue that the market price of land exceeds its social value.

However, there are other non-direct-use factors which affect land prices. Hillman and Martin (1972) noted that the discounted present value of federal subsidy programs may have been capitalized into the sale price of farmlands. Low capital gains taxes at the federal level, and in most states, mean that income achieved through land appreciation is largely sheltered, giving an additional boost to the attractiveness of the land as an asset.¹³ In the urban-rural fringe, where land use controls are usually of high interest, and where we would most like to obtain good estimates of the social value of land, speculation plays a strong role in land price determination. Due to the influence which speculation and the other factors listed above exert on the formulation of expectations, Schmid (1968) concludes that land prices enjoy a dynamic all their own, which may well cause them to diverge from true social values.

One of the most important contributions which economists could make to the land use control and planning process would be the development of a means of measuring the magnitudes which the various factor described above exert on land price and then to construct a sound rationale for determining which factors have social value and which do not. In the absence of clearcut guidelines on social value, there often may be a tendency to overlook the social opportunity cost of diverting land from one use to another. If such opportunity costs are overlooked, and if courts are permissive with regard to the taking issue (which they often can be), then too much land may be retained in open space and similar uses.

To sum up our observations on the present ability of economics to clarify impacts, measure benefits and costs, and thus to aid in the determination of the social value of various land use objectives, some important beginnings have been made but a great deal remains to be learned. There is no hope of filling all of the gaps in our knowledge overnight. We will continue to proceed in an incremental fashion, learn-

¹³ While land appreciation enjoys no special treatment under capital gains, the rates indicated in footnote 12 indicate that few other generally available assets offer such rapid capital gains.

ing as we go. Some of the information we can produce will be fed into the political process, where objectives are fought over, and new informational needs will be generated. The process will be slow and imperfect.

This gives rise to a final point about costs. In some cases, the slow speed with which land use planning is bound to proceed presents the possibility of imposing serious social costs. This is because many, perhaps most, types of land conversion tend to be irreversible. Associated environmental impacts are often irreversible, too. For example, the cost of reassembling land for farming once it has been subdivided and converted to urban use is often prohibitive. Once swamplands are filled, it is usually not possible to restore them to their natural state. By keeping lands open, we preserve our options for the future. These may be cases where an incremental, learning-by-doing process could be devastatingly harmful. If farmlands become critically scarce in the future, or if it turns out that marshlands serve some vital but unforeseen ecological function, this would be so. In some instances, a case may be made for adopting "a safe minimum standard of conservation." Indeed, following Wantrup (1963), a direct regulatory measure such as open space zoning would be most suitable in such situations. Indirect controls, to which we refer below, may be more productive elsewhere.

III. CRITERIA FOR EVALUATING ALTERNATIVE LAND USE CONTROLS

A number of criteria may be used in evaluating alternative control devices. These include: (1) Effectiveness in achieving planned objectives, (2) effects on the distribution of associated benefits and costs, (3) the costs required for organization and administration, (4) the degree of directness or indirectness, (5) political and legal acceptability, and (6) effects on the provision of (other) public services. Before proceeding to evaluate some of the available alternatives, we will discuss some of these criteria in more detail.

Direct Versus Indirect Controls

Control devices may be classified as direct and indirect (d'Arge, 1973, p. 168). Direct controls get right to the point. Some forms of zoning fall into this category. Ordinances which prohibit any landfilling in marshes and wetlands are direct. Their contribution to the fulfillment of specific goals (e.g., preservation of critical natural areas) is usually

easy to predict, and, in this sense, information about direct controls is well known. On the other hand, little may be known about their trade-off costs in terms of other goals such as economic efficiency.

Indirect controls leave latitude for individual decision making. They contain incentives which are intended to modify individual behavior in some pre-established fashion. Information about the results of indirect controls is thus less readily available because these results involve a behavioral link in addition to the technical link. Since direct controls have no behavioral link, it is necessary to rely on the police powers of the state to secure compliance. Indirect controls, on the other hand, require little expenditure on policing. They require a great deal of research and perhaps more monitoring in order to verify that behavior is, in fact, being modified in the desired fashion. Thus, the information-gathering costs associated with indirect controls tend to be high (d'Arge, 1973, p. 170). Direct controls may be capable of achieving results quickly because they lack the uncertain behavioral linkage. Indirect controls may require higher expenditures of both money and time for gathering information.

Safe minimum standards are, of necessity, achieved through direct controls. Because of the potential risk to society, their attainment cannot be left to the uncertainties and possible time lags associated with indirect controls.

THE POLITICAL DISTRIBUTION OF BENEFITS AND COSTS

The distribution of benefits and costs associated with alternative control devices is one of the most salient issues in land use planning today. The primary burden of costs associated with direct controls, such as zoning to preserve open space, is highly visible and is concentrated on a well-defined subset of landowners. This apparent inequity provides a basis for strong political resistance. Analysis of the political dimensions of alternative control policies may be crucial if effective policies are to be designed. As political scientists, Godwin and Shepard (1974) draw on the writings of Salisbury and Heinz (1968) and Lowi (1964, 1972) to set up four classes of policies: distributive, redistributive, regulatory, and self-regulatory.

Distributive policies are those where costs are widely borne and benefits accrue to more select groups. The provision of a neighborhood park with the general funds of a municipality might be an example in

the land use area. Such programs provide high payoffs to political decision makers, and informational costs are low.

Redistributive policies are much more visible to both cost bearers and beneficiaries. Benefits are transferred from one specific group to another. Preferential property tax treatment for farmland in a predominantly rural area might serve as an example of such a policy. The payoff to political decision makers is much more uncertain with these policies than with distributive ones.

Self-regulatory policies are the least coercive. Unlike distributive and redistributive policies, they do not involve the actual transfer of resources between groups. Permissive programs in the land use area, such as allowing farmers' groups to regulate their own pesticide application, are examples of such policies. Regulatory policies are the most coercive. An example would be a regulation prohibiting any development or change in use of privately owned swampland.

Godwin and Shepard (1974, p. 6) summarize the feasibility of implementing these policy types as follows:

Distributive policies are the most politically feasible type of statute because they do not conflict directly with the traditional American values of not forcing anyone to do anything; the persons benefiting from them are well aware that this is the case; the persons losing are not so aware of their loss; and the decision costs are low. This greater feasibility is particularly evident in a new and controversial area such as statewide land use policy. Close behind distributive measures are self-regulatory policies. Characterized by voluntarism and low information costs, these policies are less feasible than distributive measures, only because of their greater visibility. The passage of a regulatory, or a redistributive, policy is far more difficult. These policies are clearer as to both their losers and their winners, and thus are not so desirable from the political decision-maker's standpoint. To justify the coercion associated with the enactment of such a measure, there must be some type of crisis, some fundamental conflicts, or large levels of previous "public education."

From this political science viewpoint, then, it is not only the benefits and costs which count, but how broadly or narrowly they are distributed . . . and, of course, to which groups.

The Godwin-Shepard analysis suggests that economists and other social scientists might make a valuable contribution by estimating the incidence of benefits and costs of various land control policies and decisions on different political interest groups who are affected. Although his findings were not quantitative in nature, this was precisely the ap-

proach taken by Harrison (1971) in analyzing the controversies surrounding rezoning for the location of two large industrial plants in the Puget Sound region of Washington. Table 1 provides a summary of Harrison's findings. Of particular interest is the comparison of the various groups' perception of incidence versus that which Harrison judged actually would be obtained. This suggests that interest groups' perceptions may not be correct and that reactions to public land use decisions might be altered by the provision of reliable estimates of the sort proposed above.

Table 1. Political incidence of benefits and costs from rezoning to permit a new oil refinery (Port Susan case)

<i>Direction of Perceived Net Costs and Benefits:</i>		
	Net costs	Net benefits
Snohomish County		X
Atlantic Richfield		X
Local manufacturing industry	X	
Local service industry		X
Local landowners affected by the development	X	
Local labor	X	
Local occupational groups	X	
Interest groups concerned with environmental quality	X	
<i>Direction of Actual Net Costs and Benefits:</i>		
Snohomish County		X
Atlantic Richfield		X
Local manufacturing industry	X	
Local service industry	X	
Local landowners affected by the development		X
Local labor	X	
Local occupational groups	X	
Interest groups concerned with environmental quality	X	

Property Rights and the Law

In the view of Bosselman and Callies (1973), the crux of the legal issue also is tied closely to a benefit-cost calculus. In principle, policies which result in severely restricting the value of private property amount to a taking of property rights in violation of the Fifth Amendment to the U.S. Constitution. *However*, based on Justice Holmes' reasoning in

the landmark *Pennsylvania Coal Versus Mahon* case, "The courts have continued to use a balancing test . . . a weighing of the public benefits of [a disputed] regulation against the extent of loss of property values" (Bosselman and Callies, 1973, p. 321). Since the 1922 ruling, the Supreme Court has refused to hear most cases involving the taking clause, thus leaving lower courts to rule in these cases. The same authors find, however, a general tendency of state court rulings to uphold regulations and thus to deny contentions of taking. Nevertheless, the issue is far from settled and the potential need to compensate individual property owners for lost rights is, in many cases, still a strong possibility.

To those who have followed the historical evolution of property rights, it comes as no surprise that the question of whether or not these rights are to be redefined boils down to a benefit-cost type of calculus. North (1972), for example, traced shifts in rights in Medieval Europe to shifts in benefit-cost calculations. Nevertheless, the issue of compensation to those rights holders who are adversely affected is controversial. It will be discussed below as a possible plan for implementing control policies.

Impact on Public Finance

Another factor to be considered in evaluating land control policies is their relation to the financing of public services.¹⁴ On one hand, they may constitute an important new demand on already strained public financing capacities. This is especially true of some compensation schemes. Where bond issues are required, this will add a further demand on the already limited additional bonding capacities of many governments. On the other hand, land use tax incentives threaten to interfere seriously with the flow of revenues upon which other public services depend. The changes in property values which some types of land regulations produce will further interfere with the property tax base, which is the cornerstone of most local government services.

IV. A REVIEW OF SOME ALTERNATIVE CONTROLS

The preceding criteria appear to be some of the most important ones which enter into the economic evaluation of alternative land use

¹⁴ As noted earlier, the form and geographical distribution of public services, such as roads and sewers, have strong impacts on land use patterns. For this reason, strategies for the provision of public services will be discussed below as potential land use control devices.

controls. But what specific controls are available? Some controls are tried and proven. Their strengths and limitations are fairly clear. Others are new, with effects largely unknown.

Zoning

Zoning is one of the oldest and best known control devices. As noted earlier, it was first initiated as a means of avoiding the spillovers or externalities associated with incompatible uses on adjacent properties in a highly urbanized and congested setting. As such, it was not really a planning device since it was not envisioned as a means of controlling the evolution of land development and use. The consensus is that zoning is quite ineffective as a planning device. Siegan (1970) notes that land use and development patterns in Houston, a city without a zoning ordinance, differ little from those in zoned cities. Reps (1964) finds that zoning was conceived in answer to problems of a bygone era and has little to offer in solving the problems of modern land use control.

Aside from its ineffectiveness in achieving more desirable land use patterns, zoning has produced a number of undesirable side effects. Costs tend to be borne more heavily by certain segments of society. Branfman, Cohen, and Trubek (1973) suggest that there is a strong positive relationship between clustering of the poor and the degree of zoning, for example. Zoning has increasingly been fought in the courts on the basis that it is exclusionary (Bergman, 1974). A recent study of the New Jersey situation (Williams and Norman, 1970) clearly outlines the exclusionary function of zoning. In an effort to preserve community identity and character, zoning is used as a means of excluding mobile homes and multiple unit dwellings. The result is that housing needs of the poor are not met, and poor people are excluded from an increasing number of communities. Delafons (1969, pp. 32-33) observes that zoning has often been "aimed explicitly at protecting and promoting the value of private property" and may have little to do with "what planners would regard as a desirable pattern of land use."

Another criticism of zoning is that it is *negative* in nature. It specifies what cannot be done but, in itself, contains no mechanism which insures that what the public wants in terms of land use is accomplished. This explains why the most recent innovations in zoning advocate concurrent use of taxing and/or compensatory devices. Exclusive Farm Use (EFU) zoning, for example, typically operates in conjunction with use

value taxation.¹⁵ Similarly, transferable development rights (TDR) as proposed by Chavooshian (1974), propose compensation to be used in conjunction with zoning. Continued legal difficulties arising from the taking issue are likely to make incentive devices used in zoning look more attractive (Hagman, 1974). In spite of the past ineffectiveness of zoning, to the extent that it can be revamped and modified, it may yet become a more effective land use control.

At first glance, zoning appears to be a direct control on land use; when it is strictly applied, this may be the case. However, the traditional zoning process typically entails extensive appeals and variance procedures (NCUP, 1969), meaning that local parties who are adversely affected have great latitude to secure alterations to any given zone configuration. Larger property owners and developers have a natural advantage in influencing variance procedures. This explains why d'Arge (1973) classifies zoning as an indirect control. When developers are successful, as is frequently the case, the zoning process takes on more of a self-regulatory nature than a strictly regulatory one. It is the self-regulatory aspect of zoning which explains its political acceptability.

Public Service Strategies

There is a rapidly growing awareness of the interdependence between land use patterns and the provision of public services. In addition to chewing up open space and encumbering farming operations, urban scatter and urban sprawl are now understood for their tendency to increase the cost of providing public services. At the same time, we recognize that the decision to improve or extend urban services to peripheral areas acts as a spur to more development in these areas.

Development spread may be curtailed through decisions to limit services to outlying areas. This is inherent in the concept of the *urban service boundary*. One survey, which did not pretend to be comprehensive, lists 12 cities and areas which have recently adopted some form of the service boundary concept (BGRS, 1974). All are attempts to insure that services will not be provided beyond a certain periphery and that any growth and development will thereby be confined to its interior. Most of these programs are designed to function in concert with zoning. Their effectiveness remains to be seen.

¹⁵ This is the case with EFU zoning in Oregon (LGRD, 1973, pp. 9-19), as well as in New York (Conklin and Bryant, 1974).

If sprawl increases the costs of public service provision, the economist quickly recognizes that one appropriate remedy might be to design *marginal cost pricing* schemes for outlying customers. Special assessments to cover new sewer and water installations already may do this in some cases. The "systems development charge" which has been used in Corvallis, Oregon, in recent years is an example of a special assessment policy which was developed to control sprawl limitation. Pushed to the limit, one could envision a system of property taxes and/or service charges which is differentiated so as to place a heavier burden on residents in sprawling development areas, justified by the higher cost of providing such services as roads and police services.

Marginal cost pricing of services merits consideration by economists. A first step would be to determine the extent to which service costs actually vary depending upon density of new housing development and distance of these developments from city centers or existing development periphery. Some studies of these issues have already been made. A second step would be to compare these costs with existing development charges and service rates to verify that shortfalls actually exist. A third phase would be to predict the effect that true marginal cost pricing of services would have on land use patterns, i.e., would expected increases in sewer rates and other charges to low density or outlying units provide a sufficient incentive for changing corresponding land use patterns? The answer to this question depends on the strength of people's preferences for various residential patterns.

Because of the wide variety of strategies which land use oriented public service may take, it is difficult to classify these strategies politically, or in a legal sense. Like standard zoning, the boundary concept has the appearance of being quite direct, but the appeals and change procedures which are adopted may leave it open to extensive alterations through the political process. Pricing policies would be indirect in their operation, and thus are more uncertain in their ultimate impact on land use, given our initial state of knowledge.

Tax Incentives

Tax incentives are, in reality, but another facet of public service strategies, though they need not conform to any rationale of cost differentials. Tax policies are typically indirect with respect to their impact on land use, and thus considerable time and effort must be expended in assessing their effectiveness.

Use-value taxation has been used as a land use incentive for almost two decades now, since Maryland enacted its first law in 1956. A number of recent studies have concluded that the ultimate impact of use-value assessment, in terms of preventing the conversion of farmlands and open space to urban uses, is at best negligible (Barron, 1973; Carman and Polson, 1971). Some of the early laws even appear to have worked to the benefit of land speculators, serving to lower the cost of holding lands until attractive sales opportunities arose or could be generated. Laws in most states recently have been revised to include penalties for converting lands which have been held on use-value tax rolls. If such penalties no more than equal the accumulated difference in taxes, plus interest, however, they will still help to provide the would-be speculator with useful financing.

Referring back to the classification scheme used by Godwin and Shepard (1974), use-value taxation would be characterized as distributive in nature. It shifts the tax burden away from a relatively small group who can easily perceive its benefits to a large group who probably do not readily perceive their increase in the share of costs. This gives it high political acceptability. This may be an equitable arrangement, however, since, as McMillan (1974, p. 8) observes, "it can reduce the subsidy to urban development which market value assessment implies."

Capital gains taxes frequently are cited as a measure which could be used to curtail land speculation by reducing the incentive to seek large gains through land value appreciation. In this indirect fashion, it is argued, one of the key driving forces in land conversion would be curtailed. Vermont is the only state to initiate such a tax to date, and it is too early to ascertain effectiveness since the law has only been in use for a year.¹⁶

Capital gains taxes are a sensitive issue politically in that they may fall heavily on a well-identified and powerful group. It is significant that Vermont's law applies to gains on the sale or exchange of land only, and does not tax the broader spectrum of capital gains. Furthermore, the law was designed to strike at short-term gains, meaning those generated in lands which have rapidly been converted to recreational use by de-

¹⁶ Bingham (1974) reports that in the first year of operation, the tax raised \$1.2 million in revenues versus an anticipated \$3.5 million. This leads to conclude either that the tax might have been an effective disincentive, or that the measure was applied ineffectively.

velopers and speculators. In Vermont, the latter groups frequently have been composed of nonresidents. It may well have been impossible politically to adopt a measure aimed more directly at state-resident landowners.

Hagman (1974) lists *transfer taxes* and *unearned increment taxes* as two additional devices which could be used in land use control. They are little used in this country at present. Like capital gains taxes, these taxes are viewed by Hagman as methods of "windfall recapture." Windfalls are increases in private property value which occur as a result of the actions of public bodies (e.g., the construction of roads which provide access to markets) or of society at large (e.g., increased demand from population growth), and not from any "sweat" or productive effort on the part of the landowner himself. They are unearned increments in property value. But, as Hagman acknowledges, there is a difficulty in measuring "windfalls."¹⁷ Furthermore, windfall recapture devices are politically difficult because the set of losers is so well defined.

Development taxes are yet another measure which may be used as a disincentive to development and land conversion. These taxes appear to be more direct in their effect on open space consumption in that they apply to development per se, rather than to all land transfers. Development taxes recently have come into heavy use in California, where they have taken the form of a business license tax on housing developers (Hagman, 1974, p. 13). As yet, there is no known measure of their effectiveness in controlling land conversion. In California, these taxes are used to raise general revenues.

McMillan (1974) proposes that the development tax be used specifically for the purpose of raising funds to purchase open space in the process of development on the urban-rural fringe. Large developers now can be required to provide adequate open space in planned unit developments. The development tax would permit local governments to perform the same function in the case of smaller developers.

Where development taxes are used to purchase open space rather than generate general revenues, they probably will be more feasible politically. Benefits will be returned to the same group which bears the costs of providing them. Furthermore, the taking issue, which arises when attempts are made to zone lands open without compensation, is avoided (McMillan, 1974, p. 25).

¹⁷ Difficulties in measuring windfalls are similar to those in measuring the social value of land, as discussed above.

Compensation for Loss of Development Rights

The failure to compensate property owners for restrictions placed on the use of their land has led to repeated attacks on, and modification of, local zoning schemes. Similarly, legislation to preserve critical natural areas has been ineffectual in the absence of compensation. Batie and Long (1974, p. 3) cite this as a primary reason for the failure of preservation acts in two critical areas of Virginia.

The legal constraint which the taking issue constitutes is not necessarily what counts. As we have pointed out, state courts have often been quite permissive with respect to the taking issue. According to Bosselman, Callies, and Banta (1973, p. 324), "many local governments fail to exercise their [land control] powers—or, if they do, they back down easily when challenged." Often, the political power of landowners is the crucial factor. In the Virginia example, Batie and Long (1974, p. 3) observed that the State General Assembly's failure to provide means of enforcing their critical areas laws was a case of where "[y]ielding to the property owners' resistance was apparently the politically expedient course of action."

Compensation in the form of the purchase of development rights or easements is one alternative which may be both politically expedient and help achieve a desired land use objective. The political expediency would appear to depend on how costs are to be distributed, both among the public and through time.

But is there justification for compensation? The answer is yes, to the extent that the price paid is a proper reflection of social opportunity cost. Again, this raises the importance of obtaining such a measure. On the other hand, the answer is no, if payment contributes to the solidification of an undesirable distribution of wealth. While we have no *a priori* way of specifying what a desirable distribution of wealth is, it would, nevertheless, be helpful to know the distributional impacts of proposed compensation schemes and to add this information to the decision making process. One of the objectives of our current land use research at Oregon State is to clarify the distribution of both the benefits and the costs associated with compensation. One of our first obstacles is trying to come up with some reasonable way to estimate the distribution of land ownership.

McMillan presents an awe-inspiring list of the difficulties which may attend the public purchase of *development easements* (1974, pp. 6-7). Purchasing of these rights has, at times, cost almost as much as

obtaining the full property right. Furthermore, obtaining the development easement on farmlands is typically no guarantee of access for recreational purposes. But the biggest obstacle may well be financing the purchase of the easement. Especially in the case of local governments, public service budgets and bonding capacity already are sorely strained. Suffolk County, Long Island, for example, is now entering into a long-range program of purchasing development rights on remaining farmlands. Indications are that \$60 million will be required to acquire lands in the first round of purchases alone, and that prices from \$4,000 to \$5,000 per acre will be paid.¹⁸

The attractiveness of the *transfer of development rights* (TDR) program, which is being advocated by Chavooshian (1974, p. 11) and others, is that it promises to be self-financing. A region is first zoned. Then, in order to be able to develop lands in areas designated as developable, landowners must purchase additional development rights from other landowners, presumably those in the area zoned for open space. In this way, a market for, and transfer of, development rights is brought about.

This scheme is receiving trials in a few areas, but no results are yet available. It is not clear that the market for TDR's would develop as envisioned. Landowners are uncertain whether they would receive higher or lower effective returns for their lands under TDR than they would in the current market.¹⁹ Uncertainties about the approach are apparently so pervasive at this time that any institution will proceed slowly, and we will have to wait years to gain any extensive evaluation.

V. PARTING OBSERVATIONS

Our discussion has centered about the measurement of various types of benefits and costs associated with land use planning. Unlike water resources planning, land use lacks any central focus such as the cost-benefit analysis of alternative public investment projects. Rather, benefits and costs here are scattered widely. Gaps in our information

¹⁸ Based on remarks by J. V. N. Klein, County Executive, at Conference on Rural Land-Use Policy in the Northeast, October 2-4, 1974, Atlantic City. See also [Klein, 1974].

¹⁹ Remarks by Phillip Alampi, Secretary, New Jersey Department of Agriculture, at conference cited in footnote 18. His remarks were based on extensive interviews with New Jersey farmers.

are so great that it is not possible to speak in terms of net social benefit except in broad conceptual terms.

The discussion of benefits and costs nevertheless helps to unify three important aspects of land use control—the economic, the legal, and the political. On the economic side, established techniques may be useful in the quantification of some of the anticipated benefits of land use planning, such as cleaner air, open space, and improved recreational opportunities.

The distribution and concentration of benefits and costs among various interest groups can help to explain political feasibility. Using the policy typology adopted by Godwin and Shepard (1974) for sizing up land use policies was, by and large, rewarding. It offered a number of useful insights as to the likely political success or failure of alternative land use control programs.

Following the legal analysis of Bosselman, Callies, and Banta (1973), the crux of the "taking issue" can be expressed in terms of social benefits and private costs to landowners. This is how Justice Holmes' balancing principle translates into legal terms. However, those writers observe that the "taking issue" may be somewhat mythical when trends in recent state court findings are examined. The overriding constraints in implementing land use controls may well be political rather than legal.

One way to smooth the political path in land use planning would be through use of compensation schemes. Uncertainties about the distribution of benefits and costs of such schemes seems to be a limiting factor at present. Economic research in this area could contribute to decreasing some of these uncertainties.

Acknowledgments: Support for this research was provided under National Science Foundation Grant No. 74-19412.

REFERENCES

- Barron, James. *Impact of Open-Space Taxation in Washington*, Wash. Expt. Sta. Bull. 772, March 1973.
- Batie, Sandra S., and Burl F. Long. "Looking Before Leaping: Land Use Legislation and the Need for Economic Analysis," Staff Paper SP-74-1, Dept. of Agric. Econ., Virginia Polytechnic Institute, Blacksburg, Aug. 1974.
- Bauman, Zygmunt. "The Limitations of 'Perfect Planning'," in *Action Under Planning*, B.M. Gross, ed. New York: McGraw-Hill, 1967.
- Bergman, Edward M. *Eliminating Exclusionary Zoning: Reconciling Workplace and Residence in Suburban Areas*. Cambridge, Mass.: Ballinger Publishing Co., 1974.

- Bingham, William H. "Vermont's Tax on Capital Gains in Land Sales as a Device to Control Land Speculation," Conference on Rural Land Use Policy in the Northeast, Atlantic City, N.J., Oct. 4, 1974.
- Bish, Robert, and Vincent Ostrom. *Understanding Urban Government: Metropolitan Reform Reconsidered*. Washington, D.C.: American Enterprise Institute for Public Policy Research, 1973.
- Bishop, Richard S. "Land Prices, Social Costs, and Land Use Policy," in Rpt. No. 4, Committee on the Economics of Natural Resources Development in the West, 1973.
- Bosselman, Fred, and David Callies. *The Quiet Revolution in Land Use Control*. Washington, D.C.: Council on Environmental Quality, Dec. 1971.
- Bosselman, Fred, David Callies, and John Banta. *The Taking Issue*. Washington, D.C.: Council on Environmental Quality, 1973.
- Branfman, Eric J., Benjamin I. Cohen, and David M. Trubek. "Measuring the Invisible Wall: Land Use Controls and the Residential Patterns of the Poor." *Yale Law Jour.*, Jan. 1973 (reproduced in Listokin, 1974).
- Bureau of Governmental Research and Services (BGRS), University of Oregon. "Local Government Policies for Urban Development," April 1974.
- Carman, Hoy F., and Jim G. Polson. "Tax Shifts Occurring as a Result of Differential Assessment of Farm land: California, 1968-69," *National Tax Jour.*, Vol. 24, Dec. 1971, pp. 449-457.
- Castle, Emery N., and R. Bruce Rettig. "Land Use Conflicts and Their Resolution," in *Jour. of Soil and Water Conservation*, Sept.-Oct. 1972, pp. 207-210.
- Chavooshian, B. Budd. "Transfer of Development Rights: A New Concept in Land Use Management," Conference on Rural Land Use in the Northeast, Atlantic City, N.J., Oct. 2, 1974.
- Ciriacy-Wantrup, S. V. *Resource Conservation Economics and Policies*. Univ. of Calif., Div. of Agric. Sci., 1963.
- Clawson, Marion. *Suburban Land Conversion in the United States*. Baltimore: Johns Hopkins Press for Resources for the Future, 1971.
- Clawson, Marion. "The Finiteness and Flexibilities of Land Resources," in *Jour. of Soil and Water Conservation*, Sept.-Oct. 1972, pp. 202-206.
- Clawson, Marion. "Historical Overview of Land Use Planning in the United States," in *Environment: A New Focus for Land Use Planning*, Donald M. McAllister, ed. Washington, D.C.: National Science Foundation, RANN, Oct. 1973.
- Clawson, Marion. "Problems and Policy Issues in Rural Land Use Control," Conference on Rural Land Use Policy in the Northeast, Atlantic City, N.J., Oct. 2, 1974.
- Conklin, H. E., and W. R. Bryant. "Agricultural Districts: A Compromise Approach to Agricultural Preservation," in *American Jour. of Agricultural Economics*, Aug. 1974, pp. 607-613.
- Dahl, Robert A., and Charles E. Lindblom. *Politics, Economics, and Welfare*. New York: Harper, 1953.
- d'Arge, Ralph C. "Economic Policies, Environmental Problems, and Land Use," in *Environment: A New Focus for Land Use Planning*, Donald M. McAllister, ed. Washington, D.C.: National Science Foundation, RANN, Oct. 1973.

- Day, John C. "A Linear Programming Approach to Floodplain Land Use Planning in Urban Areas," *Amer. Jour. of Agricultural Economics*, May 1973, p. 165.
- Delafons, John. *Land-Use Controls in the United States*, 2nd ed. Cambridge: M.I.T. Press, 1969.
- Durbin, E. F. M. *Problems of Economic Planning*. London: Ruoteledge and Kegan Paul, 1949.
- Friedmann, John. "The Institutional Context," in *Action Under Planning*. B. M. Gross, ed. New York: McGraw-Hill, 1967.
- Godwin, R. Kenneth, and W. Bruce Shepard. "State Land Use Policies: Winners and Losers," Ore. State Univ., Corvallis, Nov. 1974.
- Hagman, Donald G. "Windfall for Wipeouts," draft copy, 1974.
- Harrison, Peter. "The Application of Benefit-Cost Analysis to Proposed Land Use Change: The Guemes Island and Port Susan (Kyak Point) Conflicts." Seattle: Institute for Economic Research, Univ. of Wash., May 1971.
- Hillman, Jimmye S., and William E. Martin. "Elements of a National Land Use Policy," in *Jour. of Soil and Water Conservation*, Sept.-Oct. 1972, pp. 211-216.
- Hirsch, Werner A. *The Economies of State and Local Government*. New York: McGraw-Hill, 1970.
- Hirschman, Albert O. *Development Projects Observed*. Washington, D.C.: The Brookings Institution, 1967.
- Isard, Walter, et al. *Ecologic-Economic Analysis for Regional Development*. New York: The Free Press, 1972.
- Jaksch, John A., and Herbert H. Stoevener. "Effects of Air Pollution on Residential Property Values in Toledo, Oregon," Spec. Rept. No. 304, Agric. Expt. Sta., Ore. State Univ., Corvallis, Sept. 1970.
- Jaksch, John A., and Herbert H. Stoevener. *Outpatient Medical Costs Related to Air Pollution in the Portland, Oregon Area*. Washington, D.C.: U.S. Environmental Protection Agency, July 1974.
- Klein, John V. N. Report of the Suffolk County Agricultural Advisory Committee to the Suffolk County Legislature, March 1974.
- Kneese, Allen V., Robert U. Ayres, and Ralph C. d'Arge. *Economics and the Environment: A Materials Balance Approach*. Baltimore: John Hopkins Press for Resources for the Future, 1970.
- Knetch, J. *Outdoor Recreation and Water Resources Planning*, American Geophysical Union, Water Resources Mono. No. 3, Washington, D.C., 1974.
- Leontief, Wassily. "Environmental Repercussions and the Economic Structure: An Input-Output Approach," *The Review of Economics and Statistics*, Vol. 52, 1970, pp. 262-271.
- Libby, Lawrence W. "Alternatives for Land Use Management: Tax Policies and Other Special Incentives," Conference on Rural Land Use Policy in the Northeast, Atlantic City, N.J., Oct. 2, 1974.
- Listokin, David, ed. *Land Use Controls: Present Problems and Future Reform*. New Brunswick, N.J.: Rutgers Univ. Center for Urban Policy Research, 1974.
- Local Government Relations Division (LGRD), Executive Dept., State of Oregon, and Ore. State Univ. Ext. Serv. "Oregon Land Use Legislation, Vol. I, Analysis," Sept. 1973.

- Lowi, Theodore. "American Business, Public Policy, Case Studies, and Political Science," *World Politics*, Vol. 16, July 1964.
- Lowi, Theodore. "Population Policies and the American Political System," in *Political Science in Population Studies*, Richard Clinton, William Flash, and R. Kenneth Godwin, eds. Lexington, Mass.: D.C. Heath, 1972.
- McMillan, Melville. "Land Use Control for the Preservation of Open Space on the Rural-Urban Fringe: An Alternative Policy," Working Paper No. 7, Center for Resource Policy Studies, Univ. of Wis., Madison, Dec. 1974.
- National Commission on Urban Problems (NCUP). "Land Use Controls: Zoning and Subdivision Regulations," in *Building the American City*. Washington, D.C.: Govt. Printing Office, 1969 (reproduced in Listokin, 1974).
- North, Douglass. "The Creation of Property Rights in Western Europe 900-1700, A.D.," unpub. manuscript, 1972, cited in "Property Rights and Economic Theory: A Survey of Recent Literature," E. Furubotn and S. Pejovich, in *Jour. of Economic Literature*, Dec. 1972, pp. 1137-1162.
- Randall, Alan. "Measuring the Benefits of Environmental Improvements," in *Committee on the Economics of Natural Resources Development in the West*, Rpt. No. 4, 1973.
- Reps, John. "Requiem for Zoning," in *Planning 1964*. Chicago: American Society of Planning Officials, 1964 (excerpts reproduced in Listokin, 1974).
- Roberts, E. F. "A Basic Introduction to Land Use Control Law and Doctrine." Ithaca, N.Y.: The Cornell Law School, Oct. 1974.
- Roberts, Kenneth J., and R. Bruce Rettig. "Linkages Between the Economy and the Environment: An Analysis of Economic Growth in Clatsop County, Oregon," joint publication of Sea Grant College Program and Agricultural Experiment Station, Oregon State Univ., Corvallis. Agric. Expt. Sta. Bull. 618, May 1975.
- Salisbury, Robert, and John Heinz. "A Theory of Policy Analysis and Some Preliminary Applications," in *Policy Analysis in Political Science*, Ira Sharkansky, ed. San Francisco: Markham, 1970.
- Samuelson, Paul A. "The Pure Theory of Public Expenditures," *Review of Economics and Statistics*, Vol. 36, 1954, pp. 387-389.
- Schmid, A. Allan. *Converting Land From Rural to Urban Uses*. Baltimore: Johns Hopkins Press for Resources for the Future, 1968.
- Siegan, Bernard. "Non-Zoning in Houston," *Jour. of Law and Economics*, April 1970, pp. 129-144 (reproduced in Listokin, 1974).
- Tweeten, Luther, and Yao-chi Lu. "Attitudes as a Measure of Optimal Place of Residence," Okla. State Univ., Stillwater, 1974.
- Vars, Charles R., Jr., and Gary W. Sorenson. *Study of the Economic Effects of Changes in Air Quality*, Ore. State Univ., Air Resources Center, June 1972.
- Williams, Norman, Jr., and Thomas Norman. "Exclusionary Land Use Controls: The Case of Northeastern New Jersey," in *Land Use Controls Quarterly*, Fall 1970 (reproduced in Listokin, 1974).

Methods for Evaluation of Economic Impacts of Large Scale Developments

Thomas E. Dickinson*

INTRODUCTION

RECENTLY, as attention has been drawn to the concept of growth inducement, officials and citizens have become increasingly concerned about fiscal impacts of proposed projects and particularly skeptical of benefit-cost analyses which purport massive local and regional benefits. Sufficient examples are available to support the contention that the benefits may be short-lived while the accompanying costs may be much longer lasting.¹

Concern with fiscal effects of new projects has caused resistance to unplanned growth and sometimes any growth at all.² The reaction has been called the gangplank syndrome—"I'm on board, let's pull up the gangplank," a response which is neither good nor bad necessarily but is certainly insufficient. Planners, decision makers, and citizens need good information about real costs and benefits of growth.

* Assistant Professor, Division of Environmental Studies, University of California, Davis.

¹ Examples range from the Alaskan Pipeline and the Oroville Dam in California to the location of private industrial plants in Hanford, California, and Modesto, California. The initial beneficial impact almost always is increased employment possibilities. In the case of the pipeline and the dam, excess workers were drawn into the area for whom no jobs existed. See Patricia R. B. Malott, "The Oroville Dam Project and Local Impact," (unpublished M.A. thesis, University of California, Davis, 1967), and "Alaskan Pipeline Jobs Scarce, Brennan Warns," *New York Times*, Dec. 8, 1973.

² As of June 1973, a study based on information from the Urban Land Institute found 5 states and 39 counties, cities, and townships with growth constraints. This study also listed two states and six cities which were seriously considering some type of growth control. The authors admit that this list is only "the tip of the iceberg" since the information is already out of date. Berkeley Planning Associates, *Economic Growth Study Design, a Report to the Department of City Planning, San Francisco*, Phase 1: "A Critical Review of Existing Growth Studies and Literature Related to Growth and Its Impacts," Berkeley, California, June 1973.

Four basic issues must be considered when attempting to evaluate a project's impact on a community. First, does the new development or set of developments require more services than the tax revenue generated? Second, what are the job levels, wages, sales, and profits provided? Third, what environmental impacts are created? Fourth, what are the non-economic social impacts? Methods available to provide information in the first two categories will be discussed in this paper.

In evaluating various economic impacts on a region caused by a given project, the analyst at a minimum should be aware of the following considerations: (1) The level of unemployment, (2) the level of skills of those unemployed, (3) any excess capacity in the public service sector, (4) the demographic characteristics of the impacted area, and (5) the probability of migration into the area. The most important consideration is to determine how long the initial economic stimulus will last and whether anything will replace that stimulus once it is gone.³

A variety of techniques are applicable to the investigation of fiscal and economic impacts of public works projects and large-scale private developments. Presently, cost-revenue studies are the major tool for assessing public impacts, while economic base studies and input-output studies generally have been used to evaluate private impacts.

EVALUATION OF PUBLIC ECONOMIC IMPACTS— COST-REVENUE ANALYSIS

Cost-revenue studies are limited to consideration of fiscal costs and benefits of a development to specific governmental units. The basic issue is: What will the local entity have to supply in services and what are the revenues expected to be generated by the development? For public works projects such as a reservoir or freeway, direct fiscal impact may be limited to the removal of real estate from local tax rolls. However, such projects may require provision of additional local services such as building and maintaining freeway access roads or developing recreation and sanitation facilities at reservoirs. These direct costs are obviously attributable to the project.

³ For a fuller discussion of these needs see T. E. Dickinson, and J. R. Blackmarr, "Evaluation of Public and Private Economic Impacts Caused by Development" in *Social Impact Analysis*, ed. James McEvoy. John Wiley, forthcoming.

Equally as important but often less obvious are indirect costs and revenue arising from a public project. When the project is located some distance from existing population centers, construction crews and their dependents probably will reside, at least temporarily, in the local area. The new population will demand public services such as education, police and fire protection, and social services.

The rerouting of a highway may lead to relocation or destruction of local commercial business such as gas stations, motels, and restaurants which depend primarily on tourist trade. Conversely, construction of a new freeway interchange may create new commercial opportunities with attendant costs and revenues. If highway relocation occurs entirely within the jurisdiction of the single local government, overall costs may be balanced or even outweighed by increased revenues. If the highway is changed to a route outside the original town, the town may sustain substantial costs and the adjacent local unit large gains.

To evaluate all fiscal effects of a proposal, the entire chain of events likely to occur must be anticipated and relevant cost and revenue data obtained. Indirect fiscal effects are more difficult to forecast than direct impacts such as property tax revenues resulting from project-related changes in land use. The analyst should evaluate past experiences of similar-type projects to increase validity of his estimates of induced activities caused by that type of project.

Projects generated in private sectors present very similar problems. The attribution of particular governmental costs to specific developments is difficult and often arbitrary. A single family subdivision will increase need for education, public protection, and other services. However, unless the project is a recreational, second-home development or all residents commute to another jurisdiction to work, the project is likely to be accompanied by a net increase in commercial and industrial activity. These firms will pay taxes as well as requiring services. Residents will make local retail purchases which bring sales tax to local government. The decision as to how to allocate this additional sales tax revenue is not easy.

Conventional cost-revenue (C-R) studies usually try to consider residential, commercial, or industrial developments in isolation, not acknowledging the highly interdependent nature of economic activity. For this reason, a fairly detailed methodology is generated to allocate expected costs and revenues to the particular land use activity or group

of activities being analyzed. In no small measure, results generated from these studies depend on the assumptions used to make allocations.⁴

METHODS OF ALLOCATING EXPENDITURES

One allocation scheme often used is to divide expenditures into three categories—expenditures attributable to land regardless of the type of use; expenditures allocatable directly to people; and expenditures related to both people and property.⁵

Only a small fraction of local government expenditures are simply property related. Allocation of costs for capital improvements such as sewers, sidewalks, and roads to the parcel which benefits from them would be reasonable, and certainly, some part of public protection expenses are intended to protect property rather than people.⁶

Allocation of services such as health, sanitation, welfare, and public education provides a tougher question. Such expenditures are services to people and are often labeled as “services of community-wide benefit.”⁷ The argument has been made that these costs cannot be allocated back to specific properties. These costs usually comprise the majority of local expenditures, and therefore must be accounted for in any C-R analysis. A variety of procedures has been developed to allocate services to people on various land uses. These procedures include:

1. Allocating costs on a per capita basis to residential land use classes according to average densities.

⁴ Examples of such studies include:

Livingston and Blayney, City and Regional Planners, *Foothills Environmental Design Study: Open Space vs. Development*, City of Palo Alto, Palo Alto, California, 1971.

Milpitas Planning Department, *1969-70 Milpitas Community Comprehensive Land Use Study: Cost-Revenue*, Milpitas, California, 1971.

Eric G. Johnsen, Jr., *Is Population Growth Good For Boulder Citizens? Zero Population Growth*, Palo Alto, California, 1971.

Russell Benton, *The Costs of Urban Growth for the Salem, Oregon Area*, Willamette Valley Council of Government, Salem, July 1972.

⁵ For example, Thomas E. Dickinson, J. Peters, and J. Cupps “The Fiscal Impact of Alternative Land Use in Stanislaus County,” Division of Environmental Studies and Stanislaus Area Association of Governments, January 1972.

⁶ An example of this approach is a recent study by M. Huddleston, *City of Davis Cost-Revenue Analysis Fiscal Year 1971-72*, Planning Department, Davis, California, April 1973, where the author analyzes police activities in terms of “beat” patrols and calls for assistance enabling some costs to be allocated to land uses specifically.

2. Allocating costs according to average assessed valuation, acreage, or other characteristics of real property classes.

3. Assigning costs to land uses on the basis of opinions of department personnel about which land use activities are responsible for what proportion of program costs.

4. Using performance budgeting to attempt to determine the actual incidence of costs of services.

Depending on the technique employed, results may vary substantially. One study calculated police protection expenditures for a subdivision at \$7,000 using performance budgeting, \$19,000 based on the fraction of the city's assessed valuation accounted for by the subdivisions, and at \$22,400 on the basis of the estimate by the police administrator.⁸ However, a number of factors often prohibit use of performance budgeting. First, the time necessary to perform such a study can be one to three man-years.⁹ Second, most departments do not keep records from which costs can be allocated to specific land uses or parcels. Third, there is no standard method of record-keeping between departments to allow for comparison. For these and other reasons, reliance on one of the short-cut methods such as average per capita costs or assessed valuation is necessary for most short-term studies.

Perhaps the most debated and sensitive cost allocation revolves around public education. Not surprisingly, many people allocate all education costs to residential uses. Opponents of this view argue that without a labor force or clientele, industrial or commercial firms would not locate in the area. When the entire education bill and cost of services to people are allocated to residential uses, these properties do not pay their way.

It can be argued that no general "deficit" land use categories are likely to emerge unless services of community-wide benefit are assigned entirely to a particular land use. Mace and Wicker¹⁰ introduce an al-

⁷ Ruth L. Mace, *Municipal Cost-Revenue Research in the United States: A Critical Survey of Research to Measure Municipal Costs and Revenues in Relation to Land Uses and Areas 1933-1960*. Chapel Hill, Institute of Government, University of North Carolina, 1961.

⁸ Huddleston, *op. cit.*

⁹ Dickinson, Peters, and Cupps, *op. cit.*, Milpitas Planning Department, *op. cit.*

¹⁰ Ruth L. Mace, and Warren J. Wicher, *Do Single Family Homes Pay Their Way?* Urban Land Institute Research Monograph 15, Washington, D.C., 1968.

ternative procedure of assigning the "costs of people services" according to the proportion of total assessed attributable to two land use categories, residential and non-residential. If 80 percent of the tax base is residential, then 80 percent of public education costs are charged to residential property. The method is based on the premise that assessed value of land reflects the intensity of the land use and hence the relative importance of that use to the community.

Most commercial, industrial, residential or agricultural uses of land are interdependent and unlikely to persist in isolation. If the region-wide land use mix could be assumed to accompany any local development activity, it would not matter to which classes of land various costs were allocated; for it could be expected that any change in service costs would be balanced by a generally proportional increase in revenues. However, local government property-taxing jurisdictions and their boundaries do not recognize this land use interdependence. In almost any region, one cannot expect to find a homogeneous distribution of cost-generating and revenue-producing sources. While recognizing that property tax and other fiscal resource inequities exist between local jurisdictions, in studies of fiscal impacts the analyst must treat real costs which are caused by development. One could arbitrarily allocate costs in a manner as close as possible to the pattern of revenue allocations, in order that no classes of land use show any significant surpluses or deficits. However, this procedure is the absurd extreme.

ALLOCATION OF REVENUE

Similar problems arise with the allocation of revenues. Some revenues, such as property taxes, are easy enough to allocate to specific parcels. Other revenues, however, are not so easy to allocate. In states with a general sales tax, part of the revenue may be returned to the local jurisdiction from which the taxes were collected. Many C-R studies have allocated this entire amount to retail-commercial,¹¹ while others have allocated most of this revenue to residential lands.¹² The basic issue is to determine what percentage of retail expenditures was generated indigenously. The greater the percentage of retail sales to local

¹¹ Milpitas Planning Department, *op. cit.*

¹² See L. T. Wallace, George Goldman, Ronald H. Tyler, and Joe Hart, *A Framework For Analyzing Public Service Costs and Revenues Associated With Land Use Alternatives*, University of California, Cooperative Extension Service, June 1973 (mimeograph).

residents, conceivably the larger percentage of sales taxes should be allocated to residential lands.

Suggestions of Resolution of Allocation Assumptions

A simple solution to resolve the arbitrary allocation dispute is to employ two contrasting allocation procedures and report both sets of results. The rationale for each method could be presented along with the cost-revenue summary tables. Then the public and decision makers could evaluate the meaning of each set of results. The procedures should be structured to emphasize their differing effects on the results. Two which have been suggested are:

1. The "residential growth as a burden" formulation
 - Cost of services to people allocated entirely to residential lands
 - Sales tax revenues allocated entirely to retail commercial lands
 - Other revenue and cost allocations, when debatable, consistent with this approach.
2. The "interdependent community" formulation
 - Costs of service to people allocated according to land class by assessed value
 - Estimated fraction of sales tax revenue due to purchases by residents allocated to residential sector
 - Other cost and revenue allocations, when debatable, consistent with this approach.

For communities which are primarily bedroom suburbs, the two approaches should produce very similar results. In a more economically balanced community the results should differ substantially. As is apparent, those alternative allocation procedures do not alter the actual fiscal impacts of project development. They merely put the effects in varying contexts for decision makers to consider.

AREAS FOR ECONOMIC RESEARCH

The three major areas for research on cost-revenue studies are: (1) Increasing the specificity of land uses, (2) developing methods to encompass marginal rather than average costs, and (3) integration of public and private impacts into a single process.

The value of any cost-revenue study is increased or reduced according to the specificity of the land use classes and their respective

fiscal characteristics. The use of general citywide figures for single family subdivisions would be of little use in estimating impact of any particular new development. The more that is known about the proposed development and the better the information on similar developments, the more precise the estimates of expected fiscal impact can be.

Critics of cost-revenue studies continually point to the use of average figures to estimate impacts of proposed projects. They claim, with some justification, that these kinds of studies are of little use in evaluating impacts at the margin. On the cost side, because of existing excess capacity in certain capital facilities, the applicable marginal costs may be substantially different than the average costs that are being utilized.¹³ In terms of siting decisions, without recognition of existing excess capacities, the public body will not be able to accurately estimate the true cost for the proposed development.

The most realistic approach to fiscal impact estimation requires prediction of the full range of economic activities which will stem from or develop in conjunction with a specific public or private project. Techniques for determining the full range of activities are not well developed, so educated guesses must be used, based on a complete appraisal of existing local economic conditions. Several alternative scenarios may be generated. Suppose a residential subdivision in a suburban bedroom community is proposed; there may be a small net increase in local employment associated with the project development, especially if one assumes new resident employees commute elsewhere to jobs. The increase in population may provide additional opportunities for local businesses or may form the basis for new businesses to locate in the suburbs. These new businesses may result in some additional jobs. Conversely, if new residents moving in to the subdivision are to be employed locally, a large net increase in local industrial or commercial business activity can be anticipated.

The residential and associated commercial and industrial development occurring in the city or county can be viewed as a "package," none of the components occurring without the other except in the very short

¹³ Even sophisticated data handling systems such as The Municipal Impact Evaluation Systems (MUNIES) attribute the entire cost of a capital expansion such as a new school or sewer plant to a particular proposed development if there is no existing available capacity. See Dennis E. Gale, *The Municipal Impact Evaluation System: Computer-Assisted Cost/Revenue Analysis of Urban Development*. American Society of Planning Officials, Chicago, Illinois, Planning Advisory Service Report 294, Sept. 1973.

run. As a result, there are fewer problems of allocating costs and revenues to particular land uses. Net changes in costs and revenues are ascribed to the "package." Such an approach is well adapted to combination with input-output analysis for predicting changes in economic activities in the private sector which will accompany the proposed project.

While the process of cost-revenue analysis is not very advanced, this comprehensive package approach should be attempted, since information about local public finances is an important input to the evaluation of the impacts of any project. To date, the project of C-R studies has been to look only at the effects on government financial position and not on the effects on the private sector.

ESTIMATION OF PRIVATE IMPACTS

Economic Base Studies

Cost-revenue studies look at only a part of the picture,¹⁴ and critics have repeatedly pointed to the fact that private sector impacts on the economy from a given development are totally ignored in such studies. Furthermore, because of the static nature of cost-revenue studies, even if marginal cost pricing is used, there is no allowance for the synergistic effects which can occur because of the new project. This is particularly obvious if a given project is placed in an area of high unemployment where the project could utilize available labor and thereby increase total employment. Under this set of circumstances, it is possible that the cost-revenue calculation might overestimate the negative effects; therefore, it seems valuable to look at not only the public cost-revenue effects but also at the private effects of a given project. There are two primary tools available for evaluating private effects, the economic base model or the input-output model.

The economic base model divides the economy into two sectors or categories, one labeled basic activity, the other labeled service or local activity. Basic activities, also known as the export sector, are those which result in income being transferred into the area. Included are activities such as national manufacturing firms which have a majority of

¹⁴ For a more complete discussion of economic base studies, see Walter Isard, *Methods of Regional Analysis*, MIT Press, 1960; Charles M. Tiebout, "Exports and Regional Economic Growth," *Journal of Political Economy*, Vol. 64 (April 1956); Richard B. Andrews, "Comment re: Criticisms of the Economic Base Theory," *Journal of American Institute of Planners*, Vol. 24 (1958).

their sales to residents other than those in the area of consideration. The other part of the economy (local activities) are the enterprises and undertakings which provide services primarily to the local residences or market. The underlying assumption for distinguishing between the two sectors is that growth of a region depends on the goods and services produced locally but sold externally. Production in the "basic" sector provides a means of paying for the goods and services which are not produced within the region as well as supporting the service activities which are primarily local in scope.

The economic base method results in a basic-service employment ratio,¹⁵ which provides an employment multiplier which can be used for projection purposes. If one is able to estimate changes in employment in the basic sector for any given region by using employment multipliers generated by the model, the analyst is then able to estimate changes in total employment. From this total employment, one can then calculate future potential population projections by using an employment to population ratio.

A variety of problems are encountered when using economic base models, but the major one is that the high level of aggregation in the sectors (only two sectors) leaves the analyst with an average figure. Industry A may use large quantities of locally provided goods and services while industry B may not; therefore secondary effects caused by increases of specific industries within the basic sector are likely to differ substantially. This aggregation often is overlooked by people using the economic base model, but it is a very serious failing.¹⁶

A regional employment multiplier derived from a basic-service ratio of the economic base study is of limited usefulness. It can provide a reasonably static description of an economy, but the analyst should be cautious about using the economic base method for prediction purposes. At best, it should be used in concert with other methods including input-output analysis.

¹⁵ A complete discussion of the means of calculating the basic-service ratio and the attendant employment multiplier can be found in Isard, *op. cit.*, and in Dickinson and Blackmarr, *op. cit.*

¹⁶ The imperfections of economic base studies are more pervasive than merely the aggregation issue. Since the analyst is searching for predictive models, he is in need of a method capable of such use. The economic base model provides an excellent description of the current economic situation. However, it lacks the dynamic characteristics necessary for prediction purposes. For a detailing of specific other limitations of economic base studies, see Isard, *op. cit.*, and Andrews, *op. cit.*

Input-Output Models

An input-output (I-O) model¹⁷ provides a higher level of understanding of the private impacts of a proposed project than does an economic base model. The I-O matrix indicates how one portion of the economy is related to the others. The method allows investigation of economic effects, albeit only private economic effects, of alternative resource uses. Therefore, the analyst can explore a wide range of alternatives and estimate impacts through the entire economy. The model disaggregates the basic service sector of the economic base study. The major question is how disaggregated a model is necessary to achieve the results desired. The major trade-off is between the degree of additional accuracy and the cost to build and run the more detailed model. Isard points out that using a more detailed model increases the number and types of hypotheses and models that can be tested. However, such detail involves additional costs, and the investigator must weigh the gains against these costs.¹⁸ The second important question is, "What is the objective of the study?" If the purpose is to investigate shifts of land from agriculture to other uses, a majority of the model will probably be agricultural with other economic enterprises being incorporated into highly aggregated sectors.¹⁹ On the other hand, if the analyst is trying to assess the effects of shifts from, say, light to heavy industry, the model constructed is likely to handle agriculture in one sector and have a sector for each and every manufacturing industry.²⁰

The actual development of input-output models will not be presented in this paper; for more information, the reader is referred to Isard, Goldman, and Isard and Langford.²¹ Once a model has been developed, the analyst is provided with a table which indicates what will happen if a change occurs in one sector of the economy. This change will cause changes in other sectors of the economy. Summing

¹⁷ An excellent description of practical input-output models at the local level can be found in George Goldman, *Explanations and Applications of County Input-Output Models*. Cooperative Extension, University of California, Berkeley, California I-O 8, March 1974.

¹⁸ Walter Isard, and Thomas W. Langford, *Regional Input-Output Study*, MIT Press, Cambridge, Mass., 1971.

¹⁹ George Goldman, L. T. Wallace, and John Mamer, *Sonoma County Economic and Resource Use Study*, Cooperative Extension, University of California, Berkeley, California, I-O 2, January 1973.

²⁰ Isard and Langford, *op. cit.*

²¹ Isard, *op. cit.*; Goldman, *op. cit.*, and Isard and Langford, *op. cit.*

the changes in all the sectors provides a multiplier which indicates the total change in private economic activity caused by a change in one sector. As an example, suppose that a hundred acres of land used for growing wheat is sold to a subdivider. The subdivision will have five hundred homes with an average of four people per house; assume that the average family income is \$20,000 a year, all of which is earned in jobs outside the region. The input-output model would be able to estimate the effects of the additional expenditures by the new people on the various segments of the region's economy, including construction, manufacturing, trade, and service sectors. The model also would be able to estimate the decrease in economic activity by removing the land from its former use. Therefore, the analyst can estimate the net effect of changing the land from one use to another.

While this method is substantially more powerful than economic base studies, it has several limitations.²² The majority of the limitations are embodied in the assumptions upon which the model is built, including homogeneity of sectors, constant input-output coefficients, stable prices, and no major structural changes in the economy. Do these limitations require the use of input-output models, in the same manner as economic base studies, to merely describe the present economic structure? Probably not, as long as the limitations are recognized and steps are taken to minimize the problems.²³

Since projecting with input-output models is an approximation procedure, the more clearly the analyst can see the future pattern of prices, technology, and economies of scale, the more accurate will be the projections. The closer the projection year is to the base year, the more accurate should be the projection. Therefore, the more recent the input-output table, the more useful is the model.

One of the major problems of I-O models, like any tools, is the possibility of being misused. The greatest danger is the misapplication of multipliers. There is temptation to apply a set of multipliers developed for some other region with no modification to the study site. This is less serious if the structure and dynamics of both economies are similar. However, far too often, the structure and dynamics are dramatically different.

The strengths of this method are many; as long as the user recognizes the weaknesses, it can provide a fuller description of impacts of

²² See Goldman, *op. cit.*

²³ See Isard, *op. cit.*, p. 341, for suggestions on how to minimize the problems.

any project. It is far better to use the tool to investigate private impacts than to leave them unanalyzed or to use an imprecise methodology which could provide misleading information.

The input-output model is eminently adaptable to the concept of the "package" approach discussed earlier in this paper. The evaluating agency can plug the expected initial impacts of the proposed project into the I-O model. This would provide information on changes which would occur throughout the entire economy. Going back to our hypothetical subdivision, the subdivision would provide additional income to the region which would generate activity in the business, commercial, and service sectors of the economy, as well as the manufacturing and basic sectors, and this income could be translated into the number of additional acres needed for each land use. The results from this first-round look at the I-O model would now describe an expected "package" of land uses that would accompany our 100-acre subdivision. The evaluating agency can now look at the costs and revenues caused by the expected "package," rather than just the initial 100-acre subdivision, and estimate the net fiscal impact of the "package." The result is a decision on the 100-acre subdivision not in isolation, but rather on what the effects would be for the total economy.

CONCLUSION

Public decision makers and private citizens are increasingly concerned about real fiscal and economic impacts of proposed projects. They no longer are willing to accept a priori the "chamber of commerce syndrome"—if some growth is good, more growth must be better. There is an increasing number of demands for solid economic information upon which to base decisions. The methods, models, and techniques discussed and suggested in this paper can provide some of the desired information.

Unfortunately, these methods are often incorrectly formulated and utilized to substantiate prejudices of the decision makers or the analyst (i.e., residential land is always a net tax user). Such conclusions may result from either the assumptions used in the study or from analyzing only one set of impacts.

It is important that an integrated methodology be constructed which provides information on both the private and public economic impacts of any single development, group of developments, or alternative sites for development. One possible approach is the "package" con-

cept which uses input-output analysis in combination with a cost-revenue framework. Regardless of the method used to develop and provide the information, it is absolutely essential that such information be developed and that the analyst state explicitly the techniques used and the assumptions upon which the analysis is based.

Property Rights, Scarcity, and Economic Rent: Some Considerations for Land Use Planning

Gordon C. Bjork*

LAND USE PLANNING is a "hot" topic. Congress has been considering this for several years. Several states have instituted it on a statewide basis. Many special interest groups have come out for and against it. Academics have sharpened their scalpels and shouldered their shovels to work on the topic.

The current public interest in land use planning has a multiplicity of explanations. Some of the heat which is generated on the subject arises from the very close and immediate self-interest of landowners who stand to gain or lose from changes in permitted land use. Some of the heat comes from citizens with preferences for open spaces or natural areas (belonging to others) which are "threatened" by development. There is a temporal dimension to the arguments which emphasizes the impending scarcity of land, living space, and natural resources. These types of concerns were first raised over a century ago by Malthus and Ricardo. Some of them were elaborated almost a century ago by Henry George. Their latest manifestation is the exponential functions of the *Limits to Growth*.

Much less light has been generated for the public illumination of the issues. In part, this has been deliberate because public support of, or at least acquiescence in, land use planning depends on deliberate vagueness about objectives and priorities.¹

To date, economists have not had a great deal to say, professionally, about land use planning. This conference is a demonstration of a widely felt need for the sharing of professional perspectives on the

* Professor of Economics, Oregon State University, Visiting Fellow, Battelle Research Center.

¹ R. K. Godwin and W. B. Shepard, "State Land Use Policies: Winners and Losers." Mimeographed. Dept. of Political Science, Oregon State University, 1974. The vagueness of goals and objectives and the concentration on the establishment of agencies and procedures is a noticeable feature of the "Land Use Policy and Planning Assistance Act" (S. 268) which was sponsored by Senator Jackson and passed in the 93rd Congress.

problem. My aim in this paper is limited to trying to give some perspective, delineation, and, hopefully, some insight into the character of some of the problems in property rights and scarcity as they relate to land use control.

Property rights, scarcity, and "market failure"

The demand for land use planning arises from a lack of confidence in and dissatisfaction with the land use decisions resulting from our present institutional mechanisms. Our primary institutional mechanisms for land use control are private property and the market. The self-interested decisions of individual, corporate, and public landowners are affected and modified by taxation and zoning systems.

Land use presents some unique problems for a private property, free market system. Private property and free markets also offer some powerful advantages in efficient allocation, management, and protection of the individual, advantages which merit continuing recognition.

Problems do not exist in the real world. A "problem" is said to exist when one's positive description of phenomena in the real world is at odds with one's normative model of how the real world ought to be. Social values are changing. The ratio of population/land is changing. This is the source of our "problems."

One set of problems arising from land use is the problem of externalities. Private property in land is a method of ordering externalities. I have argued elsewhere that the basic logic of our system of institutional arrangements is the provision of powerful incentives for the development of land and other productive assets.²

Private property in land is granted and guaranteed by a society to alter the fundamental benefit-cost ratios of an individual decision maker. The communal tenure, open access systems of land tenure used by pre-capitalist societies are inefficient because an individual's benefit-cost calculation for undertaking land development or using stock or flow resources at a socially optimal rate is frustrated by his realization that personal increased effort and deferred consumption may be of less value than his personal share of increased future consumption, which will be socially shared.³

² G. C. Bjork, *Private Enterprise and Public Interest: The Development of American Capitalism*, New York: Prentice Hall, 1969. See particularly Chapters 3-8.

³ For an interesting discussion of this point, see D. C. North and R. P. Thomas, *The Rise of the Western World*, Cambridge University Press, 1973.

The imposition of external costs on neighbors by particular types of land use was not such a serious problem in the past when the ratio of population/land was less. The system of property rights in land which we inherited from the past was structured to maximize the incentives to development by allowing individual landowners to internalize benefits and externalize costs. Some of the "externalities" problems which concern us in land use today arise from our failure to modify our system of property rights to bring individual and social benefit-cost ratios into equality. Our society presently places greater value on aesthetics and lower value on material goods than it did in the past. Our "market failures" with externalities are not really caused by malfunctioning of markets but by the failure to adapt our systems of property rights to modern technology and values.

The second set of problems with regard to land use arising from the increase in the population/land ratio is "rent." Land is a heterogeneous factor of production in spatially and temporally fixed supply. The return to land is called "rent."

The allocation of income and wealth in any society is determined by the definition and distribution of property rights. Property rights in land are more difficult to justify from an economic, philosophic, or social point of view than property rights in labor and capital. A person's moral right to property in his own labor is persuasive. The practical necessity of offering positive wage inducements to secure appropriate work responses is evident. The original source of capital in labor and deferred consumption is a somewhat more tenuous argument for private property in capital. The practical necessities for positive inducements for capital formation are evident in an open society. Arguments for private property in land and natural resources are somewhat more tenuous.

Private property in the income from one's labor does not cause as much inequality in the distribution of income as private property in capital and land. This historical process which leads to unequal holdings of land and capital poses some vexatious questions for income and wealth distribution in a capitalistic society.⁴ I do not discuss the relationship of land use planning to interpersonal income distribution in this paper in a constructive way because not very much evidence on the subject is usable and readily available. The problem of income distribution is the basis of the "taking" problem. The 5th and 14th amend-

⁴ On this point, see Bjork, *op. cit.*, Chapter 15.

ments of the Constitution provide that the federal government and the states shall not take private property for public use without due process and just compensation.⁵

Regulation and restriction on land use does deprive owners of economic value. Does this comprise a "taking"? Generally, the courts have said no. I think there are real problems here. I acknowledge the rights and powers of governments to define property rights, regulate property use, and levy taxes. My concerns are that regulation and taxation do not have *arbitrary* or unexpected effects. The political problems and economic uncertainties generated by actions which are *perceived* to be arbitrary and discriminatory between persons pose real problems for constructive change.⁶

My constructive comments refer to the arbitrary and discriminatory character of land use regulation rather than the problem of income distribution, which I believe needs to be solved by more comprehensive approaches than land use controls.

With these distinctions about the problems arising from externalities and economic rents because of old definitions of property rights and the impact of economic, demographic growth on the population/land ratio, let us consider some of the problems cited as reasons for land use planning.

Arguments for land use planning

1. *Urban deterioration and suburban sprawl.* This phenomenon is often "explained" by speculation. It is attacked on aesthetic and sociological grounds which I will not evaluate. Economically, it is condemned as inefficient allocation of resources. It is alleged that the social overhead capital in sewers, streets, utilities, and schools is abandoned, with high marginal capital costs involved in the provision of new capital infrastructure to new areas.

2. *The conversion of "prime" agricultural land to residential, commercial, and industrial uses.* The economic argument here is that the quantity of "prime" agricultural land is very limited, while residential, commercial, and many industrial uses could be located on marginal or nonagricultural land. For example, a recent article in the local news-

⁵ F. Bosselman, D. Callies, and J. Banta. *The Taking Issue*, Washington, D.C., Council on Environmental Quality, 1973.

⁶ For a discussion of equity considerations on the public regulation of land use, see J. L. Sax, "Takings, Private Property, and Public Rights," *Yale Law Journal*, Vol. 81, 1971.

paper advocating land use planning alleged that paving the Duwamish Valley and subdividing the Okanogon would raise the price of lettuce and beef. The implicit argument was that the value of social output is *not* maximized by the unconstrained choices of buyers and sellers of agricultural land.

3. *The conversion of areas of scenic beauty from their "natural" state.* The argument is made in a variety of ways. The "value" of wilderness areas is alleged to be beyond economic calculation. The benefits to the public from certain "open-access" resources such as forests, coastal areas, and river basins is alleged to exceed the net benefits from their development but to be concealed by the lack of a market mechanism to collect use charges.

4. *Effects of land-holding patterns and zoning changes on income distribution.* The arbitrary and capricious effects of present land-holding patterns and zoning changes on the interpersonal distribution of income are said to cause "windfalls" and "wipeouts." The adverse effect of differential changes in the value of land is held to have an adverse effect not only on income distribution; the second-order effects are held to be corruptive of the political system and disruptive of public planning for land use. Henry George predicted that land site rents would increase with the growth of population and urbanization and increasingly concentrate wealth and impoverish the masses. The evidence is not compelling. Not much is even available.

AN EVALUATION OF ARGUMENTS FOR LAND USE PLANNING

The "need" for land use planning is often made in terms of the problem areas listed above. We already have a variety of public policies affecting land use. In my opinion, a cogent argument in favor of land use planning needs to show: (1) The present "problems" cannot be solved with existing institutional mechanisms, (2) some proposed institutional mechanisms can solve the problems better, and (3) the use of some comprehensive statewide land use planning mechanism is not likely to create a new group of problems.

Let us consider some of the causes of the "problems" and their relationship to extant institutional mechanisms.

Urban Deterioration and Suburban Sprawl

I suggest that the primary determinant of suburban sprawl is consumer preference for more physical living space. Land for gardens and

house space is an income-superior good. Rising real incomes and declining transportation costs as a proportion of disposable income have led to a rapidly increasing demand for residential space and the supply has been created by suburban sprawl.

Another reason often cited for moving to suburbia from the inner city is superior educational programs and facilities in suburban public schools. There are racial and socioeconomic aspects to urban-suburban migration of enormous importance. The ambiguous effects of the 1954 Supreme Court decision and the current controversy over mandatory busing to achieve racial balance should make us cautious and skeptical about the efficacy of governmental policies imposed to change social patterns. Many critics of suburbia would like to limit the range of people's available choices. *If* there are important reasons to limit sprawl, positive inducements in terms of improving urban schools and recreational facilities might be a preferable way rather than limiting attractive alternatives.

On the supply side, suburban sprawl could be limited by decreasing the supply of available land by a variety of public policies. Zoning land to agricultural use or open space would limit the supply of residential land and drive up its price.

There are also some public utility policies which have led to suburban sprawl. The pricing of public utilities such as water supply and sewers is an obvious one. Allocating incremental capital costs for utility lines to residential lot prices would solve the problem of excessive demand for capital formation in new public utilities. Demand would be rationed by the price mechanism and a "user charge" mechanism would service capital interest and amortization by a system which did not involve the subsidizing of "new" suburban users by "older" urban users.

There are a variety of complex reasons for believing that the property tax assessment policies of local government units have also created economic incentives for urban deterioration and abandonment. It is sometimes alleged, for example, that the site value of land is relatively underestimated and the value of structures is relatively overestimated by assessors. This reduces the carrying cost of undeveloped land in urban areas. It also tends to delay the replacement of older, less economically valuable structures. It encourages less intensive use of urban land for gas stations, parking lots, etc.

Assume, that it is a social objective to build structures on urban land and replace old buildings with newer, more expensive and exten-

sive buildings. The owner of an urban parking lot or tenement will hold that land in present use as long as the current net return plus increase in site value is greater than the rate of interest. Symbolically, land will not be developed to a higher (i.e., more capital intensive) use as long as

$$X + \Delta S/S > i$$

where X = net income from present use of land,
 S = site value of urban land, and
 i = interest rate.

X , the net income from the present use of land, is gross rents minus operating costs and taxes levied on land and improvements.

S , the site value of land, in a perfectly competitive market, is determined by rents, taxes, building costs, and the interest rate.

Symbolically,

$$S = \frac{R - T_L - T_B}{i} - C$$

and

$$\Delta S = \frac{\Delta R - \Delta T_L - \Delta T_B}{i} - \Delta C$$

where R = net rents (exclusive of taxes),
 T_L = tax on land,
 T_B = tax on buildings, and
 C = construction costs.

An urban taxation district can increase the intensity of land utilization by increasing assessments on present structures or increasing taxes. Tax policy may "ripen" land for development.

It bears emphasis that the urban land market prevents "premature" development of land which will support higher capital intensity at a later period of time. As long as expected rents less taxes are rising at an annual rate higher than the rate of interest, it is economically rational for the private owner and society to delay development until the time when site value rents can be maximized by the embodiment of capital. In the meantime, the less intensive development of fringe areas which relieves the pressure of demand for space at the urban center also can be seen as an aid to the minimization of "real" (i.e., capital and labor) costs on an intertemporal basis.

The consequence of market forces in the delay of utilization of scarce resources in urban land markets is analogous to the mechanism

explained by Solow for exhaustible natural resources.⁷ The theoretical determinants of equilibrium turn out to be extremely complex. When you add in such institutional forces as the conversion of income to capital gains for tax avoidance, the multiple depreciation of buildings for tax purposes, and the differential policies followed by the commercial banking system and the federal government through the VA and FHA, the understanding of the economic determinants of land use turns out to be a little understood economic phenomenon. I suggest that an improved understanding by economists of the theory of land prices is a necessary prerequisite to interfering with the market more than we already have through zoning and tax policies.

Conversion of "Prime" Agricultural Land

The public concern over the irreversible decision to convert "prime" agricultural land to other uses poses theoretical problems similar to those discussed under urban sprawl. Let me state the obvious lest it remain unsaid. The value of land in farming depends on its capacity to produce an economic return over and above the normal rate of return to the capital and labor employed thereon. The "rent" which accrues to the owner of farmland of superior fertility and market accessibility is a measure of the savings to society of capital and labor from the use of a fixed resource with no cost of production.

The site value of land for a commercial, residential, or industrial use likewise occurs from the savings of capital and labor afforded by locational advantages. The difference between farmland worth, say, \$500 per acre in agriculture and \$5,000 per acre in an industrial use is a market measure of the social savings afforded by the transfer of the site from one use to another. A nonmarket decision to delay the conversion of agricultural land to industrial use is a decision to decrease the level of social output valued at current market prices.

Now, there may very well be social objectives not adequately reflected in prices in the preservation of particular agricultural land. It may, for example, provide visual amenity or recreational opportunity as an open access resource.

Delay in the conversion of agricultural land has been accomplished under present zoning regulations. Use-value taxation is a widespread present device for delaying conversion by its effect on the values determining "ripening."

⁷ R. Solow, "The Economics of Resources or the Resources of Economics," *American Economic Review*, Vol. LXIV, No. 2, May 1974.

Preservation of Scenic Areas

The preservation of areas of great scenic beauty seems to me to be one of the most important motive forces behind land use planning advocacy. I have a passage on my wall from Thoreau's *Walden*:

We can never have enough of nature. We must be refreshed by the sight of inexhaustible vigor, vast and titanic features, the seacoast with its wrecks, the wilderness with its decaying trees We need to witness our own limits transgressed and some life pasturing freely where we never wander.

This need for nature, while living in New York, led me to spend a large proportion of my disposable income getting out of New York to experience nature. The natural beauty to which I have convenient open access in the Pacific Northwest has enormously increased my "real" income.

I doubt that anyone would seriously question the wisdom of the federal and state governments in setting aside land for parks and wilderness areas. The current problem is much more likely to be the desirability of setting aside more such areas as an increasingly rich and urban society recognizes the need for wilderness as a psychic and aesthetic counterbalance to the pressures of modern society.

The value which society places on wilderness is not adequately measured because no charges are made for its use. Wilderness and scenic beauty are perfect examples of a public good.

Where areas of natural beauty are in private ownership, their preservation could be accomplished either through public purchase of title or by public payment of a "use" fee to the owner to maintain public use on an "open-access" basis. There are interesting policies for the maintenance of visual amenity in England which merit examination. Picturesque villages are maintained by subsidies to present owners to thatch roofs rather than modernize them. Public footpaths through open country in private ownership are maintained jealously on the principle that the right of public access was never extinguished when lands were converted to modern systems of freehold and leasehold tenure. Many scenic houses and estates have been given to the National Trust by their owners for tax-relief considerations and the continuing rights of the former owners and their heirs to continue certain restricted uses of the properties which contribute to their public attractiveness.

In the preservation of visual amenity and natural land use patterns for public enjoyment, I believe it is entirely right and proper for govern-

ment to either purchase title to the land in question or purchase use rights from the owners to maintain public access or visual amenity. If the difference between the market value of an open space near a large city in its present and developed states is a certain capital sum based on the discounted value of expected net future site rents, let a public authority purchase title or pay the annual site rent for public access. This is "taking" land for a legitimate public use and seems well within public purposes. Private individuals should not have to bear the costs of public benefits individually.

Redistribution of Income

The income redistribution resulting from the appreciation of land relative to other assets is a vexing question about which relatively little is known. We do not have, to my knowledge, empirical information on the contemporary or historical importance of land in asset accumulation.

From a theoretical point of view, the decision to invest in land should be compared with the decision to invest in other forms of capital assets with similar patterns of risk and illiquidity. Castle and Rettig have noted that between 1955 and 1968, a 13-year period, land prices rose by 166 percent.⁸ That is a compound rate of under 8 percent. We do not know what levels of tax or economic returns were enjoyed by the landowners other than appreciation. If the alternative during that period were investment in a small business as a silent partner with reinvestment of profits (a comparable combination of risk and illiquidity), I have a hunch that the returns from land were probably not very attractive. The increase in the index of land prices during the years quoted is comparable to industrial stock indices during the period and inferior to utilities during the same period, with the obvious advantages of stocks listed on exchanges. We should expect the price of land to increase over time as its productivity increases from technological change. The market value of factors of production is not determined by their supply price but by the value of their marginal product. Human beings are also increasing in terms of the capitalized value of their income streams.⁹

⁸ E. N. Castle and B. Rettig, "Land Use Conflicts and Their Resolution," *Journal of Soil and Water Conservation*, September-October 1972.

⁹ An interesting approach to the theory of factor returns and asset valuation which suggests treating all factors of production—land, labor, and capital—in

There are several ways in which investment in real estate is relatively more attractive for the rich than the poor which occur from the structure of the federal income tax. (1) Home ownership is a way in which the wealthy can escape a larger portion of their return from capital than the less wealthy. (2) The deduction of mortgage interest and property taxes subsidizes home ownership in direct relationship to the size of the mortgage, the value of the home, and the level of income. The more valuable the home and the higher the income, the greater the level of government subsidy through deduction of housing costs from taxable income.

The rich have a similar advantage in undeveloped land speculation from the deductibility of interest and taxes, but this is true in the purchase of other assets on a leveraged basis. This is not an argument for land use planning but for income tax reform.

Considerable interest has been shown in the use of "transferable development rights" to equalize gains and losses from the arbitrary impact of zoning policies on land development. This method may even out the random effects of windfall gains and losses for upper income groups without having much overall effect on the transfer of income from lower to upper income groups through the collection and retention of scarcity rents.

SOME CONCLUDING THOUGHTS ON THE RESURRECTION OF HENRY GEORGE AND THE SINGLE TAX

Many of the problems considered in this paper might usefully be considered in terms of the impact of a tax on the site value of land. While it is theoretically possible to distinguish between a "site rent" and returns to a landowner which represent returns on capital invested in improvement, it would be very difficult to do so empirically. (Perhaps this is one of those "empty-boxes" which Clapham disparaged long ago.) Nevertheless, the tax authorities must estimate similar values every day as a normal part of their profession.

In every problem area suggested above, the revenue raised by imposition of a site tax could be used for the achievement of social objectives as well as a means of raising revenue for public purposes or tax relief elsewhere in line with some politically specified social welfare function.

terms of capital theory, has been made by Harry G. Johnson, "The Political Economy of Opulence," *Canadian Journal of Economics and Political Science*, November 1960.

Urban deterioration and suburban sprawl

Raising the tax on the site value of land (by a change in assessment or rate) would tend to force land at urban centers out of parking lots and dilapidated structures into higher value use. At the same time, a reduction in the tax rate on structures would tend to encourage building by increasing the net rental income after taxes.¹⁰

For a variety of reasons, suburban communities have used zoning regulations and assessment policies to exclude more intensive development. One objective has been reduction of the ratio of population/tax base to keep down local school costs. Another objective has been related segregation of racial and socioeconomic groups. Large lot zoning and underassessment of land in terms of potential use raises the price of land for residential purposes and increases the level and proportion of housing costs attributable to land costs. The poor are excluded by insufficient income.

If it is a social objective in land use planning to increase the intensity of land use, i.e., the ratio of people/land and capital/land in particular uses, this could be accomplished by the relatively heavier taxation of site values (with relaxation of large lot size requirements) and the accompanying decrease in taxation of buildings. Taxation of buildings affects the allocation of capital between structures and other forms of embodied capital because buildings are taxed on the basis of value while other forms of capital are taxed on their income flows. This is partially mitigated, of course, by nontaxation of imputed income in owner-occupied structures.

Preservation of farmland, open spaces, and wilderness areas

The preservation of prime farmland near expanding urban areas may be a social objective for a variety of reasons. One way to accomplish this would be an explicit public subsidy to the farmer to maintain land in a different productive mode than that which would result from market forces. Until recently the federal government has had a variety of devices such as the soil bank and support prices to maintain particular patterns of land use. Since this subsidy would be reflected in the capitalization of this subsidy into land values, it could concurrently be taxed away in part or whole by a tax on land value.

¹⁰ Some interesting analyses and recommendations along these lines may be found in Mason Gaffney, "Tax Reform to Release Land," in *Modernizing Urban Land Policy*, ed. Marion Clawson, Baltimore, Johns Hopkins Press for Resources for the Future, 1973.

I believe there are compelling arguments for public subsidy of open access resources to maintain them for public enjoyment rather than private development. Let explicit public subsidies be made to keep forest lands and areas of great natural beauty in existence. They will be capitalized into land values by the owners and can be partly recovered by the taxation of site values.

The above procedures are an explicit (an open) way of dealing with the "taking" issue. Prohibiting a farmer from developing his land because it offers the public aesthetic pleasure, which the farmer cannot "sell," deprives him of the opportunity to exploit his property in an *arbitrary* way. Prohibiting a timber company from clearcutting or harvesting an area with a stand of virgin timber *does* deprive it of an economic opportunity in an *arbitrary* way. The taxation of all land at its true value, especially when some of that value has been created by the process of civilization and explicit public subsidy, meets the tests of both equity and allocative efficiency and both are extremely important considerations.

Windfalls, wipeouts, and the inequality of wealth

A democratic society is constrained in its regulation of income inequality by the needs for capital formation and allocative efficiency. *If* there are systematic factors increasing income and wealth inequality from market forces and private land ownership, taxes on land can reduce that inequality by reducing the capitalized value of a net income stream.

A FINAL CAVEAT

We already have a complex if not comprehensive system of land use controls. We have an acknowledged lack of unified planning. That is as true in land use as it is in capital, manpower, science, education, and other concerns of our pluralistic society. Before we embark on land use planning as a panacea for various social ills, we should survey and understand what we are presently doing.

The freedom of an individual member of society to choose his own values is both rare and recent in human history. The powers guaranteed to an individual in our society by property in his labor and other productive assets against other members of society and procedurally against society itself are a bulwark of individual freedom. The existence of a frontier in American history, of a ratio of man to land which allowed for a wide dispersion of land ownership has been of immense

importance to our economic, political, and cultural development. Let us adjust our system of property rights to deal with the market "failures" produced by growth and changing values rather than getting rid of them, for continuity in social and political institutions is inextricably intertwined with private property in land.

Transferable Development Rights: Some Problems in Evaluation

Richard T. Clark*

TRANSFERABLE DEVELOPMENT RIGHTS (TDR's) are a possible tool for land use control that has only recently received widespread attention. In Wyoming, that attention has come from some large landholders who view traditional zoning as a threat. They fear their land may be zoned for nondevelopment, which could exclude them from realizing large financial gains associated with sales of developable lands in their areas.

Some groups lobby for something under the guise of one objective (for example, open space preservation) when, in fact, they hope to achieve a different objective such as obtaining a subsidy to their industry. Based on my experience in Wyoming, it seems reasonable to expect that some of the strongest support for TDR's will come from those who see the tool as a personal compensatory measure rather than as a great tool for influencing land use. Their supportive arguments likely will be couched in themes such as "save the environment" and "preserve agricultural lands," but the motivating force will more likely be monetary.

TDR PROPOSALS

What is a transferable development right? Basically, what is involved is the separation of potential developmental value from the other types of value in land. For example, if the agricultural value of a given acre is \$200 but the market value is \$600, then there must be factors other than agricultural productivity entering into the market value. The development right, that is, the right to develop that acre for something other than agricultural use, may be one of those factors.

* When this paper was presented, the author was Assistant Professor of Agricultural Economics at the University of Wyoming. Currently with Natural Resource Economics Division of the Economic Research Service, USDA.

Several plans have been proposed for the use of developmental rights. One of the earliest plans is the New York City Plan.¹ The New York City Plan, currently in effect, came about under the guise of doing something that was already being done. TDR's were adopted in New York City to preserve landmarks. The city already had a specific landmark preservation law which apparently worked quite well. Nevertheless, the TDR plan was proposed and proponents argued that its purpose was for preservation of landmarks.

Development rights entered the New York system in about 1961. Prior to that, New York had adopted a device known as FAR (Floor Area Ratio). The FAR relates total allowable floor area of a building to the area of its lot. For example, a FAR of 15 would permit 150,000 square feet of floor space on a 10,000 square foot lot. In 1961, New York liberalized its definition of a "zoning lot" to which a FAR could be applied. The "zoning lot" was defined to include not only the project site, but also any other parcel located within the same city block owned by the developer. On some property, a lease of at least 75 years was treated the same as ownership for this definition. By leasing or buying an underdeveloped or vacant lot within the given block and designating it as part of his total zoning lot, a developer could add the authorized, but yet unbuilt, floor space bulk of the leased or newly purchased parcel to the floor space bulk of his project site. Suppose a developer owned a 10,000 square foot lot and the FAR were 12. That means he could build 120,000 square feet of floor area on that piece of land. In addition, suppose the developer leased another contiguous lot of the same size for 75 years that contained a building with 100,000 square feet. The leased lot would then have 20,000 square feet of potential floor area which could be transferred to the contiguous piece of land that he owned and added onto a building which he was constructing on that lot. With a FAR of 12, he now could construct a building with 140,000 square feet of floor space by using the undeveloped 20,000 square feet from the leased parcel in conjunction with the 120,000 square feet already permitted.

In 1968, New York again liberalized its definition of "adjacent sites" to permit a lot across the street or intersection from the landmark to be counted. At the same time the law was altered to permit the landmark owner to sell his unused development rights to others, providing they

¹ Discussion of the New York City Plan is based on an article by David Richards (1972).

owned property which fell within the definition of adjacency. Another broadening of the definition of adjacent sites occurred in 1969, "... a lot . . . which is across a street and opposite to another lot or lots which, except for the intervention of streets or street intersections form a series extending to the lot occupied by the landmark building. All such lots shall be in the same ownership" (Richards, p. 356). Simply stated, the New York Plan provides for the transfer of development rights from landmarks that are to be preserved to other lots within the same general vicinity, providing the area to which the rights are to be transferred is adjacent to the landmark site in some sense. Under this plan development rights actually can move from one block to another block located several blocks away, provided all blocks in between are under the same ownership.

Another scheme for TDR's, proposed by Costonis (1973, March 1974), is referred to as the Chicago Plan. The plan is similar to the New York one in that the expressed intent is the preservation of landmarks. Unlike the New York Plan, the Chicago Plan is not in effect.

Under the Chicago proposal the city would designate a development rights transfer district to which the unused development rights of the landmark site could be transferred. The city would then designate certain sites as landmarks and their owners would be entitled to sell unused development rights based on some density determination to owners of nonlandmark sites within the transfer district. This differs from the New York Plan in that the rights could skip several city blocks in moving to the new district without the requirement that all land in between be under the same ownership. Another feature of the Chicago Plan involves the actions of the city. Costonis (1973, March 1974) proposed that the city be empowered to purchase or condemn rights of landmark owners who did not wish to transfer these rights to others. The intent of the latter proposal is to help maintain a market for TDR's.

Costonis (1973) also proposed a plan for the Phosphorescent Bay area in Puerto Rico. This area is ecologically sensitive and some people feel it is being threatened by development. The plan Costonis proposed for saving this area is similar to the Chicago Plan. The main differences revolve around transfer districts. First, the transfer district would not need to be located in a single city or in one of its sections, but rather could be found throughout the island. A second difference is in the method or medium of transfer. Rather than using a density measure of the development rights to be transferred, "... some other form of

liberalized development control, proportioned in dollar value to the frozen potential of the restricted parcel" (Costonis, 1973, p. 94) would be utilized.² Herein lies one of the problems associated with TDR's, i.e., determining how many TDR's are available for transfer. The third difference from the Chicago Plan would be mapping transfer districts independently of the protected resource and skewing downwards residual densities within transfer districts. The idea is to use a zoning ordinance (or some other regulation) to prevent transfer districts from developing at as high a density as might be demanded without regulation. The transfer area could develop at densities higher than those in the regulation if development rights were purchased from the area to be preserved. The fourth difference is that authority for transfer would be vested solely in the planning board rather than shared with property owners in the preserved area.

Chavooshian and Norman (1973) proposed a transfer scheme similar to the Puerto Rican one. Their scheme is aimed specifically at preservation of open space, but the method is similar to the Phosphorescent Bay case. One thing the New York City, Chavooshian, and Costonis plans have in common is their granting of development rights to certain people or areas and not to others.

Another plan was proposed by the Suffolk County, New York Agricultural Committee for preservation of agricultural lands (Klein, 1974). Under this proposal the local governmental unit takes major responsibility for development rights. The planning unit would designate areas worthy of preservation based on (1) soil suitability, (2) present land uses, (3) contiguity of farms, (4) development pressure, and (5) price of land. The county then announces the precise location of the area to be preserved and solicits formal sealed bids from landowners within these areas for sale of development rights. In other words, the landowner sends in a bid as to how much he is willing to accept for his promise not to develop the property.

The committee indicated that preserved farms should constitute tracts of at least 200 acres. A landowner does not have to offer develop-

² Costonis's proposal apparently would require determining the potential sale value with and without development potential. The amount of development rights transferred to the transfer district would be some ratio between the difference in the with and without value (development value) and some physically measurable unit. For example, a development value of \$10,000 per acre may translate into 'X' number of single-family dwellings or 'Y' number of multifamily units.

ment rights on all his holdings for sale. The county retains the right to reject any and all bids and the right to not buy rights to only part of a given farm. In certain cases the county could obtain title to the tract of land in which they were interested by outright purchase. Then the county would offer for bid agricultural title to such properties. That is, they would solicit bids for the land which after sale could be used only for farming. The county would retain the development rights.

A scheme proposed by Ishee (1974) grants everyone within an area development rights of various kinds. For example, suppose that in a given area 10 percent of the land was planned for commercial, 20 percent for residential, and 70 percent for agricultural uses. Each landowner would be granted development rights on the above basis. If one owned 100 acres, he would be granted 10 acres of commercial development rights, 20 acres of residential rights, and the remainder would be agricultural. The parts of the planned area that could be developed commercially and for residences would be specified by the planning authority. If the planning area were 1,000 acres, 100 acres would be specified for commercial and 200 acres for residential development. But, those acres chosen for the more intense uses would not have enough development rights to develop fully. The 100 acres specified as commercial would only have 10 acres of commercial rights associated with them. Consequently, developers would need to purchase additional development rights for 90 acres. A similar situation would exist with respect to the residential developments. Since everyone in a planning area is granted the same proportion of development rights, this scheme seems less likely, than some already discussed, to raise the takings issue in the courts.

All proposed schemes use development rights in conjunction with some control method such as zoning. I find it difficult to visualize TDR's being used entirely on their own as a means of implementing a land use plan.

EVALUATION PROBLEMS

Since development rights, or at least transferable development rights, have not been widely used and implemented, we cannot evaluate their problems and effectiveness on past experience. Even though New York City has a plan on the books, it has not been used, at least up until a few months ago. Consequently, evaluation of TDR's must take place in the abstract.

If we are going to evaluate TDR's, what criteria should we use to determine whether or not TDR's are a viable tool? Effectiveness of TDR's is one possible criterion. Effectiveness can be thought of in several ways. One might ask if they help achieve certain objectives. That immediately raises the question of "what objectives?" One objective might be implementation of some predetermined land use plan. Then we would need to ask whether or not the plan could be implemented at all with TDR's and, if so, could it be implemented better with TDR's. We might also be interested in the question of efficiency, as raised by Mel McMillan in his paper. Another way to judge the effectiveness of TDR's is to assess how they might affect private developmental decisions. If the developers and those making decisions with respect to development are not influenced by TDR's, then TDR's may not be very effective in implementing a specific land use plan.

Another point we might consider in assessing TDR's relates to their distributional effects. In other words, we might ask the question, "Who benefits and who pays when TDR's are used?" One author (Schlaes, 1974, p. 9) already has considered that question and has come to some rather interesting conclusions. He, in fact, concludes that there is such a thing as a free lunch.

If what we have said up to this point is correct, it seems clear that, once the zoning frame of reference is established, no one pays for TDR, with the possible exception of the zoning operator. For those who are familiar with the economic writings of Lord Keynes or with Alexander Hamilton's vision of the national debt as a basis for economic growth, this discovery should prove plausible as well as heartening. Indeed, like the Indian who first climbed a rope in the presence of passersby and was showered with coins for his pains, we may find that TDR confers blessings which far outweigh the cost of the rope. If the rope is free, as it seems to be, so much the better.⁹

In contrast to the above statement, consider the situation of the owner of land zoned for development both prior to and after TDR's. Without TDR's a prospective developer who acquires the properly zoned land also receives the necessary rights. With a development rights scheme, the developer who purchases the land may acquire only part of the needed development rights. Will he (the developer) be willing to pay as much for the land without the development rights? The answer would seem to be no, assuming *cetera paribus* conditions for the with and without situation. The landowner likely will receive less for his land with TDR's than without, so the TDR's have cost someone something.

One can, however, reason certain situations where a developer would be willing to pay as much for the land without all necessary development rights as he would with. Suppose the developer viewed the demand curve for his product (developed land) as perfectly inelastic. He could then pass the added cost of purchasing development rights on to the purchasers of the developed parcels. In this latter case, the final consumer (homeowner in a residential area) will bear the cost of the TDR's. Other situations could be reasoned and should be if we are going to understand the total effects of this tool.

Another question that needs to be examined with respect to TDR's used in conjunction with zoning regards the possibility of double compensation. If a preserved area from which development rights have been sold is later rezoned for development, it appears that those in the rezoned area might possibly benefit twice from this tool. First, they may benefit by selling some development rights to areas that could develop in the first round. If, at a later date, part (or all) of the preserved area is rezoned for development, one could reasonably expect that demand for developable land had increased (creating the demand for rezoning). Even though development rights of land in the new developable area were sold in the first round, owners still may receive more than the agricultural value in the second round. Whether or not the land without development rights will sell for more than the agricultural value will depend on market conditions and the way the TDR scheme is designed. If the land would sell for more than its agricultural value, the possibility of double compensation seems relevant. Further analysis could indicate that double compensation does not exist or is not a problem if it does exist. The point is, the question needs to be examined.

Administrative problems must be researched. One of the first problems to be faced by an administrator who wished to implement a TDR scheme would be to determine what scheme would work for the case at hand. Then he must decide whether or not enabling legislation is necessary and, if so, what form it should take. Another administrative problem is determining who gets which rights. The latter is directly related to determining the type of system to be used.

One of the more difficult problems that is likely to arise is maintenance of a viable market for development rights. It would seem extremely difficult for areas in Wyoming and other western states to maintain demand for development rights if the rights are used for preserving scenic and ecologically sensitive areas. Suppose, for example,

that we want to preserve an area that has an extremely good view of the Teton mountains. We would zone that area for nondevelopment and make the development rights transferable to other areas within Teton County that do not have quite as many desirable attributes as the preserved area. The question arises as to what created the demand for the development in the area to be preserved in the first place. Usually the areas we are concerned about preserving are being developed due to some unique characteristic that people want and are willing to pay for. If we permit the transfer of those development rights to other areas, what is going to insure that the "other areas" will also have demands for development? Site characteristics may be important determinants of development demand and, if so, they usually cannot be transferred to other areas.

Legal issues have been addressed more than any other issues with respect to TDR's. They need to be examined and probably deserve even more attention. For example, will various schemes avoid the takings issue? Costonis (1973, p. 105) has argued that if TDR's are deemed a taxing measure rather than regulatory, they may be more subject to legal impediments than if they are considered strictly regulatory.

From a cursory look it appears that TDR's offer some aid in implementing plans and in compensating those whose land cannot be developed. However, it is my tentative conclusion that the concept may be overrated and needs considerably more attention before it is recommended for use by various levels of government.

REFERENCES

- Carmichael, Donald M. "Transferable Development Rights as a Basis for Land Use Control," *Florida State University Law Review*, Vol. 2, Winter 1974, pp. 35-107.
- Chavooshian, B. Budd, and Thomas Norman. "Transfer of Development Rights: A New Concept in Land Use Management," *Urban Land*, Vol. 32, Dec. 1973, pp. 11-16.
- Chavooshian, B. Budd, George H. Nieswand, and Thomas Norman. *Growth Management Program . . . A Proposed New Approach to Local Planning and Zoning*. Coop. Ext. Serv., Cook College, Rutgers Univ. State University of New Jersey at New Brunswick, Leaflet 503, no date.
- Costonis, John J. "The Chicago Plan: Incentive Zoning and the Preservation of Urban Landmarks," *Harvard Law Review*, Vol. 85, 1972, p. 574.
- Costonis, John J. "Development Rights Transfer: An Exploratory Essay," *Yale Law Jour.*, Vol. 83, Nov. 1973, pp. 75-128.
- Costonis, John J. *Space Adrift: Saving Urban Landmarks Through the Chicago Plan*. Univ. of Illinois Press, March 1974.

- Costonis, John J. "Whichever Way You Slice It, DRT Is Here To Stay," *Planning*, July 12, 1974, pp. 10-15.
- Dales, J. H. *Pollution, Property and Taxes*. Toronto: Univ. of Toronto Press, 1968.
- Foster, Phillip, Frank Schnidan, and Mark Bailey. *Transferable Development Rights—Are They a Step in the Direction of Better Land Use Management?* Coop. Ext. Serv., Univ. of Maryland, EB 251.
- Ishee, Sidney. "Preserving Open Space Through the Private Transfer of 'Development Rights,'" Inaugural Convention of the Eastern Economics Association, State University of New York, Albany, N.Y., Oct. 26, 1974.
- Klein, John V. N. "Report of the Suffolk County Agricultural Advisory Committee to the Suffolk County Legislature," March 1974.
- Richards, David. "Development Rights Transfer in New York City," *Yale Law Jour.*, Vol. 82, Dec. 1972, pp. 338-372.
- Rose, Jerome G. "A Proposal for the Separation and Marketability of Development Rights as a Technique to Preserve Open Space," *Real Estate Law Jour.*, Vol. 2, Winter 1972, pp. 635-663.
- Rose, Jerome G. "From the Legislatures," *Real Estate Law Jour.*, Vol. 1, Winter 1973, pp. 276-278.
- Shlaes, Jared B. "Who Pays for Transfer of Development Rights?," *Planning*, July 8, 1974, pp. 7-9.
- Wengert, Norman, and Thomas Graham. "Transferable Development Rights, A Viable Technique for Controlling Land Use Changes?," mimeo report, Colorado State Univ., 1974.

“Transferable Development Rights” as a Means of Influencing Land Use Patterns

Sidney Ishee*

INTRODUCTION

PRIOR TO THE 1960's four recognized methods of exerting public influence on the use of privately owned lands included: (1) Public purchase in *fee simple*, (2) public purchase of less than *fee simple*, (3) direct regulation, and (4) taxation policies. Effectiveness, successfulness, and comparative costs of these methods have been widely and strongly debated. Apparently, there has been enough dissatisfaction with these measures to cause extensive searches for new methods of bringing about public influence on private decision making with respect to land use. One of these new methods involves a system of transferable (marketable) development rights.

Objectives of this paper are: (1) to review conventional methods of influencing private decision making with respect to land use, (2) to describe one proposed system of marketable development rights, and (3) to provide an evaluation of the proposed system.

ALTERNATIVE MEANS OF PRESERVING LAND IN FARMS

Though not without some restrictions, all levels of government—federal, state and local—as well as several quasi-government agencies, have acquired fee simple title to land. In doing so, the public gained full decision making powers over the use of such land. However, for a number of reasons, this method is not deemed desirable or acceptable as a means of inserting the public voice over land use patterns to the extent which many deem as desirable.

Purchase of Easements

In many cases, governments have acquired less than fee simple rights in land. Such rights frequently are called *easements*. These may be either positive or negative. A positive easement transfers certain de-

* Professor of Agricultural and Resource Economics, University of Maryland, College Park, Maryland.

cision making responsibilities associated with access from the fee simple, private owner to another—the public in the case considered here. Thus, some government agencies have acquired accessibility rights to some lands for the promotion of selected recreational activities such as hunting, fishing, and hiking. A negative easement, though failing to grant accessibility rights to others, restricts the fee simple owner from certain activities such as construction of billboards which destroy natural, scenic views, or the destruction of trees and shrubs. Recently, it has been proposed that governments acquire “development” easements on prime agricultural land. Such negative easements would remove the right to convert land from agricultural or open space use to other specified “developed” uses.

Proposals of this type have been made in Suffolk County, New York,¹ in New Jersey,² and in Maryland.³

In the Suffolk County case, farmland owners could offer a negative development easement on their land to the county government. If the agreement were signed, the county government would purchase the development easement which required that the land remain in open space or agricultural use in perpetuity. The transaction would be voluntary between the farmland owner and the county government. As proposed, the easements would be purchased from a fund established by the sale of bonds which would be retired by levying a one-half percent transfer tax on real estate sales within the county.

In the New Jersey proposal, each of the 567 municipalities within the state would be required to designate 70 percent of the land area currently devoted to farm use as agricultural preservation districts. Farmland owners within these districts would be eligible to sell a negative development easement to the state for a sum equal to the difference between current market value and agricultural use value. In return, the landowner would grant an easement to the state which required that such land remain in agricultural use.

¹ John V. N. Klein, “Report of the Suffolk County Agricultural Committee to the Suffolk County Legislature,” March 1974.

² William L. Park, “Providing Benefits of Agricultural Open Space in Urbanizing Situations,” *Jour. of Northeastern Agricultural Economics Council*, Vol. 3, Oct. 1974.

³ Committee on Preservation of Agricultural Land, “Report of The Committee On Preservation of Agricultural Land,” Maryland State Department of Agriculture, Parole, Maryland, Sept. 1974.

A separate proposal in New Jersey would enable landowners in the agricultural districts to sell "development rights" to private individuals. These development rights, purchased from farmland owners in agricultural preservation districts, could be used to increase the permitted density of use of current zoning ordinances in nonpreservation districts.

In the Maryland proposal⁴ farmland owners would be permitted to voluntarily petition county governments to establish agricultural districts within the state. Upon approval of agricultural district boundaries, a particular set of rules and regulations would be authorized including:

1. The districts would remain intact for a period of 20 years; after the termination date landowners could petition for the districts to remain for another 20 years.

2. No public funds could be spent for the establishment of nonfarm utilities including sewer and water lines.

3. Eminent domain proceedings would be restricted to those cases in which no reasonable alternative existed.

4. Farmland owners within agricultural districts would be permitted to sell an easement to the state which would require the land to remain in agricultural or open space use until the easement was canceled. Conditions for cancellation of the easement could occur (a) by agreement by the state (through the Office of the State Secretary of Agriculture), the county (through the county legislative body), and the landowner that the public interest would be promoted by a change in use of the land; and (b) by a payment by the landowner to the state a sum of money equal to the amount received by the landowner for sale of the easement plus a specified rate of interest for a specified period of time.

Zoning

The third form of public influence over private land use—direct regulation—usually is referred to as zoning. Since the 1920's, each of the 50 state governments enacted some form of enabling act which permitted some form of land use regulation by specified local governments. Zoning, the designation of areas as districts with permissible types of land uses, usually must be done under prescribed conditions to promote

⁴ Contained in a prefiled Bill (H.B. Bill 18) of the 1975 Maryland Legislative Session in Nov. 1974.

the health, safety, morals, and general welfare of the citizenry. Such goals are pursued by (a) providing for adequate light or air; (b) prevention of overcrowding of the land, or buildings; (c) avoiding undue concentrations of population; (d) securing safety from fires, panics, and other dangers; and (e) lessening congestion in the streets.

Zoning, as practiced in the United States, does not require compensation to individuals whose well-being may be reduced. Neither does it extract a levy from individuals whose wealth may be enhanced.

Effects of zoning ordinances on the amount of land devoted to open space and/or agricultural use have been of the "back-door" type. That is, zoning ordinances regulate the maximum density or intensity of land use rather than requiring some minimum intensity of use. For example, some residential zones permit no more than 20 dwelling units per acre, others no more than 10, others no more than 2, others no more than 1, and still others no more than 1/2, 1/3, 1/4, 1/5, and so on. Less dense uses than the most intensive are always permitted. Negotiable zoning, known under various names such as new town zoning or PUD's (planned unit development), has come into use within the last decade as a means of preserving more open space within a community. A simple case of this form of zoning occurs in cases such as the following. Suppose a given area, say 100 acres of land, is zoned for no more than two single-family dwellings per acre. The owner or developer of the tract may be permitted to construct four single-family dwellings per acre on some portion of the acreage provided a specified acreage is devoted to public use such as location for schools, parks, and playgrounds.

Although exclusive agricultural zoning has been proposed (establishment of zones for farm use only) in academic discussion, it has not been placed into practice in any jurisdiction other than through the limitation of densities. Such zones usually have been designated rural conservation (which are defined to include a wide variety of low density uses), rural residential, or agricultural. After such designation, however, variances frequently have been relatively easy to obtain. (After all, it is only agricultural land that will be lost! During most of the 1950's and 1960's, overt governmental actions were taken to reduce the amount of land used for farms.)

Taxation Policies

The fourth type of action taken in attempts to bring public influence on private land use decisions was through taxation policies.

Most local governments in the United States (in which most of the property taxes are levied, collected, and spent) purported to collect taxes on an ad valorem (market value) basis. That is, the size of any individual's property tax liability depended on the market value of property possessed and the tax rate which was established by the local government by dividing revenue needs by the value of property within the local jurisdiction. Property holdings were based on the value of tangible real property as well as on selected personal property according to the jurisdiction.

A property tax levied on a strict ad valorem basis disregards equity questions because it does not vary among taxpayers in proportion to benefits received from public expenditures, according to use of property, or according to current income position of the taxpayer.

A priori ideas concerning the effects of property tax policies (basis of assessment rate establishment and use of revenues) on land use appear to fall into three categories. First, one group claims that a tax based on an ad valorem basis will be neutral as to land use. They argue that a property tax based on market value of the property which is the same regardless of the specific use at any given point in time simply will reduce the capitalized value of all assets. Since the tax cannot be escaped by decisions or actions of the landowner to use the land in a specific manner, landowners will neither be encouraged or discouraged to select that use of land which will cause the tax load to be less.

The position of the second group seems only a half step from neutralists. They claim that a property tax levied on land only (excluding buildings) would encourage more intensive development of land with the higher site values, with less intensive use on the lower site-value lands. Therefore, the more intensive developed lands would be contiguous, eliminating urban sprawl.

The third group consists of those who believe that taxes which are collected on lands greater than the net income accruing to land will cause landowners to give up that land for the current use. Thus, the argument which developed in Maryland in the early 1950's was that the sale of a few parcels of land within the rural-urban fringe at values beyond that which could be paid by reasonably efficient farmers was attributed to all land within the surrounding community. Furthermore, this was thought to be "forcing" farmers to sell their land and change to other occupations or to migrate to other areas where land could be purchased (and would be taxed at comparable rates) at values nearer

to agricultural use value. Thus, this group claimed that land was being sold by farmers more rapidly than it was being converted to more intensive uses.

As indicated, each of these groups based their ideas on theoretical grounds. Empirical evidence to support any of the three theoretical conclusions has been lacking. To generate data suitable for empirical testing of the effects of tax policies, two areas are needed in which other economic events are similar except for tax policies. This has been near impossible since tax policies and assessment practices are not designed to test hypotheses. Furthermore, one only needs to scan the available assessment sale ratio data to find a wide variation in assessment practices as applied to different types of property despite the constitutional provisions requiring uniformity.

With 15 years of use-value assessment laws, most studies of the effects of use-value assessment on land use devoted to agriculture and other open spaces resulted in one of the following conclusions:

1. Use-value assessment had no effect on land conversion to more intensive uses.
2. Use-value assessment acts as a temporary holding action for some land in some areas.
3. Use-value assessment benefits those who would have retained their land in agricultural use anyway.

TRANSFERABLE DEVELOPMENTS RIGHTS

In the previous paper, Clark described several proposed forms of transferable development rights which might be used to bring the results of private decision making with respect to land use in greater conformity with public desires. In each case, it is assumed that a socially desirable land use plan for the community (area) has been adopted and that zoning ordinances have been effectuated. Previous experience has indicated, however, that the resulting land use pattern frequently bears little resemblance to the adopted land use plan because of changes in zoning or the granting of variances for selected parcels. Even though the original land use plan may have been in the public interest, rezoning requests for specific parcels usually are reviewed on a piecemeal basis. Furthermore, retaining some land in a low density use while other parcels are permitted a higher density use (even though physical features of the different parcels may be the same) enhances the private values of the high density parcels and decreases the value of

the low density parcels. Without some form of compensation, landowners are treated unequally. In such cases the public, through its government, finds great difficulty in maintaining land use regulations which would implement the adopted land use plan.

Conventional zoning ordinances permit uniform use densities among all land parcels within a given geographic area (district or zone). Any system of land use regulation which includes transferable development rights provides for districts or zones with variable use densities. Compensation for low density parcels are provided through permitting other parcels to be developed for more intensive (denser) uses than would have been permitted with uniform densities. If the two parcels are owned by the same person (or company), no exchange of money is required. To illustrate, using Clark's example, suppose the zoning ordinance permits a floor area ratio (FAR) of 12. The owner of a 10,000 square foot land parcel may construct 120,000 square feet of floor area on the parcel. With a TDR plan similar to the New York City Plan, the owner would be permitted to construct 90,000 square feet of floor area on part of the parcel (perhaps 5,000 square feet) and 30,000 square feet of floor area on the remaining parcel. In addition, some form of legal instrument which would assure that the use of the low density parcel would not be increased would be filed by the landowner. Presumably, the high density parcel would be worth more than it would have been under the FAR regulation of 12. Thus, the additional value of this parcel is used to compensate the owner for the diminished value of the parcel with a FAR of 6, even though no money exchanged hands.

The above plan could not be used when the owners of the two parcels are not the same. Thus, the arrangement could be varied to permit the owner of the permitted high density parcel to compensate the owner of the low density parcel. The legal instrument would be filed to assure that the low density parcel would remain in its current use.

In cases where the prospective high density parcel owners do not currently desire to increase the intensity of land use, the government could create a "development rights" bank. Thus, the development rights bank would pay the low density parcel owners to file the legal instrument to assure retention of the land parcel in its current (low density) use. At some later time, prospective high density parcel owners could purchase the right to develop their parcels in a more intensive use from the development rights bank. This would replenish the funds of the development rights bank.

In each of these plans, the land use regulating agency (the local government) simply would designate areas (zones or land parcels) in which use densities of current zoning regulations could be exceeded and those areas (zones or land parcels) which would be required to remain in current low density use with the opportunity for gaining compensation.

A third system, in which the government would purchase development rights by compensating landowners to file the legal instrument, should not be designated a transferable development rights plan. In this proposal, the land use regulating agency (local or state government) would simply pay the landowner a sum of money to place a legal restriction (easement or covenant) on the future use of the land.

Marketable Transferable Development Rights

A fourth system of transferable development rights, to which the remainder of this paper is directed, may be described as follows.

A land use plan for the area or community (perhaps a county or taxing district) would be developed as in the usual present situation. After legal adoption, zoning ordinances would be issued. Typically, the zoning ordinances designate geographical areas in which designated uses are permitted. The use districts or zones frequently permit less intensive uses than the maximum permitted. In addition, current uses of some land parcels may not be in conformity with permitted uses. In such cases, the zoning ordinance usually allows for nonconforming uses. For purpose of illustration, assume that the local total area consists of 100,000 acres. Also, assume that the area is zoned into three districts: commercial, residential, and agricultural.⁵ Assume that the zoning ordinance permits commercial use in 10 percent of the area, residential use in 20 percent, and designates the remainder for agricultural, forest, or open space use. Geographic areas in which each of the three uses are permitted are outlined. Furthermore, for purposes of this paper, assume that the entire 100,000 acres are in agricultural, forest, or other low density use (Table 1).

For this analysis assume that the current value of land (prices which are being paid or could be paid) is \$2,000 per acre for land which could be developed for commercial use, \$1,200 per acre for land which

⁵ More than three use-intensity zones could be permitted without changing the results. This example is limited to three for purposes of simplification.

Table 1. Total acreages zoned for specific uses, present land use, and average value of land for specific uses⁷

Zoning category	Acreage	Average value per acre	Present use
Commercial	10,000	\$2,000	Agricultural
Residential	20,000	1,200	Agricultural
Agricultural	70,000	600	Agricultural
TOTAL	100,000	860	Agricultural

¹ A hypothetical geographical region.

could be developed for residential use, and \$600 per acre for land for agricultural use.

In this plan, each of the landowners within the entire area (county) would receive two types of transferable development rights (certificates which would be recorded in the land records) in proportion to the area of land owned. For example, the owner of 100 acres of land in a commercial zone would receive 10 acres⁶ of commercial development rights and 20 acres of residential development rights. Landowners in each other district (residential or agricultural) would receive commercial and residential development rights in the same proportion. Transferable development rights could be purchased or sold in the same manner as land, automobiles, or other economic goods.

The use of land for commercial purposes would be limited to designated commercial zones and land for residential purposes to residential or commercial zones as under usual present zoning regulations. However, for land to be developed for commercial uses, the land must be zoned for that use and the "developer" must own the requisite number of commercial development rights. For land to be used for residential purposes, the land must be located in a residential (or more intensive use) zone and the requisite number of residential development rights must be owned.

Nonconforming uses

When zoning ordinances are enacted, some land usually is in a more intensive use than that permitted in the zoning ordinance for that district. In such cases, the nonconforming use is permitted until that

⁶ Units of development rights could be designated in several forms. The unit used in this paper is acres. One acre of commercial development rights conveys the right to develop one acre of land for commercial use in designated zones.

particular business or operation ceases. After such time, the land must revert to the less intensive use. Arrangements under a TDR plan would be similar. In order to reduce voluminous detail for purposes of illustration, land which is used for greater density than that which is permitted in the zoning ordinance would not be issued any TDR's.

Effects of TDR's on Land Values

To illustrate the effects of TDR's on property values, consider the effects of zoning without TDR's. Suppose the zoning ordinances have been issued in the 100,000-acre area without TDR's, as usually done in the present case. Land zoned for commercial use is worth \$2,000 per acre, land zoned for residential use is worth \$1,200 per acre, and land zoned for agricultural use is worth \$600 per acre, (Table 1). These values are based on the assumption that the zoning classification cannot be changed. Therefore, assuming the physical characteristics of the land are the same, regardless of the zoning, residential zoning is worth \$600 per acre and commercial zoning is worth \$1,400 per acre. It should be clear, however, that the value of land zoned for commercial use would be less if more land were zoned for that use. Without zoning regulations and with other assumptions remaining the same, average value of land would be something greater than \$600 per acre, depending on the relative bargaining power⁷ of land buyers and sellers.

Market value of development rights

Based on the following assumptions, the theoretical equilibrium value of commercial development rights would average \$1,400 per acre and residential development rights would be worth \$600 per acre. The assumptions are as follows:

1. Conditions of perfect competition prevail: (a) Perfect knowledge as to available alternatives, (b) land is homogeneous and each acre is equally suited for agricultural, residential, and commercial use with respect to physical features and from a locational viewpoint, (c) there is a sufficiently large number of buyers and sellers (land users and landowners) so that no individual may influence the price of land by varying the quantity bought or sold, and (d) there are no barriers to entry and exit from the land market.

⁷ Bargaining power would depend on information available, financial situation of buyers and sellers, expectations as to future demand and supply, and alternative opportunities available.

2. Given sufficient time, developers will purchase (or retain in ownership) up to 10,000 acres of land within commercial zones of the area to develop for commercial uses as long as the price paid for land plus that paid for development rights is less than \$2,000 per acre.

3. Given sufficient time, developers will purchase (or retain in ownership) up to 20,000 acres of land within residential zones of the area to develop for residential uses as long as the price paid for land plus the price paid for residential development rights does not exceed \$1,200 per acre.

4. Farmland owners will purchase (or retain in possession) up to 70,000 acres of land within the area to be used for agricultural and forestry uses as long as the price does not exceed \$600 per acre.

Effects of TDR's on individual landowners

Consider the effect of TDR's on the owner of 100 acres of land located in a commercial zone. Without TDR's, the land would have been worth \$2,000 per acre or a total value of \$200,000. However, with the TDR plan in effect, the landowner possesses 100 acres of land worth \$600 per acre, 10 acres of commercial TDR's worth \$1,400 per acre, and 20 acres of residential development rights worth \$600 per acre—a total net value of \$86,000, using previously established competitive market equilibrium prices (Table 2).

Table 2. Net value of land and TDR's of 100 acres in commercial zone with and without a TDR plan

Item	Quantity	Price per acre	Total value
<i>Without TDR's</i>			
Land	100 acres	\$2,000	\$200,000
<i>With TDR's</i>			
Land	100 acres	600	60,000
Commercial TDR's	10 acres	1,400	14,000
Residential TDR's	20 acres	600	12,000
Total			\$ 86,000

The owner of 100 acres of land located in the residential zone could sell land for \$1,200 per acre without a TDR plan. However, with the TDR plan in effect, the total value of land and TDR's would be the same as that in Table 2. Thus, the TDR plan reduces the total value from \$120,000 to \$86,000.

Without TDR's, the owner of 100 acres of land in the agricultural zone would be able to sell land for \$600 per acre. With the TDR plan in effect, the total value of land and TDR's would be \$86,000, the same as that in Table 2.

To summarize, implementation of a transferable development rights plan along with zoning regulations would result in a transfer of potential wealth (land values) from landowners in high intensity use zones toward landowners in lower intensity use zones. The extent of transfer would depend on the ratio of intensive use acreages to total acreage within the area within which TDR's could be transferred. Changes in value brought about by implementation of the plan could be estimated as follows:

1. Increase in net value (value of land plus value of TDR's) of land zones for agriculture = $\% L_C (V_C - V_A) - \% L_R (V_R - V_A)$

2. Decrease in net value (value of land plus value of TDR's) of land zoned for residential use = $(1.00 - \% L_C) (V_C - V_A) - \% L_R (V_R - V_A)$

3. Decrease in net value (value of land plus value of TDR's) of land zoned for commercial use = $(1.00 - \% L_R) (V_R - V_A) - \% L_C (V_C - V_A)$.

Where:

L_C = land zoned commercial,

L_R = land zoned residential,

L_A = land zoned agricultural,

V_C = value of land per acre zoned commercial,

V_R = value of land per acre zoned residential, and

V_A = value of land per acre zoned agricultural.

EVALUATION

Since this system of transferable development rights has not been implemented in actual practice, effects on land use patterns and land values cannot be measured by past records. To gain some idea of the probable effects, a simple land use game was constructed in which individuals were assigned parcels of land and capital, given a set of business activities from which to choose, and instructed to attempt to maximize income or net worth. Three types of business activities (extensive land use represented by farming and two types of intensive land use represented by residential and commercial development) were avail-

able to the game participants. Each business activity was accompanied by a set of costs and returns. Within any one business period, participants could incur losses or windfall gains depending on chance. However, the net returns were established to return a given percentage on investment over a long period.

Hypothetical landowners operated within a set of land use regulations. In other words, those located in low density zones were not permitted to engage in high intensity uses. However, at given points in the game, landowners could request rezonings. A system of granting and denying rezoning requests was developed duplicating the actual experience in total.

The game was "operated" for several rounds with zoning regulations but without TDR's. As might be expected, those in low density zones would request rezonings after experiencing a few rounds of low returns when they found additional capital was needed to continue the business in operation or to engage in more intensive enterprises.

Results of the game (spotty and strip development) appeared very similar to those in the real world in an area where there is a growing demand for land for urban and suburban development.

Introduction of TDR's

A system of TDR's similar to that described above were introduced in the game. Landowners located in intensive zones could use only part of their land for "developed" purposes unless they could purchase development rights. Furthermore, landowners in extensive use zones could sell TDR's and continue operating extensive land use activities. The game administrator found much less activity in the simulated TDR market than expected. Possible reasons for this, in addition to unfamiliarity on the part of the players, are listed below.

First, as indicated previously, introduction of this TDR system has a tendency to make the net value of land and TDR's uniform regardless of the location and use of land. For example, a landowner located in a commercial zone might decide to sell TDR's and continue operation of an extensive land use activity. When this happens, landowners located in extensive land use zones have no opportunity to sell TDR's. Furthermore, with little development taking place, they tend to request the establishment of additional intensive land use zones.

A possible solution to this problem might be to grant landowners in developable areas additional TDR's. Thus, it would cost less to develop

land in commercial and residential areas than in other areas. No satisfactory basis for this was immediately evident.

A second possible reason for the lethargic TDR market was the failure to tax TDR's. Without a tax on TDR's, holding costs of land are less, and therefore provide less incentive for selling TDR's. However, if TDR's are taxed in the same manner as land, landowners likely would claim that they are being forced to sell development rights. This is the same argument that many use to justify use-value taxation of land rather than market value.

A third difficulty is establishment of the size of the geographic area within which TDR's may be transferred. The larger the area, the less the value of individual's right or the smaller the compensation for retaining land in extensive use.

CONCLUSIONS

The growing dissatisfaction by the public with land use patterns or land settlements results from decisions made by individuals (or small groups) and the fact that balancing costs and returns by individuals do not balance social costs and returns. Therefore, the search continues for institutional changes (rules of behavior) which would cause private costs to equal social costs and private returns to equal social returns.

For almost a half century public regulation of private land use through zoning (without compensation) appeared tolerable, if not satisfactory, to the extent that it restrained land use incompatibilities from arising. However, conventional zoning (the designation of geographic areas in which given land use activities may take place) seems fraught with difficulties when one attempts to use it as a means of controlling the amount of development. Designation of which land parcels may and may not be used for intensive uses greatly influences the value of that land.

Implementation of a transferable development rights plan (in which the development rights are marketable) appears to be one means of bringing private decision making in harmony with public desires. However, more study and experimentation with the system is needed before it can be recommended for wholesale adoption.

Recent Land Use Patterns and Implications for Future Research

Melville McMillan*

CONSIDERABLE concern has been expressed during the last few years about the pattern of urban development. Many critics contend that growing communities fail to provide residents adequate open space and natural environment (Clawson, 1969; Higbee, 1960; Olson, 1958; Perloff, 1967; and Shomon, 1971). Dissatisfaction with the current pattern of land use in and about urban areas may be attributed to many factors and poses serious questions to which answers must be found. The purpose of this paper is to improve our understanding of this issue and its ramifications. In the first section a number of recent trends are surveyed and related to land use and open space demands. Following this, I discuss what I believe are two major implications of these developments for research on the land use question. One is the problem of evaluating open space and aesthetic experiences, and the other is the study of institutions for improving the provision of open space so that it may more nearly be consistent with demand.

I. CHANGING PATTERNS AND LAND USE

One of the most striking features of the United States has been its transition towards an ever more urbanized society. Between 1950 and 1970 the percentage of Americans living in an urban environment increased from 64 to 73.5 percent. Even more significant is the fact that growth of the urban population has been greatest inside urbanized areas (i.e., center of 50,000 plus and the surrounding urban fringe) and, as might be expected, particularly in the urban fringe. From 1960 to 1970 alone, the number of persons living inside urbanized areas increased by almost one-quarter. Not only has the urban population grown, but it has shifted towards larger urban centers (i.e., 10,000

* When this paper was presented, the author was Assistant Professor, Department of Agricultural Economics, University of Wisconsin—Madison. Currently he is Associate Professor, Department of Economics, University of Alberta, Edmonton, Canada.

to 100,000 residents).¹ Although this trend towards a greater part of our population living in larger urban centers was expected to continue, since 1970 there is evidence of a turnaround in population growth patterns (Beale, 1974). Currently, nonmetropolitan counties are growing more rapidly than their metropolitan counterparts. While the urban population is still increasing, it is now shifting away from the large cities and suburbs towards smaller cities. This movement decentralizes the urban population and, if it continues, it will also distribute more widely the problems of urban growth and land use planning.

As people concentrate in an urban environment, whether large or small, the demand for urban open space is likely to increase. Although the definition of urban areas includes much land not in urban uses (Clawson, 1971, Ch. 2), as urban centers grow open areas are no longer as accessible and that which is available is frequently less satisfactory on both an aesthetic and functional basis. No longer are open fields a short distance away and unused areas scattered throughout the community readily available for use. Instead, land is converted to more intensive uses and open areas become a new, and scarce, resource in the urban community (Clawson, 1969; Perloff, 1967).

Urbanization provides economies which contribute to the rising incomes most Americans experience. Real family income has about doubled since 1950. This improvement in economic well-being has stimulated, in part, the demands for a more pleasant environment. To many urban residents this includes the benefits of more private open areas, more public parks, and more recreation and preservation areas. While higher incomes increase demand, they also afford the means of assuring a greater supply. Yet the expressions of dissatisfaction noted previously indicate that a balance has not yet been achieved. Part of the reason for this may stem from changing housing patterns.

Home ownership is a deeply rooted tradition in this country. Owning a home, however, appears to be becoming more difficult and may elude a substantial part of the population. Comparing the home ownership cost index and the consumer price index (Table 1) indicates that the cost of home ownership is increasing more rapidly than other items, particularly during the last few years. One reason for this development has been the rapidly escalating cost of home sites. From 1950 to 1970 the average market price of a new home site increased over five times

¹ See Statistical Abstract of U. S., 1972, p. 17. For a longer perspective, see Clawson (1971, pp. 378-379).

Table 1. Recent trends relevant to land use^a

Item	Year						
	1950	1955	1960	1965	1966	1970	1972 1973 (March)
<i>Rural-urban population distribution</i>							
Urban	64.0		69.9			73.5	
Inside urbanized areas	45.8		53.5			58.3	
Central cities	32.0		32.3			31.5	
Urban fringe	13.8		21.1			26.8	
Outside urbanized areas	18.2		16.4			15.2	
Rural	36.0		30.1			26.5	
<i>Family income in constant 1971 dollars</i>							
Consumers Price Index	\$5,594		\$7,688			\$10,289	
Home ownership cost index	72.1		88.7			125.3	129.8
Characteristics of sites for single-family dwellings ^c	72.8 ^b		86.3			128.5	143.2
<i>Market price of site</i>							
New	\$1,035	1,626	2,492	3,416		7,952	5,341
Existing	\$1,150	1,707	2,369	3,114		3,973	4,906
<i>Site value as percent of total price</i>							
New	12.0	13.4	16.6	19.8		21.0	21.2
Existing	12.4	14.2	17.7	20.4		21.5	20.4
<i>Average lot size (square feet)</i>							
New .....	.....	.....	.....	10,709		8,851	7,127
Existing .....	.....	.....	.....	9,774		9,213	7,651

(continued on next page)

Table 1. (Continued)

Item	Year							
	1950	1955	1960	1965	1966	1970	1972	1973 (March)
Price of site per square feet					1966			
New					\$.59	.84	1,309	1.32
Existing					\$.50	.63	72	.71
Pattern of new housing starts (000)								
One unit	1,154		1,009	965		815	1,309	
Two unit	45		51	58		48	72	
Three or more units	197		237	486		606	995	
County and municipal park and recreation areas								
Number	17,142	20,417	24,710	30,507		31,235		
Acreage	644,067	748,701	1,015,461	1,496,378		965,785		
Acres per 1,000 urban population ^d	6.65	6.8	8.11	10.9		6.47		

^a Unless otherwise indicated, figures are from *Statistical Abstract of the U.S.*

^b Housing cost index for 1950.

^c FHA statistics from *FHA Trends*.

^d Calculated.

and that for existing homes only somewhat less. More importantly, the cost of the site has risen almost continually from 12 to over 20 percent of the price of a home. While part of this increase may be due to the appreciation of the costs of improving the lot, previous study suggests that a large portion is due to greater increases in the cost of the raw land itself (Schmid, 1968). Home builders (and subsequently buyers) have reacted to this appreciation by economizing on land use. Over the short period for which data are available, 1965 to 1973, the average lot size of a new FHA-financed home has fallen from 10,709 to 7,129 square feet, a reduction of one-third. Such a reduction in land use is not surprising given that the cost of land for new lots rose from \$.59 per square foot in 1966 to \$1.32 in 1973. Although the price per square foot for the lots of existing homes rose less dramatically, their average lot size fell from 9,774 to 7,651 square feet. Despite substantial limitations, these data appear to reflect significant changes in relative prices which are consistent with changes in the pattern of housing.² An implication of the increasing cost of the single-family dwelling is that it has undoubtedly contributed to the dramatic increase (500 percent since 1950) in housing starts of three or more units while the number of single-family unit starts remained relatively constant.³

The rising cost of land appears to be a dominant feature of housing over the last few years. As a consequence, home buyers have reduced the size of the lot upon which they situate single-family homes and many persons have turned to multi-unit housing as an economizing alternative. In turn, urban residents are finding they have less open space to enjoy for their own private use.

The reduced availability of private open areas places greater demands upon public facilities. Yet what has happened to the supply of public parks, open spaces, and recreation areas? The available data indicate that the number and area of county and municipal park and recreation facilities rose until 1965 but, although the number continued to increase, the area fell sharply by 1970.⁴ Cities, as opposed to other local

² This evidence must be viewed with some caution since it is largely derived from statistics on FHA loans, which represent only a portion of total lending for home purchases. However, FHA financing is an important component of the home mortgage market and the data seem compatible with generally observed trends.

³ The changing preferences of institutional investors also may have influenced this development.

⁴ The 1970 figures may be biased downward since the information is based upon questionnaires and the number responding in 1970 was less than that in 1960.

units, lost most heavily, largely to the encroachment of streets and highways.⁵ If, in fact, a large part of the growth in park acreage of the early 1960's was lost by 1970, perhaps in response to rising land prices, the park and recreation area per 1,000 urban population has remained essentially unchanged over the twenty-year period at about six and one-half acres, less than that available in 1940.⁶

While the statistics presented here are only crude indicators, they do appear to reflect some important trends. Increased urban populations and growing urban centers require the extension of open areas within these communities. Higher incomes augment demand as individuals can afford a better quality environment. Yet the costs of improving one's environment by extending the amount of open space for private use have risen more dramatically than incomes. As a result, lot sizes have diminished and more people live in multi-unit structures. If demands for open space are to be met, the area must be publicly provided. While several forces have operated to increase the demand for park land, it appears that supply has lagged. Is it any wonder that there is widespread dissatisfaction with the amount of open space and natural environment provided in urban areas?

These trends are important, but it is doubtful whether their explanation is as simple as that presented here. In fact, some of the very patterns indicated may be modified by new and more detailed evidence. In order to examine these events more closely, it will be necessary to improve and extend the data base and analyze the new information. As seen from the preceding discussion, particular need exists for an inventory of parks and public open areas, studies to identify the cost of raw land for development and the factors which influence it, and investigations of other forces (such as institution lending behavior) which affect the patterns of development. The potential contribution of land use and open space policy as a means of enhancing the environment can be revealed by such investigations.

II. EVALUATING PARKS AND OPEN SPACE

If land use is to be rationalized successfully in the urban environment and if parks and recreation areas are to be provided efficiently, it is essential that open spaces be properly evaluated so they may compete

⁵ "Local Parks and Recreation," *Parks and Recreation* (Aug. 1971).

⁶ Clawson (1960, p. 156) reports 8.5 acres of parks per 1,000 urban population in 1940.

effectively with other uses. Although open areas are recognized as a new urban resource, very little is known of in what form this resource best suits our needs and to what extent we value it (Clawson, 1962). The nature of the problem has been noted by Knetsch (1962).

The market establishes values for land used for most purposes, and while we may have reason to alter these, there are at least some priorities established for claims on land resources. But while parks surely have significant social value, there are in the normal course of things no comparable values given to them, so that such a use cannot "compete" with other uses in any meaningful sense nor can we rationally do very much toward fitting parks into development in such a way as to aim toward maximizing total values of all development. If we are to receive a better distribution of land uses in urban areas, it seems that some recognition of the value of parks must be made and allocations made accordingly. This is not only to offset a relative neglect of this land use, but to better insure that the kind of opportunities are encouraged which yield the greatest net value to society.

Although Knetsch made these remarks a dozen years ago, open space land uses still are evaluated in a haphazard fashion and only now are we beginning to see research of the type he suggested. Hopefully, this work will enable decision makers to recognize and appreciate more fully the value of open space.

The benefits of parks and open areas generally are not provided by nor allocated through the market. Because of this, it is difficult to place a monetary value on the services they provide. Since direct measurement of the worth of open spaces is not possible, attempts to evaluate them have relied upon indirect estimates. One of the more popular means of determining their value to users has been to derive demand curves using travel costs as a proxy for price. This has been used extensively to estimate the demand for outdoor recreation facilities usually located at some distance from the visitors' homes (Clawson and Knetsch, 1966). Although applied with some success, many applications of this technique have met with criticism. On occasion, demand has been inappropriately aggregated (Stoevener and Brown, 1967), and Sinden charges that the travel cost method does not account adequately for differences in tastes.⁷ For those interested in evaluating urban parks, this approach has a more significant deficiency. Because travel costs are not usually an important determinant of park use, this method cannot be applied.

⁷ See Sinden (1974) for a critique of the travel cost approach to estimating the value of outdoor recreation.

A second approach to estimating the benefits of parks and aesthetic improvements has been through bidding games. In these studies residents and visitors have been asked a series of questions which reveals the amounts they would be willing to pay to use a given recreational or aesthetic site. This may be for the particular facility they are utilizing or for a number of alternatives which they are shown (usually via photographs). The bidding technique has been used to obtain estimates of the benefits resulting from reducing the environmental damage associated with the Four Corners Power Plant in New Mexico (Randall, Ives, and Eastman, 1974). Residents were asked how much they would be willing to pay in additional sales taxes or electricity bills for various degrees of environmental improvement. Visitors recreating in the area were asked what additional user charges they would be willing to pay. From this information an aggregate bid curve was obtained and used to evaluate improvements in environmental quality.

While in theory the aggregate bid curve and benefits measured by benefit-cost analysis are the same,⁸ this approach may suffer from certain difficulties in application. Ideally, the individual's bid should be an amount which would just leave him indifferent in the two situations—e.g., no payment and a low level of environmental quality or some payment and an improved environment. The problem comes in designing a question which will elicit this response. It may be difficult for the respondent to distinguish between the maximum he would be willing to pay for a given situation (the area under his demand curve) and the amount he would pay if he evaluated all units at the value of the marginal unit (excluding consumer's surplus), as he is more accustomed to doing. Hence, his response may be downward biased. Difficulties also arise since environmental improvement is a public good and requires the cooperation of many persons if it is to be accomplished. Even when the respondent is assured that everyone bears his fair share, he will be tempted to understate his real preferences and free ride.

Bidding games also were used by Sinden (1974) to derive utility functions for recreational experiences in alternative recreational settings. From an indifference map he obtained demand curves from which he estimated benefits.⁹ But due to the complexity of the bidding game, the number of observations were severely restricted. Despite

⁸ For development of the aggregate bid concept, see Bradford (1970).

⁹ The value of benefits estimated this way exceeded those estimated by the travel cost method.

this, the use of bidding games of various types offers a potentially fruitful means of evaluating nonmarket activities and should prove useful in estimating the benefits provided by urban parks. A major deficiency of this method is that it relies upon what people say they would be willing to pay or to do rather than on their performance under actual conditions. How closely individual's intentions translate into action will determine the success of this approach and is one of the aspects of this methodology yet to be tested.

A third approach to evaluating parks and open spaces is to estimate their impact upon the value of surrounding property. To the extent that parks offer recreational opportunities and aesthetic benefits valuable to nearby residents, these benefits should be reflected in the market value of advantaged locations. The benefit of this approach is that it relies upon individuals' responses in a market situation and is uniquely suited to evaluating open spaces in urban areas. In a study of three urban water parks, Darling (1973) estimates for each the increment in the value of surrounding properties attributable to the neighboring park. Using regression analysis, he sought to explain differences in sales and assessed values of the nearby residential properties. After accounting for lot size, the nature of the improvements, and neighborhood environmental variables, distance from the water usually proved to reduce property value.¹⁰ The benefits provided by the parks, as reflected in property values, were often substantial. The estimates of benefits for these same parks, obtained from interviews paralleling the bidding game approach, were much smaller in two of the three cases.

In another study, Weicher and Zerbst (1973) sought to determine the influence of the externalities associated with neighborhood parks on property values. They found that adjacent homes with a pleasant view of a park sold for 23 percent more than did similar property within one block but without the view. Also, the value of externalities relative to the opportunity cost of the land plus park maintenance expenses were not small (8 and 22 percent) in the two cases they studied.

Although the estimates of the benefits afforded by urban parks are significant, they may still be too low. Benefits generally have been esti-

¹⁰ Hammer, Horn, and Coughlin (1971) obtained similar results in their study of the effect of a large urban park on property value. They found that the park could increase the value of neighboring lots (land only) up to one-third. Other studies of this type exist, but because of deficiencies in data or design they have not defined the property value-land use relationship as well. See Day and Gilpin (1974), Hendon (1973), and Kitchen and Hendon (1967).

mated for large parks. Yet the benefits which open areas afford neighboring properties very likely can be achieved from much smaller areas having a large frontage. In such cases the benefit per acre of park could be more substantial. In addition to examining the significance of distance from a park upon property value, it seems important to examine also the influence of size, configuration, and facilities. Furthermore, large parks very likely attract users from an area beyond that in which property values are significantly influenced. To the extent that large parks attract users from other areas and to the extent that the value such users place upon the facility is not measured, the park is undervalued by property value studies.

Property value studies have thus far included an inherent weakness. Where a park adds value to a property and that value is reflected in its assessment, a part of the taxes is in fact a payment for that facility.¹¹ As such taxes are capitalized into property values, the full benefits of the park will not be reflected in regressions on sale prices (McMillan, 1975b).

Property value studies have not yet identified demand curves for parks and open areas. Rather, they indicate impact upon property values in surrounding areas which depends upon both supply and demand factors and cannot account for consumer surplus. The relation between the change in property value and accessibility to park land reflects the availability of sites with various degrees of access and the tastes, preferences, and numbers of different consumers. Thus, while dv/dF in Figure 1 denotes the change in property values with distance (feet) from a park, individual demand curves, D_i and D_j , indicate consumer preferences and show where each will locate relative to the park in this particular situation. While the change in property value function can be used to derive estimates of the benefits of some sort of marginal changes in park land, it is inappropriate for estimating nonmarginal changes. Since the provision of a park is essentially a nonmarginal change to the surrounding area, it seems necessary that

¹¹ Assessed value usually was negatively related to distance from the park in Darling's work (Darling, 1973). However, Weicher and Zerbst (1973) report that the positive externalities in two parks they studied were not reflected in the assessments of nearby property.

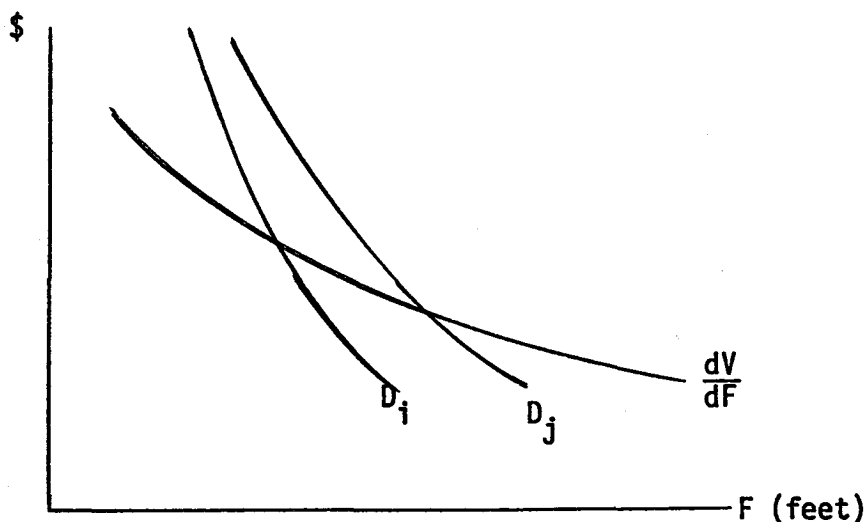


Figure 1. Property value as a function of distance.

we seek to define demand more precisely so that the full benefits a park provides may be recognized.¹²

If a new park is provided in an urban community, the value of the neighboring properties will improve as individuals bid for the preferred sites. However, as the supply of locations near park land is increased, the consequent reshuffling of individuals among locations until each is in the best location he can afford will eventually lead to reduced prices on lots near the previously existing parks. With both increases and decreases in value occurring, how are we to know if provision of the new park improved welfare? Lind (1973) provides an answer. He shows that under certain conditions (in particular, that rent absorbs all surplus), we can ignore the impact in the areas surrounding the original parks and need only sum the increase in rents of the property near the new park. While this is a valuable theoretical result, further work is necessary to confirm its validity in practical situations.

Much of the effort devoted to evaluation will be wasted, if there is not greater concern about the distribution of the benefits parks and

¹² The problem outlined here parallels the debate on the value of air pollution abatement except for the fact that it is more difficult to give meaning to making marginal changes in parks. For that discussion, see Ridker and Henning (1967), Freeman (1971), Anderson and Crocker (1972), and Freeman (1974a,b).

open spaces afford.¹³ Certainly, many of our open areas preserves and recreational facilities are not accessible to people with limited resources. Poor urban residents, in particular, are probably the least well served by local parks and the least able to utilize the extensive network of state and national facilities, not to mention private alternatives. The situation of parks and open areas in accord with simple estimates of willingness to pay will err, for equity demands that need also be a consideration where ability to pay is limited. In such cases, society values the benefits to one group more than those to another. Perhaps the examination of equity criteria will enable planners to appropriately weigh the benefits they are able to measure. Attempts to delineate the distributional implications of open space policies are essential if the provision of these services is to be enhanced.

In this portion of the paper, different approaches to the evaluation of parks and open spaces have been presented and briefly discussed. It appears that substantial potential and need exists for improving our knowledge of the worth of open areas to society in general and to specific groups in particular. While better evaluations enhance the opportunity for adequate provisions, such developments depend also upon changing the institutions in which such decisions are made.

III. INSTITUTIONAL DEVELOPMENT AND OPEN SPACE PRESERVATION

Institutions have been defined as “. . . ordered relationships among people which define their rights, exposures to the rights of others, privileges, and responsibilities” by Schmid (1972, p. 893). But the institutions which now guide our interpersonal relations have not always existed in their current form. It is argued that institutions are not a state of nature nor develop in an ad hoc fashion but rather evolve in response to growing demand (Schultz, 1968), or are induced by social response to individual efforts to internalize benefits and externalize costs (Ruttan, 1971). Institutions offer economically valuable services, e.g., convenience, information, lower transaction costs, reduced risk, supply goods. When the value of these unmet services warrants incurring the costs of developing a new institution, an appropriate institu-

¹³ See Shabman and Kalter (1969) for a study of the impact of public recreation expenditures on personal income distribution.

tion evolves.¹⁴ But institutions also define property rights and affect the distribution of income and power. Because of this, their evolution is often characterized by conflict among opposing interest groups. This has led Ciriacy-Wantrup (1969, p. 13) to define institutions as “. . . a social decision system that provides decision rules for adjusting and accommodating . . . conflicting demands . . . from different interest groups in a society.”

Private property is a traditional American institution which has, and still does though to a lesser degree, afforded the private landowner considerable power to do whatsoever he wished with his property. Obviously, abuse of the privileges of private ownership led to conflict between some property owners and their neighbors. Such conflicts became most acute in urban areas and eventually led to the development of zoning, then a new institution for land use control. Although originally conceived to control nuisances which detracted from the value of neighboring properties, zoning has been subsequently used to direct land use and control development. In so doing it has often established artificial boundaries and substantial differentials among the value of similar properties for which no compensation is afforded. As a result of creating strong economic incentives to thwart the zoner's intentions, zoning has not successfully controlled land development and has been particularly unsuccessful in maintaining open areas. In response to this failure, new institutions have developed and are being suggested which can more adequately recognize the value of open space and assure its provision.¹⁵

The growth of new towns and other large-scale developments are a move in this direction by the private sector. As long as developers were small, the value of neighborhood open space could not be captured by the individual decision maker and so open space was not adequately provided. Yet properties in communities with ample parks and recreational areas are more valuable than similar properties in less suitably designed areas. By carefully planning and developing whole communities and new towns, large developers have been able to internalize

¹⁴ An interesting example of institutional change is offered by Demsetz (1967), who describes the transition of the hunting grounds of the Labrador Indians from common property to defined areas with private hunting rights.

¹⁵ Traditional attitudes regarding private property likely have impeded the acceptance of public land ownership as a means of guiding development and controlling land use despite the important and largely successful role public land ownership played in the planning of some American cities. See Reps (1973).

the benefits open space provides and enhance the value of the overall development. While the scale of these projects prevents them from being viable solutions to the land use problems of many areas, new developments about larger centers are often sufficiently extensive to internalize some open space benefits and lead developers to pay more attention to their provision (ACIR, 1968).

The concern for urban sprawl and the preservation of agricultural lands have contributed to the development of use-value assessment. Where implemented, this policy generally has required a special legal provision to allow differential assessment rather than assessment based on market value alone. This institutional modification of the property tax affords the landowner lower taxes in compensation for maintaining his property in an approved use, i.e., giving up the development rights to his property for a specific period of time (Hady, 1970). The compensation usually comes, of course, from those property owners whose lands are not enrolled in the program who consequently must pay higher taxes (Carmon and Polson, 1971; Ching and Frick, 1970). While some may benefit from the program others may not, a point which often contributes to the debate on such proposals. Whether this policy will be successful in controlling development or preserving open areas is yet to be seen, but the size of the tax incentive relative to the private gains of development is small and so limits the policy's potential in the absence of supplementary controls (Bahl, 1968).

A tax on land development has been proposed as a potential policy for controlling land use and preserving open areas (McMillan, 1974). A planning authority would be given the power to levy a tax on land (subject to local government approval) at the time it is to be converted to urban use. This tax would be used to support public purchase of land for parks, recreation, and preservation consistent with the projected pattern of development. The objective of the authority is to afford the amount and pattern of open areas so as to maximize the value of the overall development. Furthermore, as the provision of open areas augments property values in the development, the cost of open space (i.e., the tax) will be passed on to area residents who are seen as the primary beneficiaries.

A more comprehensive proposal for land use regulation, and one now receiving much consideration, is the concept of transferable development rights—a policy which would imply significant institutional changes (Costonis, 1973). Transferable development rights proposal is

founded on the concept that the right to develop land is not inherent in its ownership but is separable and marketable. While a considerable departure from the traditional view of property rights, it maintains the rights of landowners to reap the benefits development affords but requires that all those within the developing area share those benefits on an equitable basis. Implementation of TDR requires the delineation of a development district and the specification of a plan outlining land uses to be allowed and the number of development rights required to permit each type of development. Development rights would be allocated among landowners on the basis of acreage or land value such that the total would just allow the development proposed in the land use plan. Some landowners would have more development rights and others less than necessary to develop their properties to the intensity the plan allows. A market would be established in which development rights would be exchanged between those with surplus and those with insufficient rights. Those whose land was not designated for development would be compensated by sale of their unneeded development rights. Thus, unlike the current situation, these landowners could support the land use plan because they could benefit from development without developing their own property.

When simply stated, the concept of transferable development rights has an intrinsic appeal to economists because it relies upon a market process to allocate resources in an equitable way so as to reduce the individual motivations leading to nonoptimal land use patterns. Under closer examination, however, many practical difficulties can be enumerated (Barrows, Prengruber, and Yanggen, 1974). How are development districts to be defined? What criteria will guide the design of the land use plan? How are development rights to be assigned? What happens over time as the development pressures upon land change? These are important issues, but another which has not yet been mentioned also seems perplexing. While this proposal develops a new market to exchange and determine the value of development rights, the TDR proposal divorces land use decisions from another market. Planners, not the market, allocate land among such alternatives as residential, commercial, and industrial uses. It is difficult to assure that the resulting assignment would be efficient. If most developing areas are to be planned in this sense, as must be the case if the TDR concept is to work, there is no market for comparison. A shortage of commercial property relative to residential and industrial would not lead to com-

mercial establishments bidding away land from other uses and generate a higher intensity of land use or development in the area. Limiting total development constrains not only the supply of development rights but also the overall demand. Furthermore, the relative values of land in these alternative uses in the planned areas are veiled behind two market transactions—one for the purchase of land, the other for the purchase of development rights. Hence, such a shortage need not show up clearly as above-average prices for commercial property. Competitive commercial firms would be willing to pay more for both the available land and development rights, but as they bid up the overall price of development rights the value of commercial land must be restrained. Although it is not clear what criteria planners can use to make land use decisions of such a broad scale economically efficient, assuming that this social value of land in alternative uses should be equal at the margin, it is questionable whether planners would be any more successful in achieving this goal with a TDR system than with existing methods. The importance of planning criteria requires that they be further examined and considered in relation to their applicability in alternative circumstances.

As land use problems emerged, institutions were developed to cope with them. As the problems continue to escalate, new institutions are devised and still others proposed. The few institutional innovations noted here are but the beginning of much needed research on the design and functioning of institutions for land use control.

IV. CONCLUSION

The initial portion of this paper offered some limited evidence, itself reflecting the need for more basic information, of trends indicating diminishing availability of open areas in and about urban centers. If this problem is to be confronted and solved, two needed areas of research stand out. One is the improved evaluation of parks and open spaces so that decision makers can better compare the alternatives before them. The second, is the study of alternative institutional arrangements that might facilitate better land use decisions.

Acknowledgments: Hiroshi Yamauchi and Gene Wunderlich provided helpful comments during the preparation of this paper.

REFERENCES

- Advisory Commission on Intergovernmental Relations (ACIR). *Urban and Rural America: Policies for Future Growth*. Washington, D.C.: U.S. Government Printing Office, 1968.
- Anderson, R. J., and T. D. Crocker. "Air Pollution and Property Values: A Reply," *Review of Economics and Statistics*, Vol. 54 (Nov. 1972), pp. 470-473.
- Bahl, Roy W. "A Land Speculation Model: The Role of Property Taxes on the Containment of Urban Sprawl," *Journal of Regional Science*, Vol. 8 (Winter, 1967), pp. 199-208.
- Barrows, Richard, Bruce Prenguber, and Douglas Yanggen. "Transfer of Development Rights: A New Idea in Land Use Policy," Department of Agricultural Economics, University of Wisconsin, Madison, 1974.
- Beale, Calvin L. "Rural Development: Population and Settlement Prospects," *Journal of Soil and Water Conservation*, Vol. 29 (Jan.-Feb. 1974), pp. 23-27.
- Bradford, David F. "Benefit-Cost Analysis and Demand Curves for Public Goods," *Kyklos*, Vol. XXIII (1970), pp. 775-791.
- Carman, Hoy F., and Jim G. Polson. "Tax Shifts Occurring As a Result of Differential Assessment of Farmland: California, 1968-69," *National Tax Journal*, Vol. 24 (Dec. 1971), pp. 449-457.
- Ching, C. T. K., and G. E. Frick. "Effect of Use Value Assessment on Property Tax Rates," *American Journal of Agricultural Economics*, Vol. 52 (Nov. 1970), pp. 603-606.
- Ciriacy-Wantrup, S. V. "Natural Resources in Economic Growth: The Role of Institutions and Policies," *American Journal of Agricultural Economics*, Vol. 51 (Dec. 1969), pp. 1314-1324.
- Clawson, Marion. "A Positive Approach to Open Space Preservation," *Journal of American Association of Planners*, Vol. 28 (May 1962), pp. 124-129.
- Clawson, Marion. "Open (Uncovered) Space as a New Urban Resource," in *The Quality of the Urban Environment*, Harvey S. Perloff, ed., Resources for the Future. Baltimore: Johns Hopkins Press, 1969, pp. 139-178.
- Clawson, Marion. *Suburban Land Conversion in the United States*, Resources for the Future. Baltimore: Johns Hopkins Press, 1971.
- Clawson, Marion, R. Burnell Held, and Charles H. Stoddard. *Land for the Future*, Resources for the Future. Baltimore: Johns Hopkins Press, 1960.
- Clawson, Marion, and J. L. Knetsch. *Economics of Outdoor Recreation*, Resources for the Future. Baltimore: Johns Hopkins Press, 1966.
- Costonis, John J. "Development Transfer Rights: An Exploratory Essay," *Yale Law Journal*, Vol. 83 (Nov. 1973), pp. 75-128.
- Darling, Arthur H., "Measuring Benefits Generated by Urban Water Parks," *Land Economics*, Vol. 49 (Feb. 1973), pp. 22-34.
- Day, J. C., and J. R. Gilpin. "The Impact of Man-Made Lakes on Residential Property Values: A Case Study and Methodological Exploration," *Water Resources Research*, Vol. 10 (Feb. 1974), pp. 37-43.
- Demsetz, H. "Towards a Theory of Property Rights," *American Economic Review*, Vol. 57 (May 1967), pp. 347-359.
- Freeman III, A. M. "Air Pollution and Property Values: A Methodological Comment," *Review of Economics and Statistics*, Vol. 54 (Nov. 1972), pp. 415-416.

- Freeman III, A. M. "On Estimating Air Pollution Control Benefits from Land Value Studies," *Journal of Environmental Economics and Management*, Vol. 1 (May 1974), pp. 74-83.
- Freeman III, A. M. "Air Pollution and Property Values: A Further Comment," *Review of Economics and Statistics*, Vol. 56 (Nov. 1974), pp. 554-556.
- Hady, Thomas F. "Differential Assessment of Farmland on the Rural-Urban Fringe," *American Journal of Agricultural Economics*, Vol. 52 (Feb. 1970), pp. 25-32.
- Hammer, T. R., Edward T. Horn, and Robert Coughlin. "The Effect of a Large Urban Park in Real Estate Value," Regional Science Research Institute Discussion Paper 51, December 1971.
- Handon, William S. "Property Values, Schools, and Park-School Combinations," *Land Economics*, Vol. 49 (May 1973), pp. 216-218.
- Higbee, Edward. *The Squeeze: Cities Without Space*. New York: William Morrow and Co., 1960.
- Kitchen, James W., and William S. Hendon. "Land Values Adjacent to an Urban Neighborhood Park," *Land Economics*, Vol. 43 (Aug. 1967), pp. 357-360.
- Knetsch, Jack L. "Land Values and Parks in Urban Fringe Areas," *Journal of Farm Economics*, Vol. 44 (Dec. 1962), pp. 1718-1729.
- Lind, Robert C. "Spatial Equilibrium, Rents and Public Program Benefits," *Quarterly Journal of Economics*, Vol. 87 (May 1973), pp. 188-207.
- McMillan, Melville L. "Open Space Preservation in Developing Areas: An Alternative Policy," *Land Economics*, Vol. 50 (Nov. 1974), pp. 410-418.
- McMillan, Melville L. "Open Space Preservation in Developing Areas: An Alternative Policy, Reply," *Land Economics*, Vol. 51 (Nov. 1975a), pp. 385-393.
- McMillan, Melville L. "Measuring Benefits Generated by Urban Water Parks: A Comment," *Land Economics*, Vol. 51 (Nov. 1975b), pp. 379-381.
- Olson, S. F. "Our Need for Breathing Space," in *Perspectives on Conservation*, H. Jarrett, ed., Resources for the Future. Baltimore: Johns Hopkins Press, 1958.
- Perloff, Harvey S. "Modernizing Urban Development," *Daedalus*, Vol. 96 (Summer 1967), pp. 789-800.
- Randall, Alan, Berry Ives, and Clyde Eastman. "Bidding Games for Valuation of Aesthetic Environmental Improvements," *Journal of Environment Economics and Management*, Vol. 1 (1974), pp. 132-149.
- McMillan, Melville L. "Open Space Preservation in Developing Areas: An Alternative Policy, Reply," *Land Economics*, Vol. 51 (Nov. 1975a), pp. 385-393.
- McMillan, Melville L. "Measuring Benefits Generated by Urban Water Parks: A Comment," *Land Economics*, Vol. 51 (Nov. 1975b), pp. 379-381.
- Reps, John W. "Public Land, Urban Development Policy, and the American Planning Tradition," in *Modernizing Urban Land Policy*, M. Clawson, ed. Baltimore: Johns Hopkins Press, 1973, pp. 15-48.
- Ridker, R. B., and J. A. Henning. "The Determinants of Residential Property Values with Special Reference to Air Pollution," *Review of Economics and Statistics*, Vol. 49 (May 1967), pp. 246-257.
- Ruttan, Vernon W. "Technological Change and the Environment," *American Journal of Agricultural Economics*, Vol. 53 (Dec. 1971), pp. 707-717.

- Schmid, A. Allan. *Converting Land from Rural to Urban Uses*, Resources for the Future. Baltimore: Johns Hopkins Press, 1968.
- Schmid, A. Allan. "Analytical Institutional Economics: Challenging Problems in the Economics of Resources for a New Environment," *American Journal of Agricultural Economics*, Vol. 54 (Dec. 1972), pp. 893-901.
- Schultz, T. W. "Institutions and Rising Economic Value of Man," *American Journal of Agricultural Economics*, Vol. 50 (Dec. 1968), pp. 1113-1122.
- Shomon, Joseph James. *Open Land for Urban America*, National Audubon Society. Baltimore: Johns Hopkins Press, 1971.
- Sinder, J. A. "A Utility Approach to the Valuation of Recreational and Aesthetic Experiences," *American Journal of Agricultural Economics*, Vol. 56 (Feb. 1974), pp. 61-72.
- Shabman, Leonard A., and Robert J. Kalter. "The Effects of New York State Administered Outdoor Recreation Expenditures on the Distribution of Personal Income," Research Bulletin 298, Department of Agricultural Economics, Cornell University, Ithaca, New York, 1969.
- Stoevener, H. H., and W. G. Brown. "Analytical Issues in Demand Analysis for Outdoor Recreation," *Journal of Farm Economics*, Vol. 49 (Dec. 1967), pp. 1295-1304.
- U.S. Department of Commerce, *Statistical Abstract of the United States*, 1973.
- Weicher, John C., and Robert H. Zerbst. "The Externalities of Neighborhood Parks: An Empirical Investigation," *Land Economics*, Vol. 49 (Feb. 1973), pp. 99-105.

Research Issues and Results Pertaining to Preservation of Agricultural Land: California Experiences

David E. Hansen*

INTRODUCTION

THERE HAS BEEN considerable discussion during these meetings as to the appropriate role of the economist in becoming involved with land use planning decisions. There has also ensued considerable self-searching in trying to articulate our contribution as economists, which has resulted in some questioning as to our effectiveness in enhancing the land use planning process. It seems to me that economists can make valuable contributions at at least two different levels. At one level, we can become involved in goal formulation and can provide information on the inconsistencies and economic consequences of alternative goals. We probably are more uncomfortable in this role since we tend to become more philosophical and lack the hard data needed to back up our recommendations on how land use planning should proceed. The second level sidesteps passing judgment on the goals, accepts them as given, and simply evaluates how well particular measures accomplish the goals they were set out to meet. Here, we are probably more comfortable with our data and recommendations, but we lose some of the glamour and potentially broader social impact which we might otherwise have had.

In the research reported in this paper, we have selected the second alternative, that is, we have accepted the land use goals of the California Land Conservation Act and have proceeded to evaluate how well the particular use-value taxation measure which has been selected in California helps in meeting the goals of the Act. Research at this level can also have an important impact. For example, if we are able to conclude that, contrary to the intentions of the Act, land use taxation is not effective in maintaining open space, we open the way for groups to demand a different justification for its continuance. If the Act is then

* Associate Professor of Agricultural Economics, University of California, Davis.

terminated, we are in a position to evaluate alternative measures which might be more effective in meeting the open space goals. Alternatively, we may force an admission that the Act's purpose is really to provide a subsidy to agriculture. This would then allow us to examine alternative means of providing the agricultural subsidy. Either way, the economist is still in business!

The foregoing is in part an attempt to add legitimacy to our research efforts, since our results are not all that surprising. Several of the papers at the meeting anticipate our findings—in fact, they assume them! Thus, this paper should please you since it supports your beliefs; but in a way it is unfortunate for us, since the way to be remembered would be to come up with some more startling, controversial revelations. Yet, there is an additional modest contribution which I feel our research makes. In our approach, we have utilized the individual parcel or landowner as the unit of analysis rather than relying on the much more aggregated data which is conventionally used.

The issue of premature conversion of agricultural lands to urban use is itself perceived as the source of significant problems by various individuals, interest groups, and legislative bodies throughout the nation. These problems generally are seen to fall into two major categories—urban sprawl and agricultural production.

Those concerned with agricultural production tend to see in the removal of rich agricultural lands a weakening of the agricultural economy of a region, the creation of upward pressures on food prices, and the dislocation of individual farmers and ranchers who are pressured by higher taxes to sell land which is located close to developing areas.

Those who decry urban sprawl point out the economic inefficiency which results from less intensive uses of land than could be achieved by postponing development. Government service costs tend to be higher and energy expenditures greater when sprawl is allowed. Sprawl has also been criticized for removing open spaces that provide recreational and esthetic benefits.

Since the application of zoning in most locations has been of limited effectiveness in controlling land use, attention has turned to other measures, among them development fees, unearned increment taxes, developmental rights and scenic easement purchase, full-fee acquisition, and preferential tax assessment based on "use value." Preferential taxation of agricultural land appears to be the most popular method of trying to preserve agricultural and open space land and also reduce pre-

mature land conversion on the urban fringe. At latest count, at least 28 states have implemented such programs. This paper presents some of the results of our studies which examine the California experience with a preferential use-value tax on agricultural and open space lands.

BACKGROUND OF THE CALIFORNIA LAND CONSERVATION ACT (CLCA)

Passage of the California Land Conservation Act (CLCA) in 1965 made California one of the first states to utilize preferential use-value taxation. This Act, together with a state constitutional amendment in 1966, set forth the conditions under which tax assessment was to be based on capitalization of rental income rather than on market value. Originally concerned with preservation of agricultural land, the Act was subsequently expanded to include scenic highway corridors, important wildlife habitat areas, salt ponds, managed wetlands and submerged land, and land with open space potential.

In its present form the CLCA has three major objectives:

1. To preserve agricultural lands in production for the maintenance of a healthy agricultural economy and for the assurance of an adequate food supply for future residents of the state and nation;
2. To discourage the premature and unnecessary conversion of agricultural lands to urban use because of the undesirable sprawl that results from premature conversion; and
3. To maintain lands in agricultural use for their open space value to existing or future urban areas.

The CLCA provides enabling legislation which permits counties and cities to enter into contracts with landowners who wish to obtain preferential tax assessment based on use-value. Before an individual can enter into a contract, his land must meet certain agricultural or open space criteria and must be located in areas that are designated as agricultural preserves. In most counties, the minimum area required to qualify for preserve status is 100 acres.

In accepting a CLCA contract, the landowner agrees not to develop his land for a specified minimum period (10 years in most counties) in return for receiving use-value assessment. Once the contract is in force it is automatically renewed each year for an additional year, thus maintaining its 10-year status. A contract may be terminated by either party through cancellation or by notice of nonrenewal. If not re-

newed, the contract continues for the nine-year run-out period, but assessment rates increase to approximately 60 percent of those based on market value the first year after nonrenewal notice and reach full market value by the end of the contract period. With cancellation, immediate termination of a CLCA contract is possible. Before a cancellation is permitted, the appropriate local government agency must demonstrate that such action is in the "best public interest" and that available alternative sites not under contract were examined for the proposed use. A penalty of 12.5 percent of the market value of the land at the time of cancellation is assessed the landowner unless waived by the local government and approved by the Secretary of the Resources Agency.

Political support for the Act attests to its effectiveness in providing tax relief to landowners. It is also certain that the Act has allowed agricultural use of land to continue in locations previously under pressure from high urban property taxes. However, the extent to which the CLCA has been effective in meeting the goal of reducing urban sprawl has been a matter of considerable debate. The thrust of our research effort has been to evaluate participation under the Act at the rural-urban fringe, to ascertain those factors which mitigate against the Act's effectiveness in reducing sprawl, and to examine what might be the future potential of the Act in influencing the transfer of land to more intensive uses.

DATA SOURCES AND PROCEDURES

Research results are based on three sources of information: assessment records and CLCA contract enrollment data for three study areas in Sacramento County; in-depth interviews conducted with a sample of landowners within the study areas; and mail surveys conducted among CLCA contract holders in Yolo and Sacramento counties.

Assessment and enrollment data were compiled for three study areas in Sacramento County. All parcels included in the sample were located close to the rural-urban fringe and were representative of a wide range of agricultural activities. Both assessed and market values were obtained for all parcels over 20 acres, thus eliminating the bulk of subdivided parcels intended for more immediate residential rather than agricultural use. Since CLCA assessed values were available only for parcels under contract, assessed values for noncontracted parcels were calculated from rental value of the land and the CLCA capitalization

rate. For each parcel, the appropriate total tax was calculated with and without the CLCA contract. In an effort to evaluate the reasonableness of land price and development expectations held by landowners, a detailed examination of assessed values from 1962 to 1973 was undertaken for the study area closest to downtown Sacramento.

In the Sacramento County survey, 62 landowners were interviewed using a lengthy conversational format. Nineteen of those landowners were enrolled under CLCA, while 43 were not. The survey examined the landowner's knowledge about the Act, his primary sources of information about the Act, and his perceptions of the development potential of his land. Attempts were also made to evaluate the commitment to farming and to determine the reasons for not choosing to enter a contract. Although absentee landowners and large corporations were not included in the sample, we regard the data as providing important support for other lines of evidence.

In Yolo County, a mail survey was taken of 73 landowners who already held CLCA contracts. Each respondent was asked whether a contract would have been accepted for longer than 10 years and, if so, for how long. The respondent also was asked to estimate when development was expected in the immediate vicinity of the principal holding.

General Summary of Results to Date

To evaluate the potential effectiveness of the Act in reducing urban sprawl, it is necessary to ascertain both the level of incentive provided and the responsiveness of landowners to the incentives of the preferential taxation program. The results which are summarized below indicate the level of benefits which are obtainable under the CLCA both in terms of annual tax savings and in terms of discounted total benefits. Subsequently, landowner behavior at the rural-urban fringe in response to the tax incentives is examined. Finally, the rationality of landowner behavior is evaluated based on a comparison of the contract and noncontract alternatives for different price patterns and income levels.

Level of benefits obtainable under CLCA

Since the CLCA uses tax inducements to achieve its objectives, the level of benefits obtainable through a CLCA contract is of fundamental importance. Market assessed values were compared with what would have been CLCA value for lands under contract and not under con-

tract for a variety of agricultural activities including rice, dry pasture, irrigated pasture, and row crops. These differences were then translated into per-acre tax savings under CLCA. The present value of the total benefits receivable over a 20-year contract period also were computed. The CLCA assessed values ranged from 20 to 62 percent of the market assessed values. The corresponding annual tax savings obtainable by CLCA contract are considerable, varying from \$5.76 to \$22.19 per acre. In terms of present value of benefits over a 20-year period using a 6 percent discount rate,¹ the CLCA provides total income per acre of \$140 to \$359.

Although the CLCA was found to provide substantial tax relief for landowners, this is not a sufficient condition to assure its effectiveness as a land use control measure at the rural-urban fringe. The high rates of enrollment which have been achieved are no indication that the lands are located to reduce sprawl. Land that is enrolled may be in locations that offer little alternative to nonagricultural uses. Also, contracts could be allowed to expire at about the time the landowner would have sold the land had no contract been in force. To slow the rate of premature conversion, the CLCA contract must provide sufficient incentive so that landowners who are prone to premature development will accept and maintain a CLCA contract for a period that represents a delay in the time of sale.

Landowner behavior at the rural-urban fringe

A study of landowner behavior at the rural-urban fringe in response to the incentives provided by the CLCA was undertaken. In the three study areas of Sacramento County, enrollment under CLCA was found to be away from the centers experiencing development. For example, in the study area closest to downtown Sacramento which was analyzed in detail, of the 65 parcels whose assessed values were examined for 1962-1973, only one was enrolled in a CLCA contract as of 1973.

In trying to ascertain further the type of land which owners were placing under the CLCA, it was found that, for all agricultural activities examined, the market assessed value of land enrolled under CLCA was less while its CLCA assessed value was greater than would have been the case for the noncontracted acreages. The data seem to provide

¹ The price patterns and other assumed values are those discussed under the section which compares the contract and noncontract alternatives.

some indication that, within cropping categories, lands going under contract have a lower development component in their value.

When ownership was characterized by source of income and distance from principal holdings, significantly higher proportions of enrollees received their income principally from agriculture rather than from a business or profession. Virtually all enrollees resided within 50 miles of their principal holdings, although nonlocal residents owned over 26 percent of the parcels in the sample. Finally, it was found that nearly all contracts were held by owners expecting development to occur more than 20 years hence, even though those expecting development in less than 20 years comprised nearly 60 percent of the sample. When taken as a group, these data on landowner behavior (plus other results not reported here) lead us to conclude that the CLCA is being utilized by persons who are rather strongly committed to agriculture and who have low development expectations for their lands.

When the high level of benefits which was found is compared to the low enrollment of lands close to development, the question arises as to whether the landowners are acting rationally. That is, are the land prices which they might expect of such a nature that the tax advantage should be foregone? In considering whether to accept a contract, a landowner should ask whether, given his land value and income expectations and a knowledge of the present value of future CLCA benefits, it is reasonable to give up development rights to his property for the period of the contract.

Comparison of contract and noncontract alternatives under different price patterns and income levels

To compare the contract and noncontract alternatives, a model was developed which allows a comparison of each under a variety of land price patterns and income levels. Price patterns were chosen to cover a reasonable range of future land price possibilities facing the landowner. Since wide variation in income occurs among landowners, the contract and noncontract alternatives were compared for annual after-tax incomes of \$20, \$40, and \$60 per acre. The sensitivity of the enrollment decision to timing of sale was also examined.

In comparing the two alternatives, the combined federal and state income tax rate of 40 percent and a property tax rate of 0.136 was used. A landowner discount rate of 6 percent was assumed. The agricultural assessed value which was employed was \$91, the average value re-

ported for rice acreage in the study area. The CLCA benefit calculation and comparison of alternatives were carried out for two values of initial land price: \$1,017 (the average for rice land in the study), and \$5,000. The latter was higher than any value recorded in our study and is therefore considered to represent a value near the high end of the range of agricultural parcels under which a CLCA contract is a realistic possibility.

Our findings indicate that the extra benefits derived from CLCA participation provide sufficient compensation over a wide range of price patterns to compensate for the possible loss of opportunity for a favorable sale during the contract period. However, there are certain patterns which favor contract refusal. In addition to the obvious case of very low land appreciation, the noncontract alternative is favored by price patterns featuring a very rapid initial rise followed by a constant price or a drop in price. Price patterns showing sharp peaks and representing an exceptionally favorable sale which might be lost by poor timing also tend to favor the noncontract alternative. However, even for these patterns, altering the pattern slightly to allow for reasonable price increases often will tilt the preference back to the contract alternative. At the higher initial land price of \$5,000, the number of cases favoring the noncontract alternative increases.

The enrollment decision was found to be quite sensitive to the timing of sale. Thus, if the price peak is missed, it is often preferable to accept the contract alternative. The results also show that the preferred choice is quite sensitive to income level, with higher income favoring the contract alternative. Several of the patterns favored contract refusal at \$20 and \$40 per acre, but not at \$60. At the higher initial land price, the effect of a change in income becomes less important, contributing a smaller fraction to the present value of each alternative and to the difference between alternatives.

CONCLUSIONS

In view of the rather restricted circumstances under which the noncontract alternative is preferred, considerable doubt is raised as to the extent the development expectations of landowners at the rural-urban fringe are realistic. Our inclination at present is to view landowners as overly optimistic about future price appreciation possibilities. Based on assessment values, if an enrollment decision were made in 1962 with full knowledge of 1962-1973 land prices in the study area

closest to downtown Sacramento, acceptance of the contract would have been the correct decision in at least 80 percent of the cases. By contrast, less than 2 percent are enrolled.

Our findings to date lead us to be pessimistic about the potential of use-value taxation as a land use control mechanism at the rural-urban fringe. In spite of rather high levels of benefits, apparently low enrollment has resulted. It would appear that this low enrollment is in part due to excessively optimistic beliefs regarding future land prices. Current research efforts are centered along the lines of evaluating alternative policies which might enhance the effectiveness of the Act.

Acknowledgments: This paper draws on some of the research examining the California Land Conservation Act that is being conducted by the author and S. I. Schwartz, Division of Environmental Studies, University of California, Davis.

Speculation, Land Conversion and the Public Costs of Sprawl: Some Directions for Land Use Policy Research

Bruce A. Weber*

If public policy is to be effective in guiding patterns of new urban growth, it must be based on a realistic understanding of the development process.

Kaiser and Weiss, 1970.

LAND CONVERSION in this country is taking place within a public policy framework which appears to encourage speculation and sprawl. Those who would change the public policy framework must address three questions:

1. Are speculation and sprawl undesirable? Do speculation and sprawl, in fact, have adverse impacts in terms of particular public policy objectives?
2. If speculation and sprawl are judged undesirable, why and how do they occur? What are the economic and institutional forces which encourage these phenomena and at what points in the land conversion process are the critical decisions leading to speculation and sprawl made?
3. Can public policy be changed so as to reduce the incentives to speculate and to build sprawling developments?

Economists have begun to address the third of these questions, asking whether particular land use policy alternatives will alter the pattern of land conversion. Research on policy changes should not proceed without some answers to the first two questions. Attention to the first should protect us from asking the wrong questions and an understanding of the second should ensure that the "answers" from our research provide realistic guidance to policymakers. Economic research will be useful in the design of public land use policy only to the extent that the research asks relevant questions and is based on a firm understanding of the process of land conversion.

* Assistant Professor of Agricultural and Resource Economics, Oregon State University.

The first section of the paper addresses the question of whether sprawl and speculation have adverse impacts with respect to two public policy objectives: low public service costs and an adequate supply of housing at reasonable prices. The evidence generally would support the conclusion that noncontiguous low density development (sprawl) is more costly than planned development in terms of public service costs. While there appears to be no research on the impacts of speculation or sprawl on housing costs or of speculation on sprawl, some research needs in this area are proposed.

In order to design land use policy which will effectively reduce speculation and contain sprawl (if such policy objectives are chosen), one must understand the process of land conversion and the incentives and behavior of the many actors involved. The second section of this paper is a review of literature on the process of land conversion. While this literature confirms the hypothesis that the land conversion process is a complex of sequential decisions by many different actors with diverse motivations and that these decisions are almost never based on careful economic analysis, it does identify the decision of the developer to purchase a parcel of land as the most critical decision and provide some insights into factors which influence his location decisions. Research is needed in what may be the most important and most neglected stage of the land conversion process: the stage at which land is purchased and held in expectation of speculative gain.

Two new policy approaches to the containment of urban sprawl (urban service boundaries and marginal cost pricing of public services) are discussed in the final section of this paper. Although these approaches may affect earlier stages of the land conversion process more than traditional zoning, they will have to confront some of the same constitutional challenges and administrative obstacles as more traditional land use control techniques.

I. ARE SPECULATION AND SPRAWL UNDESIRABLE?

Public land use policy has developed to achieve several objectives: (1) The separation of conflicting uses (through zoning); (2) the orderly transfer of land (through subdivision ordinances); and (3) the maintenance of public health (through sanitary codes). Increasing awareness of the externalities associated with the present land conversion process has led policymakers to consider two new objectives: (1) To minimize the cost of housing by ensuring an adequate supply of

available land at reasonable prices; and (2) to minimize the public costs (environmental, social, and economic) associated with land development.

Concern about housing costs and public service costs has led some to propose the containment of sprawl and the reduction of speculative gains as means of reducing housing and public service costs. In this section of the paper, an attempt will be made to evaluate the effect of sprawl on public service costs. Since there appears to be no research which permits the evaluation of the effect of sprawl on housing costs or the effects of speculation on sprawl or housing costs, some possible research directions in these areas will be suggested.

Is Sprawl Costly?

Sprawl¹ has come under fire as being unattractive and wasteful of land. The most serious indictments of sprawl, however, have been (1) That it results in higher public service costs than orderly development, and (2) that its inefficient use of land results in high housing costs that price low income families out of home ownership (Clawson, 1962). And while the more damning of these may be that sprawl has tended to preclude home ownership for many American families, most research has addressed the question of whether scattered and sprawl development is more expensive than compact planned development. This section of the paper will address the latter question.

A subcommittee of the National Academy of Sciences (1972) recently concluded that sprawl may *not* be more costly than planned development, for either the public or the private sector.

Although the supposed excessive development costs associated with the present conversion process have been described by many, hard and comparable data to support such a conclusion are scarce . . . Those who criticize sprawl have not effectively responded to those who argue that: (a) the present pattern of development not only conforms to consumer desires, but may be an effective way of holding land from premature development; (b) while initial development costs may be

¹ The spacing of residential development has two facets: (1) Density, the number of dwellings per acre in a given development; and (2) contiguity, (whether subdivisions are contiguous or are separated by large tracts of idle land). The term "sprawl" is generally reserved for describing low density development while non-contiguous development is called "scatteration" or "leapfrogging." Since the distinction blurs as one's perspective becomes more regional, the term sprawl will be used herein to cover both concepts.

higher, subsequent strategic infill may in the end actually result in lower total costs than would have been possible with more planned or ordered development; (c) the present pattern of development provides more options with respect to the acquisition of cheaper land than would a more regulated and orderly one; and (d) most development costs are "insensitive" to the form of development.

Granted that the jury is still out with respect to the costs of sprawl, the four arguments presented above appear to be contradicted by available evidence or logically unsound.

Argument A: present development pattern conforms to consumer desires and holds land from premature development. Clawson (1971, p. 59) points out that "the choices people have made have been limited by the alternatives open to them and . . . these have not, by and large, included clustered settlement." Thus, it is not possible to conclude that the present pattern of development "conforms to consumer desires." The proposition that present development patterns may be an effective way of holding land from premature development appears illogical since the present development of scattered outlying parcels prior to development of contiguous parcels is premature almost by definition.

Argument B: strategic infill may result in lower total costs. Clawson (1974, p. 159) has documented that the rate of infilling in many suburbs is very low:

Much land lies vacant for decades, not merely for years. Where infilling is slow, it may never reduce the costs of public services below what they would be under scattered settlement.

Much less would infilling reduce costs to what they could have been under planned development. Clawson argues that if public facilities in scattered development are only adequate for the initial settlement, infilling will require expensive duplication of water and sewer lines; whereas if public facilities are initially constructed with excess capacity in anticipation of infilling, this existence of excess capacity until infilling occurs represents a cost to the community as well.

Argument C: present pattern results in cheaper land costs. The discussion of the land conversion process in the next section of this paper raises some serious doubts about the hypothesis that the present pattern of development provides more options for cheap land than might a more orderly pattern. If the supply of land available for development were restricted through zoning or development timing controls without any other changes in policy, one would expect the price for the avail-

able land to increase. On the other hand, the reduction in uncertainty associated with a more orderly development pattern would reduce the opportunity for speculative gain. If public policy were designed to keep the supply of buildable land adequate to foster competition and provide market information about land market activity, it is possible that a more orderly pattern of land could actually reduce the cost of raw land.

Argument D: development costs insensitive to development pattern. The assertion that "most development costs are insensitive to the form of development" appears to be wholly unsupported from a number of studies. The remainder of this section of the paper will review this evidence, focusing on the public costs associated with scattered and low density development.

Perhaps the first study to systematically address the question of public service costs at alternative urban densities was Wheaton and Schussheim's *The Cost of Municipal Services in Residential Areas*. Their findings highlight the importance of location and density of development as critical variables which communities can control to reduce public service costs. They examine in detail sewer, water, schools, streets and fire service (Wheaton and Schussheim, 1955, p. 6).

Costs vary widely with location and density of new residential development. The variation in capital costs attributable to location and density may be as much as \$1,000 per dwelling unit . . . A clustering of growth in favorable municipal service cost areas would produce substantially lower costs as a result of indicated economies of scale, timing and location.

Isard and Coughlin, in their *Municipal Costs and Revenues Resulting From Community Growth* (1957), also found that the costs of providing streets and sewage disposal service increase substantially as density declines.

The potential savings in public service provision costs (over a 20-year period) due to clustered development was examined for Howard County, Maryland, in 1967. It was concluded that if future development was built to the same density as the "new town" of Columbia instead of the existing suburban densities, cost savings on investments in public services would amount to about \$2,400 per family or (assuming a 5% interest rate and a 20-year payback period) about \$150 per year per family (Howard County Planning Commission, 1967; cited in Clawson, 1971, p. 154). These figures include estimates for installations of roads, sewer and water, road maintenance, public purchase of school sites, open space, and school bus operation and do not include savings which

might occur due to economies in, for instance, the provision of police or fire protection or solid waste collection.

Downing (1969) has examined the effect of density and location (distance from treatment plant) of a very important urban service: sewage collection and treatment. Of the three components of a sewage system, (treatment, collection, and transmission) only the latter two are affected by location and density. His estimates show considerable cost savings to both increased subdivision density and increased proximity to the treatment plant. The marginal costs of collection (which are affected only by density) fall from \$6.46 per capita per year to \$4.86 per capita per year as density increases from four people per acre (approx. one-acre lots) to 16 people per acre (approx. 1/4-acre lots). Transmission costs are affected by both density (because increased density requires larger transmission line and pumping stations) and distance. Marginal annual transmission costs of serving one-acre lots decrease from \$43.50 to \$14.50 per capita as distance from the subdivision to treatment plant decreases from 15 to 5 miles. The marginal cost of transmission of serving 1/4-acre lots decreases from \$13.90 to \$4.60 per capita per year for the same distances.

In this article, Downing does not distinguish private and public costs, and thus does not identify what proportion of these costs is borne by the new homeowner and what proportion is spread over all the residents of the municipality. This depends on (1) The subdivision ordinance requirements for installation of sewer collection lines, and (2) the pricing system for sewer services. Most municipalities require the builder (and thus ultimately the homeowner) to pay for the collection system. The full cost of the transmission services generally is not paid for by new residents but is subsidized by the community at large. One implication of Downing's analysis is that this subsidy could be reduced or eliminated if communities encouraged subdivisions to be developed at higher densities and in closer proximity to the existing development. The use of marginal cost pricing to encourage greater densities and reduce the subsidies of outlying areas is discussed below.

Downing (1972, pp. 632-633) also analyzed the costs of providing refuse collection related to density and location for the city of Riverside, California, and found that annualized average costs of refuse collection (twice a week backyard pickup) and disposal varied from \$42 to \$57. The major factors affecting this variation were lot depth, topography, and distances between subdivided areas.

The most comprehensive look at the question of public and private costs associated with alternative development patterns is Real Estate Research Corporation's (RERC) recent study entitled *The Cost of Sprawl*. This report, subtitled "The Environmental and Economic Costs of Alternative Residential Development Patterns at the Urban Fringe," examines the costs and adverse effects resulting from some hypothetical developments which differ with respect to housing type, density, and what they call "degree of planning," which is essentially the extent to which housing type, density, and the overall design of a site are under the control of a single entity. Direct cost estimates are made for housing, open space recreation, schools, transportation, utilities, and other community facilities and services, considering both capital and operating costs. And the study is unique in that the alternatives are costed out year by year over an assumed development period. Some tentative work is done estimating indirect effects, both environmental and "personal."

The analysis is done at two levels: a neighborhood level in which housing type and density are varied for developments of 1,000 dwelling units on 100-500 acres; and a community level in which housing type-density and "degree of planning" are varied for developments of 10,000 dwelling units and 6,000 acres (9.3 square miles). Neighborhood prototypes include single-family conventional, single-family clustered, town-house cluster, walk-up and high-rise apartments, and a mixture of 20 percent each. Community development prototypes vary from low density sprawl (unplanned) to high density (planned) development with different mixes of housing type density and planning. The neighborhood level analysis shows the effect of different densities within a subdivision or development on public and other costs; the community level analysis shows both the effects of different housing type density mixes and of "planning" (eliminating leapfrogging and incorporating strategically placed open space) on the appropriate costs.

While it is difficult to summarize the major conclusion of such a complex study, RERC (1974, p. 7) made the following attempt: "In terms of alternative development patterns for a given site, the study indicates that better planning will reduce all types of costs and their incidence on government, but that increasing density will increase some of these costs, though not nearly in proportion to the increased number of households who can live on the site with increased density."

With respect to the public service costs of different development patterns, the following three conclusions are offered: (1) For a given

neighborhood, higher density development could reduce total capital costs to be borne by local government by as much as 62 percent (because of lower costs of roads and public utilities) and operating costs by 73 percent (RERC, p. 18); (2) holding density constant at the community level, planned development may decrease the total capital cost burden to local government by as much as one-third and operating and maintenance costs by 5 percent (RERC, p. 8); and (3) if both density and planning are allowed to vary at the community level, planning and higher densities can result in significant savings (RERC, p. 21).

While planning results in cost savings, density is a much more influential cost determinant . . . compared to low density sprawl, the amount of total capital costs borne by local government may decrease by almost 50% for high density planned communities. Operating and maintenance costs borne by local government may decrease by 13%.

Most research on the public costs of land conversion has focused on the urban fringe. Fully developed rural recreation developments, however, are likely to have a larger relative impact on local government costs than suburban developments do, both because they are likely to represent a larger proportional increase in population and because they tend to be located at greater distances from service centers and to be built at lower densities. A study by Tillson and others (1972) of a large recreational subdivision (1,300 acres and 1,850 parcels) in central Oregon indicates that because only 4 percent of the lots had been developed in the two years since the subdivision had been platted, the service demands were minimal; it was concluded that at that level of development, the subdivision returned more revenue to the community (mostly from out-of-state owners) than it required in services. At a 50 percent level of development, however, service demands were likely to be high enough that the subdivision would be a fiscal drain on the community.

Reilly (1973, p. 264) indicates that the level of development is not likely to get that high:

Most purchasers of recreational lots, though, are buying, not building. For the nation as a whole, at least six recreational lots were sold in 1971 for each home constructed (in fact, the ratio is probably higher because many second homes are built on country property and farms that have not been subdivided) . . . In California, between 50,000 and 100,000 acres of rural land were subdivided annually in the late 1960's and early 1970's by recreational lot sellers. By 1971, however, houses had been built on only 3 percent of the lots sold in the previous decade.

More information is needed about both the rates of development of rural recreational subdivisions and on their fiscal impacts.

Summary

Available research supports the proposition that the spatial pattern of urban growth substantially affects public service costs. The evidence on the private monetary and nonmonetary costs of low density noncontiguous development and its social and environmental effects generally tends toward the same conclusion: that sprawl is more expensive than planned contiguous development.

The effect of sprawl on housing costs is uncertain. To the extent that outlying land is less expensive than land closer to the urban center, sprawl may permit lower housing costs. Higher private transportation costs and the higher taxes or service charges necessary to pay for the more expensive public services may make sprawled housing more expensive to the homeowner than more compact housing. Examination of these relationships is a potentially fruitful research area.

Does Speculation Lead to Increased Housing Costs and Sprawl?

Speculative gains affect the price and supply of housing and to some degree the timing and spacing of development. Maisel (1953, p. 192) has asserted that for builders the price of land is arbitrary, merely an internal accounting decision, and that builders merely pass on whatever price they pay to the home buyer. Thus, while a number of factors cause housing to be priced out of the market for a large proportion of the population (antiquated building regulations, trade union requirements, interest rates), the high price of land for building because of a substantial speculative component in this price is certainly an important one.

Much of the public concern about gains to land speculation revolves about three issues: (1) The amount of gain and the consequent incentive for a landowner to exert inordinate influence in public decisions; (2) the fact that a gain caused largely by public action is wholly captured by one individual; and (3) the effect of speculative gains on housing costs.

Some of the public concern might dissipate if more were known about the magnitude of speculative gain. Such information is, however, almost nonexistent. Schmid (1968, p. 26) has put together a composite of land prices at various stages in the conversion process from national data on suburban land. His 1968 composite suggests that the price of

raw land appreciates about \$1,700 between purchase of the land from the farmer for \$1,300 and sale of raw land to the subdivider or developer for \$3,000. Whether this represents an "unreasonable" return on the investment depends on the amount of risk involved and the length of time between the purchase and sale of land.

In *House and Home* (a major trade journal of homebuilders), Vollman (1972, p. 72) provides some insight into the latter question. Her article presents an insider's view of "how to find raw land in the right place and how to make the best deal" and a land dealer's estimate that the average holding time of raw land is about seven years.

The amount of risk involved depends largely on public actions like sewer and water facility extensions and zoning, and it is difficult to make general statements about risk. If land speculation is truly risky, however, there will be losers as well as gainers. Gains and losses might very well not be symmetrical, however; I would expect land speculation to be a positive sum game.

An assessment of the cost of speculation is almost impossible, because we do not know much about the size and distribution of speculative gains and losses. This information gap is due in part to the difficulty in obtaining reliable data on transactions in raw land. As Clawson (1971, p. 102) has pointed out, the most valuable commodity that speculators and land dealers have is "not land itself but information . . . The land trader or dealer profits primarily by his superior knowledge and by his ability to take advantage of that knowledge . . . It is not surprising under these circumstances that this group has not been anxious to tell outsiders everything about its operations." This difficulty in obtaining reliable data is mentioned by every researcher in the field.

If society is to be able to evaluate whether the benefits of speculation outweigh its costs, such information is necessary. Possibly, the market is working in this instance and risk-bearing, land assembly, and subdivision functions necessary for land development are performed more "economically" under the present system than under an alternative. In order to make this judgment, however, we need to know more.

An evaluation of the effect of land speculation on sprawl also requires research in new areas. Land transactions tend to be regarded as something which does not much affect the pattern or timing of development but merely the price of land. Milgram's (1968) study suggests this as does Schmid's (1968) focus on price appreciation. Unless, however, the demand for suburban land is completely inelastic with respect

to price, any changes in the price for land will affect the quantity demanded and therefore the timing and spacing of urban growth. Research related to demand elasticities and land transactions should follow Clawson's (1972) lead in developing researchable hypotheses by linking theory to an understanding of developer and landowner behavior and market structure.

II. THE PROCESS OF LAND CONVERSION: HOW AND WHY DO SPRAWL AND SPECULATION OCCUR?

Any evidence that sprawl and speculation have undesirable impacts on public objectives suggests redesign of public policy to reduce these impacts. Design of public policy, however, requires an understanding of the process one is attempting to modify by that policy. This section of the paper reviews the basic elements of the land conversion process.

Land speculation, sprawl and intermingled idle land are all natural outgrowths of economic and institutional forces, not perversions of them . . . Perhaps we regard the result as socially undesirable; if so, we should examine wherein the economic and institutional base might be modified. (Clawson, 1962, p. 107).

The private decisions in conversion process take place within a structure of economic incentives based largely on private property rights and within a matrix of public policies intended to influence private decisions. An understanding of both property rights and public policies is required before attempting to change this incentive structure or to develop specific public policies. There has been growing interest in the public policy framework for land use controls and in property rights as a basis for land use decisions. A standard reference for the former subject is Delafons (1969), and for the latter is Bosselman and others (1973).

Within this structure, the timing and spacing of suburban or other land development is determined by numerous private decisions which, taken together, constitute the market for land.

Land Conversion at the Urban Fringe

These private decisions and the incentives which motivate the various actors in the process of land conversion have been the object of considerable research. The most probing analysis (Kaiser and Weiss, 1969) of the behavior of various actors in the residential development

process has been the work done at the Center for Urban and Regional Studies of the University of North Carolina by Shirley Weiss and associates during the mid-1960's. The process of land conversion is viewed as a sequence of decisions, the most important of which are "the decision of the predevelopment landowner to sell or hold his land, the decision of the residential developer to locate subdivisions, and the decision of the household to move and to choose another location" (Kaiser and Weiss, 1969, pp. 597-598). The schematic diagram in Figure 1 summarizes their conception of the process of residential land conversion, and illustrates quite graphically the number of actors and decisions in the process.

Underlying land conversion is a complex set of decisions by assorted individuals and groups, each guided by his own incentives—the household by basic needs and preferences, the developer-entrepreneur by the profit motive, the predevelopment landowner by a mixture of pecuniary and personal motives. These decisions, shown on the second row of Figure 1, are the ones that land use controls must influence if local government is to affect the pattern of change. (Kaiser and Weiss, 1970, p. 31).

Their research suggests that the most critical decision in land conversion is the *developer's decision to purchase the land*. The "decision to develop land is anticlimactic to this decision, for development typically follows within less than five years and probably in a form not much different than the development programmed at the time of purchase" (Kaiser and Weiss, 1970, p. 32).

Kaiser and Weiss conclude that the most important factor in the decision to purchase a particular parcel of land is the social prestige level of the location, a variable which is not much affected by public policy. Their analysis indicates, however, that public policy determining the availability and cost of public services could have a substantial impact on developer location decisions.

Marion Clawson devoted a major section of his *Suburban Land Conversion in the United States* (1971) to description of the process of land conversion and the various actors in the process: home buyers, developers, builders, planners, lenders, landowners, and public officials. Clawson, however, does not stop with a description of the actors and their incentives. He attempts to use his understanding of the process of land conversion to develop a theory of the urban land market.

The market for suburban land is different in some respects from the usual markets that economists study. There is no organized ex-

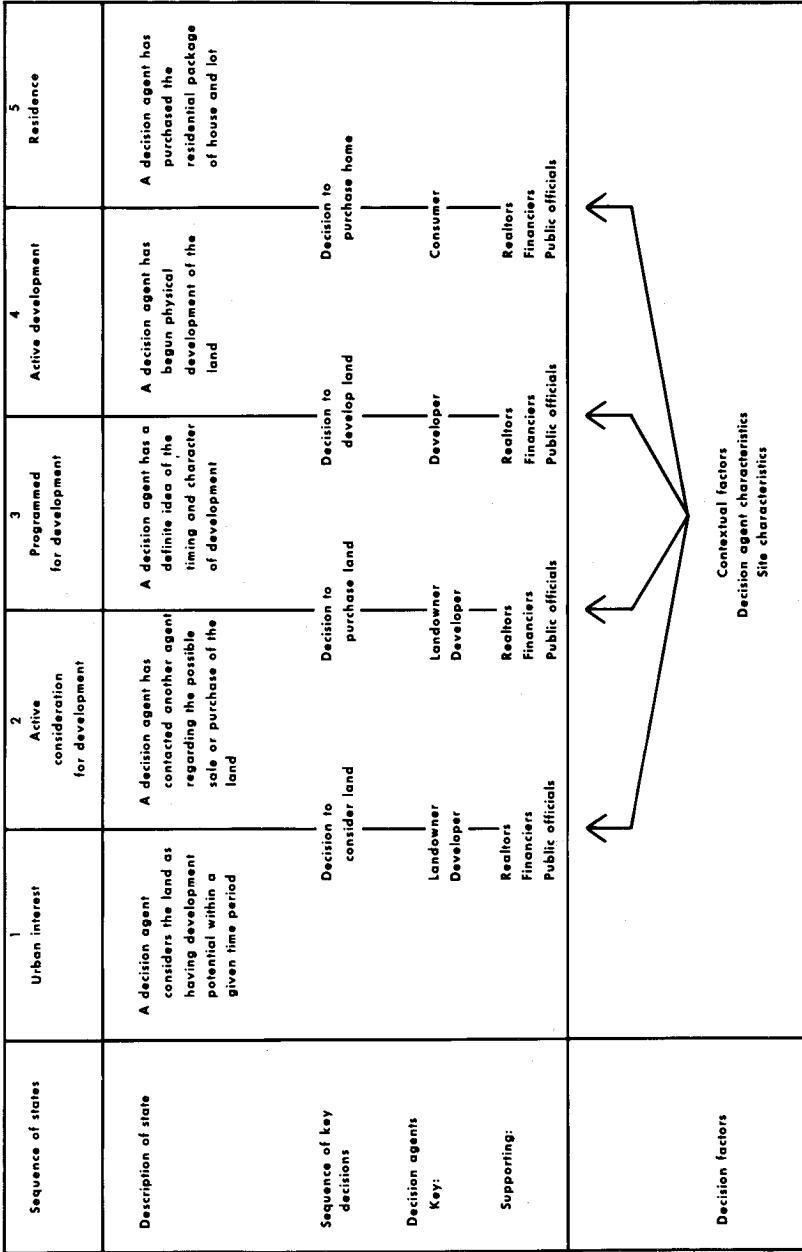


Figure 1. The residential land development process: Sequence of states, key decisions, and decision factors. From Burby, 1967, p. 9.

change, partly because land is not a standardized commodity; turnover is relatively slow; market information is not widely available; and the timing and ultimate price in any transaction is highly dependent on seemingly capricious local government decisions (Clawson, 1971, pp. 121-122). Furthermore, the supply side of the market is often clouded by title uncertainties and nonpecuniary factors.

One example of Clawson's use of an understanding of the land conversion process to develop land economic theory is his critique of the neoclassical theory of land rent (Clawson, 1971, pp. 117-120). He demonstrates that the failure of the land market to react as neoclassical theory would predict to a decline in housing demand is caused partly by the market structure (who owns the land) and the expectations of the principal actors (especially landowners). This ability to think through how the behavior of the principal actors might affect land conversion gives Clawson's discussions of land markets a usefulness in framing researchable questions about potential policy impacts which is lacking in standard theoretical treatments of land economics.

The most thorough examination of the land conversion process on the rural-urban fringe is Grace Milgram's study, *The City Expands*. She traced the ownership transfers, subdivision, and use changes of 248 parcels of land (vacant in 1945 and larger than 10 acres in size) in northeast Philadelphia over the period 1945 to 1962. Her focus on the transactions and use changes themselves, rather than the behavior of the owners and developers, makes this study unique. A "transactional history" was established for each parcel from 1945 until it was developed or until 1962 if it remained undeveloped throughout the period, establishing acreage sold, name of seller and purchaser, and price. With this information Milgram addresses three issues: (1) Land development: under what conditions, at what rate, and by whom has land been developed; (2) land transactions: rates of turnover, price changes, evidence of speculative activity; and (3) public policy: "What public policies can serve to limit the price rise or produce a more efficient developmental pattern?" (Milgram, 1968, p. 12).

With respect to the land conversion process, Milgram (1968, p. 82) concludes that ". . . transactions and development seem to be the result of different forces, with changes in transactional rates related to shifts in the availability of credit or alternative investment opportunity, rather than the changes in rates of development."

Most examinations of the land development process focus on the interaction of private decision makers operating within a set of predefined public policy rules. Land development, however, involves extensive interaction between private land developers and public officials with decision making authority in land development matters. McBride and Clawson (1970, p. 27) called attention to the importance of negotiation between developers and local governments with respect to public decisions about land development: ". . . in spite of existing rules, standards, procedures, and fee-schedules, many public decisions and actions pertaining to land conversion are negotiable." They argue that local governments have tended to act as "accommodators" to development proposals and not as "initiators" in the process of land conversion, and they suggest that local governments should become "initiators." Two ways in which local governments could increase their negotiating capacity are proposed: (1) Public purchase of land or development rights; (2) taxation of land on basis of development value.

Land Speculation at the Urban Fringe

Of the various stages in the land conversion process, least is known about the early stages in which parcels of developable yet "unripe" land change hands in the expectation that price of these parcels will appreciate substantially as development approaches. Yet as Kaiser and Weiss (1969, 1970) suggested, these may be the most important in terms of the ultimate use of land. Except for the studies of Milgram (1968), Kaiser and others (1968), Schmid (1968), and Gaffney (1956), the transactions which precede the decision to build have received practically no attention. As Schmid points out, however, much of the increase in the price of residential land occurs prior to its purchase by the builder, largely because of public actions which affect its suitability for development.

The role of speculation in the land market needs more attention. Major uncertainties about when a particular parcel of land will be "ripe" for development and the price it will command have created a need for dealers who are willing to facilitate transactions in this uncertain market. Clawson (1971, pp. 135-136) lists five useful functions which may be performed by "intermediate landowners": (1) They communicate demand signals to present landowners and, by bidding up the price of land, facilitate conversion; (2) they force land into its "highest and best" economic use; (3) they may assemble or subdivide

parcels, making land more suitable for a higher use; (4) they provide a ready stock of land to builders; and (5) they bear risks and uncertainties. Still the question remains: Is there an alternative system for providing these functions which is less costly to society? Research on the effectiveness of the present system in performing these functions vis-a-vis other systems would permit a better assessment of the true cost of land speculation.

Rural Recreation Land Conversion and Speculation

Most of the research on land conversion and speculation focuses on the Atlantic coast and almost all relates to land conversion and speculation at the urban fringe. The urban fringe, however, is not the only area of rapid conversion; in terms of total land area affected, it may not even be most important. Rural land conversion for recreational residences has taken a great deal of land out of agricultural and forest use and has placed a public service burden on adjacent communities. In many, if not most cases, this burden of providing public services has fallen on communities with small population bases which are not accustomed to providing public services at the levels expected by urban dwellers.

Rural recreation land subdivision characteristically occurs at "rural fringes" in the eastern and midwestern United States: on the shorelands of rivers and natural and artificial lakes and at the foothills and major ski developments of the mountains. Johnson (1964) has provided some information on the rural recreational subdivisions serving Washington, D.C., and Fine (1966) has collected information on private "seasonal" housing in Wisconsin. In the west, one finds "ranchettes" (parcels of 40 or so acres) as well as developments with urban-type densities which characterize eastern recreational subdivisions.

The *process* of rural recreation land development may be expected to differ substantially from that of suburban land conversion, both in the identity and expectations of the actors and the time frames of development. Some general information about the actors and the process of recreational land development can be found in *The Use of Land* (Reilly, 1973, Chap. 7). To my knowledge, however, the only detailed research with respect to the recreation land development process is that by Cocheba and others (1973), who looked at the market structure, the identity and expectations of major actors, and market transactions from 1920-1968 on the San Juan Islands in the state of Washington.

Furthermore, recent federal attempts to control interstate land sales (which are largely for rural recreation purposes) suggest that land speculation in rural recreational development differs from that of the urban fringe in some important respects (especially with regard to the incidence of fraud).

Summary

Considerable work has been done on the behavior of various actors and the transactions that occur in the residential land development process at the urban fringe. This research helps us to understand the resulting sprawling and noncontiguous pattern of land development and the high prices paid for raw land. It helps identify the critical points in the process toward which public policy can be directed to reduce high land prices and contain sprawl. In particular, it highlights the importance of the developer's decision to purchase a particular parcel and the potential importance of public service provision and pricing decisions in the developer's location decision.

There are, however, some gaps in our understanding of the process. One of the most serious, it seems to me, concerns the magnitude and distribution of speculative gains on raw land and, more generally, the nature and frequency of transactions on raw suburban land.

Research into the conversion process in rural recreation land markets could also be pursued with considerable payoff.

III. THE IMPACT OF PUBLIC POLICY ON LAND CONVERSION: Can Public Policy Affect the Timing and Spatial Pattern of Land Conversion and Reduce Speculative Gains?

Ever since the city of Boston, prior to the American Revolution, passed an ordinance banning gunpowder storehouses to the outskirts of the city, local governments in this country have attempted to regulate the spatial pattern of land uses, with greater and lesser degrees of success. Increasing awareness of the externalities associated with leapfrogging have led some municipalities to attempt to control the timing of land conversion and not just the ultimate use to which land is put.

Public policies to influence the timing and spatial pattern of urban growth may be grouped under four types:

1. *Land use control policy*: the exercise of police power (zoning, subdivision, and sanitary controls) and of the power of eminent domain (public purchase of fee-simple title and easements).

2. *Tax policy*: the property tax and differential assessment schemes as they affect the rate of land conversion, and the income and "land value adjustment" taxes as they affect speculation in land.

3. *Public service provision policy*: controlling the timing and spacing of water and sewer service and revising public service pricing systems.

4. *Redefining property rights*: separating particular rights (e.g., to develop land) from the property rights bundle.

Traditionally, governments have employed the first two policies to influence development. The traditional police power policies (zoning, subdivision, and sanitary controls) which provide the basic framework of current land use policy have not been very effective in containing sprawl. This is largely because they intervene in the land conversion process too late to affect the critical decision of the developer to purchase a parcel for conversion. The expectations of gain already have been created, and perhaps sizable investments have been made in the expectation of gain. The economic pressures for conversion are generally so great at this point that, in many cases, subdivision and use restrictions are modified to permit development.

Tax policy, in theory, should have an effect on the behavior of intermediate landowners and developers and hence on conversion rates. The differential assessment schemes which have been attempted to date, however, apparently have not provided enough of a monetary incentive to affect conversion rates or patterns.

Attempts to increase the efficiency of traditional land use control and tax policies have been frustrated by both constitutional limitations (e.g., the "taking" question) and by problems in the administration and enforcement of these tools. Bosselman and others (1973) discuss the taking issue at length. Babcock (1966, p. 54) has argued that the "Sargasso Sea of zoning" is zoning administration, especially local record keeping, conduct of local hearings, and the adequacy of the findings of the local administration agency. Weber and Peroff (1974), in the case of Wisconsin's shoreland zoning law, have shown there is great variation among counties in administration and enforcement of the zoning, sanitary, and subdivision provisions of the law.

Hansen (1974), in a study of the California Land Conservation Act of 1965, concluded that preferential taxation is not likely to have much effect on the rate of farmland conversion on the urban fringe. Holland's

(1974) analysis of the 1970 Open Space Taxation Act of the state of Washington suggests that the potential capital gains which farmers are likely to receive for urban fringe land are too large relative to the deferred tax and penalty under the law to have much effect on urban fringe land conversion.

The general ineffectiveness of land use control and taxation policies in guiding urban growth and their complexities in administration and enforcement have led some to look to fundamental changes in the structure of property rights. Costonis (1973) provides a discussion of one such proposal—transferable development rights. Many who prefer more incremental changes look to the provision of public services as a major policy instrument in determining in which directions and at what rate cities expand.

Public service policy has been offered as a possibly effective means of guiding land conversion and reducing speculative gains. The potential of public service policy to achieve these goals will be evaluated in this section of the paper. There are basically two ways that public service policy can be used as a complement to land use control and tax policies to guide urban growth: (1) By directing the timing and location of public services such as sewer, water, and roads; and (2) by devising a pricing scheme which makes sprawl very expensive and thus encourages dense contiguous development.

Urban Service Boundaries

Milgram (1968) has shown that one of the major determinants of land conversion for the urban fringe of Philadelphia is access to roads and sewers. Harris and Allee (1963), in a study of the suburban land market in Sacramento County, California, reached a similar conclusion about the importance of freeway access and sewer laterals in "ripening" land for conversion. Goldberg (1974, p. 87) found that most developers require properly zoned and sewered land in reasonable quantities before they will consider building. This suggests that policies about where and when to extend sewer and water lines could have a significant influence on the timing and spatial pattern of urban growth. A number of municipalities in this country have adopted policies which restrict public service provision to within an "urban service boundary" and discourage development outside of this boundary. The Bureau of Governmental Research and Service at the University of Oregon (1974, pp. 13-42) recently surveyed a number of jurisdictions with such policies and found

a wide variation with respect to the details of the policy and the strength of commitment to the policy.

A number of questions have yet to be resolved about urban service boundary policies. The policies which put an upper limit on development within the jurisdiction will have to contend with arguments that they violate constitutional guarantees of the right to travel and migrate. Even for the majority of urban service boundary schemes, which do not confront constitutional barriers, the administrative details and problems of intergovernmental coordination remain. For example, the imposition of a boundary by one city without agreement by surrounding jurisdictions may encourage rather than retard scatteration, as developers leapfrog to surrounding jurisdictions or unincorporated areas with fewer restrictions on development.

To my knowledge, there has been no research on the effectiveness of urban service boundaries in reducing scattered development. When an adequate history of such policies exists for a couple of urban areas, attention should be given to the effects of such policies on land prices both within and without the boundary, and on land transactions and conversions in the total regional housing market. If good data on land use conversion and prices can be obtained for a long enough period, a statistical technique called "intervention analysis" may prove to be appropriate for examining the impact of the adoption of an urban service boundary policy (or, for that matter, of a marginal cost pricing scheme) on land prices and on private land development decisions. The technique was developed to help educators determine whether certain educational "treatments" had any effect. More recently, the technique has been used to examine the effect of changes in certain environmental regulations on air quality in Los Angeles. To my knowledge, this technique has not been applied to the analysis of land use policy impacts, although it has a number of advantages over other statistical techniques for this purpose (Box and Tiao, 1973).

Public Service Pricing Schemes

The use of prices to guide resource allocation decisions with respect to urban public services is getting increasing attention by economists (Mushkin and Bird, 1972, p. 3):

Continued revenue pressure on urban finances has led many cities to consider carefully the prospect of augmenting their financial resources by introducing or increasing fees and charges for various local govern-

ment activities. At the same time the development of two previously disparate strands of economic analysis—marginal-cost-pricing and “public goods” and externalities—has provided a more adequate conceptual basis for the use of the price system by governments, both to correct distorted private market prices and to improve the allocation of resources within the public sector itself.

Vickrey (1963, p. 62) has argued that pricing schemes for public services, in addition to other effects on efficiency in resource allocation, can influence urban form.

In what may be the only published research on public service pricing systems and land development, Downing (1973, pp. 634-635) has attempted to determine the effects on land development of three alternative pricing schemes for sewer services for a hypothetical city of 100,000: a marginal cost user charge, the property tax, and an average cost price. He concludes that an average cost pricing, which is the basis of most sewer charges, has the effect of undercharging outlying areas. On the basis of very weak evidence, he asserts that “any benefits that accrue to a site but are not fully charged to it will be reflected in an increase in land value.” To demonstrate the effect of the pricing system for a sewer extension on the development of fringe farmland which is submarginal for residential use, Downing (1973, p. 636) postulates:

If the project were financed by a marginal cost user charge and this were a marginal project such that $\Delta R = \Delta C$ (the change in the marginal productivity of the land resulting from sewer service equals the user charge), then the bid price for the residential use would not change and the choice of use would remain indifferent. However, if an average cost charge was levied, the bid price for the residential use would increase while the agricultural bid price would remain unchanged. The residential use would then outbid the agricultural use and the land would be subdivided.

On the base of this argument, he concludes that “the method of financing those municipal services which directly affect the marginal productivity of land in one or more alternatives can affect the development decision.”

Downing's conclusion may be correct, but his argument is misplaced and contrary to what we know about land markets and developer behavior. Downing implies that developers will figure out how the new sewer changes the marginal productivity of the land, subtract from this the “user charge” and capitalize the difference into their bid price and/or that landowners will adjust their reservation price accordingly. It seems highly unlikely that this would occur. What we know

about landowners and developers suggests they do not make such detailed calculations prior to land transactions. Furthermore, if it is true, as Lind has claimed (Lind, 1970, cited in Downing, 1973, p. 634) that the accuracy of the capitalization of benefits from the provision of urban services into land values depends on the closeness of the land market to assumptions of perfect competition, then the discussion in the first section of this paper casts serious doubt on the ability of land markets to reflect the overcharges or undercharges in the value of sewer-ered land.

Even if land markets were perfect, however, and the overcharges or undercharges were fully capitalized into land prices, the distribution of the subsidy is wholly irrelevant to the decision to develop. Developers do not appear to pay much attention to land prices in selecting building sites (see Maisel, 1953) and are concerned much more about the *availability* of sewer service than about its price since they can pass both land and sewer charges on to the home buyer. Their decisions about which sites to purchase and how much to pay for these is based on an expectation about the total price they would receive for a finished house (costing them a certain amount to build) and a lot. The imposition of a marginal cost pricing scheme for sewers might well have an impact on the builder's decision to purchase a piece of land for development, but it would be because of the effect this charge would have on the finished price of the house and lot, and not, as Downing implies, because of its effect on the price of the land.

Downing (1969, p. 636) does not attempt to explain how marginal cost pricing might affect the development decision. He asserts that "the subsidy will make the marginal residential use in our example supra-marginal," but it is not clear how this would happen. Furthermore, the argument is backwards for it implies moving from a marginal cost pricing system in which there is no subsidy to an average cost pricing system. In fact, present pricing systems are generally average cost systems and any price adjustments associated with a subsidy would already be built into existing prices. Downing should address the effect of instituting a marginal cost pricing system on existing land price (the effect of removing the existing subsidy on land prices).

By concentrating on land prices and on the distribution of the subsidy in average versus marginal cost pricing, Downing failed to focus on the major determinant of the effectiveness of a marginal cost pricing scheme: the effect of such a scheme on the total cost to the home buyer

and thus on the developer's expectations about whether he could sell the house and lot at an acceptable level of profit. Only through builder/developer expectations about profit on a total package can a marginal cost pricing scheme influence the timing and spatial pattern of land conversion. Research on the effectiveness of marginal cost pricing for urban services in guiding urban growth should focus on this issue.

As with urban service boundaries, marginal cost pricing schemes are likely to depend on intergovernmental cooperation. Policies which encourage density within a jurisdiction by penalizing development at the fringe may, in fact, promote development beyond the boundaries of the municipality if the policy is not effective within the entire market area.

The question which remains after all administrative questions have been resolved is: Can marginal cost pricing reduce sprawl? In spite of the inadequacy of Downing's analysis, a strong case can be made that, at some level of user charges, marginal cost pricing should reduce sprawl by raising the cost for the total housing package in outlying areas relative to that in contiguous areas. Future research on the effectiveness of marginal cost pricing in reducing sprawl will have to deal with the following questions: (1) What is the marginal cost of providing services as distance from the urban center increases (how much more will housing cost for each additional mile from the urban center)? and (2) What is the elasticity of demand for scattered housing? If the demand for exurban housing is relatively inelastic, as I would suspect, then the demand for such housing would not be much reduced even by substantial price increases caused by the use of marginal cost pricing for public services. We do not have answers to these questions and therefore can not say much about the effectiveness of such policies.

Even if such a policy were effective, it might have some unintended distributional consequences. It is not at all clear, for example, that the imposition of a marginal cost pricing scheme would not lead to locational rents for landowners closer to the urban center and that attempts to capture these rents would not wipe out the expected price differential on which the effectiveness of the policy hinges. The ultimate incidence of this pricing scheme may be quite different than expected and should receive attention by researchers.

Reducing Speculative Gains

Gains accrue to speculators partly because of public decisions affecting suitability of land for development and because of the difficulty of obtaining land market information. The losses are borne by the public in the form of higher land and housing prices. If this distribution of gains and losses is not acceptable to the public, and if public intervention results in a better distribution, then public intervention into the functioning of the land market would be justified. Clawson (1962) has suggested that the present situation could be improved by: (1) Providing more certainty about the location and timing of future urban development; and (2) gathering and disseminating market information about land transactions. A well-implemented urban service boundary could achieve the first of these. These actions presumably would reduce the price of land for residential development by making the information on which speculation gain is based more widely available, thus resulting in lower costs to the home-buying public.

Redistribution of speculative gains from land dealers to the public also might be achieved by public purchase and resale of land on the urban fringe at the appropriate time and at a price which balances the need for low cost housing with the public desire to realize an adequate return on its investments. Clawson (1971, pp. 137-140) discusses this suggestion at some length in his book. The public ownership and resale (land-banking) policies of the city of Saskatoon, Saskatchewan, are discussed in Bureau of Governmental Research and Service (1974, pp. 34-35).

Summary

While it appears that planning extensions of roads and sewer and water service to the urban fringe could be a powerful tool to control urban form, a number of serious questions about the constitutionality and administrative feasibility of this technique must be resolved before planners and local government officials jump on the new "urban service boundary" bandwagon. The administrative questions which face urban service boundaries are not dissimilar to those that confront zoning: Who will plan the extension of public facilities and with what procedures? How will the windfalls and wipeouts associated with these decisions be compensated? How will requests for exceptions with respect to sewer and water needs be decided and who will make these decisions?

Marginal cost pricing schemes also have some administrative and intergovernmental cooperation problems which must be dealt with. The effectiveness of these schemes depends on at least three factors which need further research: (1) The effect of marginal cost pricing on the price of a total housing package at various distances from an urban center; (2) the elasticity of demand for scattered low density housing; and (3) the reservation price behavior of landowners closer to the urban center with respect to possible capitalization of location rents caused by the marginal cost pricing scheme.

The central question remains: Can urban service boundary and public service pricing policies affect the timing and spatial pattern of urban development? At the present time, we do not have enough information to say. It appears, however, that these policies, particularly marginal cost pricing, have a potential to affect decisions in the land conversion process (especially the developer decision to purchase) earlier than in traditional zoning.

CONCLUSION

Public decisions about land traditionally have sought a separation of conflicting use, orderly transfer of ownership, and the avoidance of public health problems. More recently it has become clear that land use decisions determine to a large extent both housing costs and public service costs. Designers of land use policy have of necessity become concerned about ensuring an adequate supply of land for housing at reasonable prices and the minimization of the public costs associated with development.

It is fairly clear that urban sprawl is more costly than planned compact development, particularly as regards public service costs. It is also clear that effective containment of urban sprawl may further exacerbate the current shortage of housing for middle and low income families by increasing the price of developable land and thus of housing. Under the current institutional structure, these two important public policy objectives appear to be incompatible. If minimizing the public costs of development entails restricting the supply of buildable land, policymakers will need to consider how to encourage reasonably priced housing within this constraint. Research which helped define the trade-off between public service costs and land and housing prices would materially aid in policy design. It could, for instance, facilitate an explicit transfer

of some of the public and private savings from planned conversion to a fund specifically used for the encouragement of low cost housing.

If properly conceived and executed, basic research on the suburban land market and applied research on the impacts of alternative policies on land prices and conversion patterns can help policymakers design land use policies that will achieve their intended objectives.

Acknowledgments: This paper was written with the support of the Oregon State University Agricultural Experiment Station. The critical comments of Don Sorenson make this a better paper than it would have been.

REFERENCES

- Babcock, Richard F. *The Zoning Game: Municipal Practices and Policies*. Madison: Univ. of Wis. Press, 1966.
- Bosselman, Fred, David Callies, and John Banta. *The Taking Issue: An Analysis of the Constitutional Limits of Land Use Control*. Washington, D.C.: U.S. Govt. Printing Office, 1973.
- Box, G. E. P., and G. C. Tiao. "Intervention Analysis with Applications to Economic and Environmental Problems," Tech. Rpt. No. 335, Dept. of Statistics, Univ. of Wis., Madison, Oct. 1973.
- Burby, Raymond J., III. "Lake-Oriented Subdivisions in North Carolina: Decision Factors and Policy Implications for Urban Growth Patterns: Developer Decisions," Chapel Hill, N.C., Center for Urban and Regional Studies, Institute for Research in Social Science, Univ. of North Carolina, Nov. 1967.
- Bureau of Governmental Research and Service. *Local Government Policies for Urban Development: A Review of the State of the Art*, School of Community Service and Public Affairs, Univ. of Ore., April 1974.
- Clawson, Marion. *Suburban Land Conversion in the United States; An Economic and Governmental Process*. Baltimore: Johns Hopkins Univ. Press for Resources for the Future, 1971.
- Clawson, Marion. "Urban Sprawl and Speculation in Suburban Land," *Land Economics*, Vol. 38, May 1962, pp. 99-111.
- Cocheba, Donald J., Ralph A. Loomis, and Eldon E. Weeks, *The Land Market and Economic Development, A Case Study of San Juan County, Washington*, Wash. Agric. Expt. Sta. Bull. 773.
- Costonis, John J. "Development Rights Transfer: An Exploratory Essay" *Yale Law Jour.*, Vol. 83, Nov. 1973.
- Delafons, John. *Land Use Controls in the United States*, 2nd ed. Cambridge: MIT Press, 1969.
- Downing, Paul B. "Extension of Sewer Service at the Rural-Urban Fringe," *Land Economics*, Vol. 45, Feb. 1969, pp. 103-111.
- Fine, Isadore V. *Private Seasonal Housing in Wisconsin*, Dept. of Resource Development, Madison, Wis., 1966.
- Gaffney, Mason. "Land Speculation," unpub. Ph.D. diss., Univ. of Calif., 1956.
- Goldberg, Michael A. "Residential Developer Behavior: Some Empirical Findings," *Land Economics*, Vol. 50, Jan. 1974, pp. 85-89.

- Hansen, David E. "Research Issues Pertaining to Preservation of Agricultural Land: California Experiments and Experiences," Workshop on Economic Research for Land Use Planning, Seattle, Wash., Dec. 1974.
- Harris, Curtis C., Jr., and David J. Allee. *Urbanization and Its Effects on Agriculture in Sacramento County, California: 2. Prices and Taxes of Agricultural Land*, Giannini Foundation Res. Rept. No. 270, Calif. Agric. Expt. Sta., Univ. of Calif., Davis, 1963.
- Holland, David M. "An Economic Analysis of Washington's Differential Taxation Program," College of Agriculture Research Center, Circ. 578, Wash. State Univ., Dec. 1974.
- Isard, Walter, and Robert Coughlin. *Municipal Costs and Revenues Resulting from Community Growth*. Wellesley, Mass.: Chandler-Davis Publishing, 1957.
- Johnson, Hugh A., Jr. *Rural Residential Recreation Subdivisions Serving the Washington, D.C. Area*, AER-59, Economic Research Service, U.S. Dept. of Agriculture, 1964.
- Kaiser, Edward J., Ronald W. Massie, Shirley F. Weiss, and John E. Smith. "Predicting the Behavior of Pre-development Landowners on the Urban Fringe," *Jour. of the American Institute of Planners*, Vol. 34, Sept. 1968, pp. 328-333.
- Kaiser, Edward J., and Shirley F. Weiss. "Decision Agent Models or the Residential Development Process—A Review of Recent Research," *Traffic Quarterly*, Dec. 1969, pp. 597-630.
- Kaiser, Edward J., and Shirley F. Weiss. "Public Policy and the Residential Development Process," *Jour. of the American Institute of Planners*, Vol. 36, Jan. 1970, pp. 30-37.
- McBride, George A., and Marion Clawson. "Negotiation and Land Conversion," *Jour. of the American Institute of Planners*, Vol. 36, Jan. 1970, pp. 22-29.
- Maisel, Sherman. *Housebuilding in Transition*. Berkeley and Los Angeles: Univ. of Calif. Press, 1953.
- Milgram, Grace, with the assistance of Christine Mansfield. *The City Expands: A Study of the Conversion of Land from Rural to Urban Use*, Philadelphia 1945-62. Washington, D.C.: U.S. Govt. Printing Office, 1968.
- Mushkin, Selma, and Richard Bird. "Public Prices: An Overview," *Public Prices for Public Products*, Selma Mushkin, ed. Washington, D.C.: The Urban Institute, 1972, pp. 3-26.
- National Academy of Sciences, National Academy of Engineering. *Urban Growth and Land Development: The Land Conversion Process*, Report of the Land Use Subcommittee of the Advisory Committee to the Department of Housing and Urban Development. Washington, D.C., 1972.
- Real Estate Research Corporation. *The Cost of Sprawl: Environmental and Economic Costs of Alternative Residential Development Patterns at the Urban Fringe*. Washington, D.C.: U.S. Govt. Printing Office, April 1974.
- Reilly, William K., ed. *The Use of Land: A Citizens' Policy Guide to Urban Growth*, a Task Force Report sponsored by the Rockefeller Brothers Fund. New York: Thomas Y. Crowell, 1973.
- Schmid, A. Allan. *Converting Land From Rural to Urban Uses*. Baltimore: Johns Hopkins Press for Resources for the Future, 1968.

- Tillson, Gregory D., Russell C. Youmans, and Marion D. Thomas. *Local Tax Impact of Recreational Subdivisions: A Case Study*, Spec. Rpt. 365, Ore. State Ext. Serv., Corvallis, July 1972.
- Vickrey, William. "General and Specific Financing of Urban Services," *Public Expenditure Decisions in the Urban Community*, Howard G. Schaller, ed. Washington, D.C.: Resources for the Future, 1963.
- Vollman, June. "How to Find Raw Land in the Right Place and How to Make the Best Deal," *House and Home*, Aug. 1972, pp. 70-73.
- Weber, Bruce A., and Kathleen S. Peroff. "Rural Land Use Management in Wisconsin Counties: The Response of Local Government to the Shoreland Protection Act," Institute for Environmental Studies, Univ. of Wis., Madison, Aug. 1974.
- Wheaton, William L., and Morton J. Schusheim. *The Costs of Municipal Services in Residential Areas*. Washington, D.C.: U.S. Department of Commerce, 1955.