Land use planning: a focus on rural land

John J. Eckes

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LAND USE PLANNING

- A Focus on Rural Land -

by

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Presented in partial fulfillment of the
requirements for the degree of

Master of Resource Administration

UNIVERSITY OF MONTANA

1974

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Date July 11, 1974
ACKNOWLEDGEMENTS

I am indebted to the Soil Conservation Service, United States Department of Agriculture, for the opportunity to attend this graduate study program.

Sincere appreciation is expressed to Dr. Richard E. Shannon, Director of the Resource Administration Program, for his help and guidance.

Thanks to Wilson T. Moon, State Conservationist of Iowa, State Office and Area-6 SCS personnel, for their support and cooperation extended on many requests for assistance.

Finally, I am most grateful to my wife, Julie, and three children, Tracy, Sue and Patrick, for their help, patience and encouragement this past year.
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CHAPTER I

LAND USE PLANNING - A FOCUS ON RURAL LAND

Introduction

In the decade of the seventies the regulation and control of land use may be extended beyond anything we have experienced in this field to date. Signs of change are especially visible in the legislative area, in both state and federal levels. National Land Use Planning bills now in Congress, if passed, will have a tremendous impact on both private and public land use.

As a professional resource conservationist working for the U.S Soil Conservation Service for the past seventeen years, I wish to discuss several points of land use planning as they are related to natural resource management, more specifically to soil and water.

Land Use policies and land planning are certainly not new. We have pursued conscious land use policies at the national, state and local levels for many years, beginning perhaps with our early land sales in the United States under the Homestead Act of 1862. There are many land ethics and concepts prevalent in the United States today and they all must be considered if we are to bring about a change that is acceptable and desired. A brief look at some of these are:

Fill it up, connect it up, use it up.
I'll do what I please with my land and no one has the right to tell me differently.

We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect. There is no other way for land to survive the impact of mechanized man, nor for us to reap from it the esthetic harvest it is capable, under science, of contributing to cultures.¹

Changes which seem to be inevitable, will not occur without considerable controversy, conflict and political struggle. It appears the center of controversy may be with owners of rural land — farmers, ranchers, land developers and speculators and more diverse, essentially urban-oriented groups of conservationists, environmentalists, planners and others who are responding to a need to preserve and restore outdoor landscapes and rural countrysides.²

Behind the emerging controversy are strongly divergent values with respect to what constitutes a quality environment and a satisfying way of life. To a large extent the controversy will center on two very practical questions: (1) Can private land uses be controlled for public benefits and purposes; and (2) does the owner of open or rural land have a right to a monetary profit, not simply from the productivity of his land and his managerial input, but from the unearned increments due to fortuitous location and population growth or movement (urbanization)?


For land use regulations and controls to be carried out effectively, the first question will have to be answered, "yes" and the second question answered, "no". 3

If these are the ultimate answers time brings, they will not be without conflict or compromise along the way.

The Soil Conservation Service has been involved in land use planning since it was established in 1933. 4 Data and facts on soil and water resources are a significant imput in conventional land use planning. Today a wealth of basic natural resource and other information is available. Landowners and communities have a moral obligation, and increasingly, a legal obligation to use this information. The Soil Conservation Service and other agencies work to supply it. 5

In the following Chapters, I wish to discuss several aspects of land use planning, current legislation, land use regulations, land use economics, the citizen's role in land use planning and resource data needs as they apply primarily to rural land use planning and a soil and water conservation program.

In doing so I will use examples and data primarily from the states of Pennsylvania, Iowa and Wisconsin. I have worked for the Soil Con-

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3Ibid., p. 143.

4Congress established to Soil Erosion Service in the Department of Interior in 1933. The S.E.S. was transferred to the Department of Agriculture in 1935 and named the Soil Conservation Service.

For the National Park Service in these states and feel the illustrations used are typical problems and needs of the land use planning challenge facing the United States today.
A Review of Land Use Planning

The subject of land use planning has been thrust into national prominence as public policy makers attempt to deal with this complex subject. The ultimate goals are wise resource use and environmental protection. Land use planning has been described as an idea whose time has come.

Today's concern appears to be the second period of intense interest in land use planning and control. The first major concern appeared during the 1920's and 1930's. The major focus then was on agricultural adjustment and the gradual removal of settlement from areas of marginal soil productivity, poor living conditions and high costs of public services. After thirty years of relative public dormancy, the topic has returned.

The focus now is on urban growth and its effects on rural land uses, including agriculture, wildlife habitat, water, forests and related natural resources.

Current Land Use Patterns

The land area of the United States is finite. There are 2.35 billion acres in the fifty states, about one-third of this land is owned by the federal government. Man can do little to modify this acreage. Demands on our land resources have been increasing. Between 1950 and 1970,

The current land use picture in the United States is documented in "The Conservation Needs Inventory", the comprehensive national inventory of private lands completed under the direction of the Soil Conservation Service in 1967. The following data is taken from this report.

One-third is public land owned by the federal government, of the remaining two-thirds about three per cent is urban and three per cent is owned by state, county and local governments, two per cent is reserved for American Indians, 59 per cent or 1.3 billion acres is privately owned rural land.

This private land is divided into four major uses:

1. Cropland: 437,583,000 acres
2. Pasture and range: 481,876,000 acres
3. Forest land: 482,320,000 acres
4. Other land: 56,217,000 acres

The "Conservation Needs Inventory" also shows more than three-fifths of American's private land is not adequately treated to the extent conservationists feel is necessary to protect the soil for sustained use. Overall land use patterns have not changed greatly since 1950. There has been a slight increase in urban and highway land areas. (See land utilization charts on following page.)
Figure 1. Standard metropolitan statistical area land use, average (percent of total area), 1970.
Future Needs: A Look Ahead

A recent study for the National Water Commission by Earl Heady and others at Iowa State University, projected agricultural land and water use under nine alternative set of assumptions as to population, water prices, insecticide limitation and governmental supply management programs. The general conclusion was that agricultural land would not be a physically or economically scarce resource by the year 2000.  

Marion Clawson also states:

I am convinced we can rather easily meet these increased demands. True enough, the total land area is fixed. But the output of the land is a function of input, of labor, capital and management and these can be varied.

We also do not use our land as intensively as we could. The 1967 Conservation Needs Inventory estimates that 631 million acres are suitable for cultivation (land use capability classes I - III). Approximately 438 million are currently being utilized as cropland. About one half of the remaining 193 million acres are forest lands and one half are grasslands. Some would require improvement by drainage, irrigation, or conservation practices applied.

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Economic Research Service (ERS) recently analyzed trends in population, production, and land use by projecting changes to the year 2000, and concluded that agriculture should be able to meet the country's needs for food and fiber (excluding forestry products)....

With land development following recent trends, the ERS projects that by the year 2000, there will be a three per cent decrease in the amount of land in farming compared to 1969. Of the nearly 34 million acres going out of farming, 22 million would be for urban expansion including highways and airports. The greatest impact will be around the current growth centers. Seven million acres are projected to go from agriculture to recreation and wildlife areas. Where recreation is introduced as a multiple use of land, a decrease in the agricultural base need not necessarily follow.

The ERS study also projects five million acres to leave farm land for public facilities, water control reservoirs, defense facilities, second home communities and strip mining.

The net change amounts to one and one-half million fewer acres of cropland, thirteen million fewer acres of forest or woodland and nineteen and one half million fewer acres of pasture, range and farmstead. This amounts to a little over three per cent of the more than one billion acres of land in farms in 1969.

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The expected impact of these land use shifts will vary from region to region in the United States. The greatest change will occur in the Northeast, where nearly seven per cent of sixteen million acres will shift to non-agricultural use by the year 2000. Central and western regions will be reduced by two per cent or about six and one-half million acres in each region. The southeast shows a decrease of nine million acres from 151 million acres in 1969. An interesting projection here shows crop-land increasing by four and one-half per cent with additional clearing of woodland and draining of wetlands. This leaves woodland reduced by nine million acres and grassland reduced by nearly five million acres.

ERS concludes that by the year 2000, some 222 million acres of the nation's total acreage of more than two billion, or about a tenth, will be non-agricultural use. Most of the land changes taking place will be going for urban and built up areas.®

Even though severe shortages of emergency proportions can be postponed and probably forestalled altogether, the spiraling appetites for resources created by our contemporary economy, coupled with increasingly refined and sophisticated desire for quality, balance, and beauty in their utilization, make it clear that the nation is facing the prospect of massive demands on a relatively limited supply of natural resources. Growing world demands for consumer and agricultural products -- some of which the U.S will be expected to meet -- will add to domestic requirements. It is evident that we shall have to make a given quantity of land, water, or other resource serve more than one purpose at the same time. Multiple-purpose use will become more than a means of

®Ibid.
maximizing efficiency in resource development — it will become an ever-present necessity of life.\

CHAPTER III

A SUMMARY OF CURRENT LAND USE POLICY LEGISLATION

Land use bills currently in both the House and Senate of the United States Congress are: S 268, Land Use Policy and Planning Assistance Act and H.R. 10294, Land use Planning Act of 1974. They are basically similar bills except for a few minor differences.

The proposed legislation has three major points of emphasis:

1. They are calling for land use control at the state level - not just "planning" or "co-ordination" or "information gathering". The purpose is to put teeth in the state land use planning process - not just more plans, but better planning and decision-making.

2. Their emphasis is on certain significant land use issues that have regional impact; such as the protection of critical environmental areas, the control of some growth inducing key facilities, the control of large scale development, and assuring development for regional benefit.

3. The legislation deals with the role of the states. The approach is not to shift authority over land use to the federal government or even to remove small units of local government from the majority of public decisions over land use. It is rather to encourage the states to estab-

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lish a process for identifying and controlling those major land use decisions that require a broader review than that provided solely by the current fragmented approval process at the local level. As long as the necessary processes are established, the federal government will not attempt to second-guess the land use decisions that result.

Senator Jackson of Washington, Chairman of the Senate Committee on Interior and Insular Affairs, included in his presentation a brief historical review of land use planning and regulation in the United States. He also stated,

\[\ldots\text{land use management decisions of wide public concern are often being made on the basis of expediency, tradition, short-term economic considerations and other factors which are unrelated or contradictory to sound environmental economic and social land use considerations.}\]

Federal administration of S 268 would be centered in a newly created Office of Land Use Policy Administration in the Department of the Interior. The Director of the Land Use Policy Administration would serve as the Chairman of an Interagency Land Use Planning Board composed of representatives from ten other federal departments.

The House bill does not designate a Land Use Policy Administration be established, however, the Department of the Interior representative would provide advice, assistance and report to the Office of Land Use Policy Administration.

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The Council of Environmental Quality is specifically directed to issue guidelines to federal agencies to assist them in carrying out the requirements of the Act, (H.R. 10294).

The fifty states would be the prime administrators. To assist states in carrying out the purposes of the Act, Congress is authorized to appropriate not more than $100,000,000, each fiscal year for eight years. In order to be eligible to receive these funds, a state would have to establish an "... eligible land use planning agency...". To continue its eligibility for receipt of such grants, each state would need to develop an "... adequate state land use program..." by the end of the fifth fiscal year.3

Relative to all requirements of the state agency planning process and land use program, the Act does provide functional definitions, a specific federal review process with co-ordination, and co-operation provisions. The specific funding arrangements of the $100,000,000 are based on a cost-share formula with the states.

There are different cost-share rates proposed in each bill. The Senate version (S 268) states ninety percentum of the cost for developing the state land use programs; the House states seventy five percentum be paid by federal funds.

3Ibid., S 380.
There is controversy over the question of what actions the federal government will take if a state does not comply. This is a sensitive issue and it relates to states' rights: should a state be penalized if it chooses not to qualify for federal land use planning or program grants?

Administration of the Act, in the judgement of James Sundquist, would be difficult. "...no cabinet department has ever been able to act affectively, for long, as a central co-ordinator of other departments of equal rank that are its competitors for authority and funds." It may require a supra-cabinet level for administration and co-ordination.

National land use policy legislation will have an impact on all states!

The State of Iowa and Land Use Planning Legislation:

An Example of State Action

The bill S 268 and H.R. 10294, as passed, are more procedural than substantive. It provides for a system of federal, state and local planning with federal grants-in-aid to the states. It leaves the content of the plans almost wholly up to the states.

Iowa currently has legislation pending in the House of the General Assembly. A bill introduced March 12, 1974, (H.F. 1422.) would

expand the existing Department of Soil Conservation to the Department of Soil Conservation and Land Use. It would also provide for a state land use policy commission, an inter-governmental advisory board, and county land use planning commissions.

The principle duties of the state land use policy commission would be to recommend a state land use policy and state land use policy guidelines to be acted upon by the general assembly, to review and approve local comprehensive plans, ordinances or regulations for land use submitted by cities, counties and special use districts. It would also have authority to guide, review and approve comprehensive plans for land use submitted by state agencies. 5

The county land use policy commission in each county would consist of not less than nine nor more than fifteen members, selected and appointed by and from members of the board of supervisors, a convention of mayors and city councilmen, and the soil conservation district commissioners.

The counties are directed to prepare a comprehensive land use plan to be approved by the state land use policy commission.

H.F. 1422 specifies twenty-eight duties that the state commission shall implement and comply with. The bill is also specific in stating fourteen general land use policy objectives for the state. An example of these objectives are:

5Iowa, State Land Use Planning Act, H.F. 1422, by the Committee on Natural Resources, Des Moines, Iowa, March 12, 1974, p. 41.
1. Preservation of agricultural land.

2. Establishment of criteria for the approval of: large scale developments, key facilities, residential, commercial and industrial developments and underground resources. \(^6\)

The current Iowa legislation, under consideration, provides for implementation by local governmental agencies. The federal bill allows for this form of implementation in contrast to direct state planning and regulation. The state will be responsible for key facilities, areas of critical environmental concern, development and land use of regional benefit, and large scale subdivisions.

In many cases, local units of government, especially the rural counties, are not organized to meet the requirements of the proposed federal and state legislation. The Iowa Code does provide for planning and zoning bodies to be organized at the city, county and regional level, at the present time.

It appears the actions proposed by this state legislation in Iowa would meet the requirements of the pending federal legislation.

It is evident that the proposed federal legislation will call for heavy state and local involvement. The staff assistance needed to meet these demands will be substantial, perhaps beyond the resources of many individual counties and towns. Substate planning regions, composed of

\(^{6}\)Ibid., p. 14.
several counties each, may well provide the financial and staff resources required for data collection, storage and retrieval, cartographic functions and educational activities. State governments could provide direct support to both regional, county and cities with many planning activities.

Farmers and ranchers will be directly involved; all must consider the question of public control over use of private lands.

Assistant Secretary of the USDA, Long, has asked,

Who's going to make the land use decision. We have a tradition in this country of a kind of total land ownership which permits a man to use his property as he wishes, and sell or rent it to whom he wishes. The highest bidder generally gets the land. Man yields that right with the utmost suspicion and reluctance. It is clear that as America's population continues to grow, as more conflicts develop in land use, and as the dedication to a higher quality environment grows, some controls must be exercised over man's use of his private land. His rights to swing his arm must end where his neighbor's nose begins. But how much control over what land uses, and by whom?

That is the question which land use planning legislation makes us face.

Land use planning legislation discussed in this Chapter has not been enacted into law at the state or national level to date.

The fact that land use legislation has been drafted and is being considered is an indication of growing public concern for the uses to which land is put by both private and public enterprises. No doubt, marked changes in our past land use policies and attitudes will soon be taking place.
CHAPTER IV

A REVIEW OF LAND USE REGULATIONS

The "Quiet Revolution" in land use control is taking place in the United States today in two phases neither of which, upon close examination, is in fact, a true revolution as much as a return to first principles. As the "old saw" goes, there is nothing new in the world. The most obvious phase of the revolution in land use control is the relocating of authority. Many states are taking back the land controls delegated to municipal governmental units through zoning enabling acts.

The more subtle phase of the revolution is a change in the concept of land, from a commodity to be traded for economic gain to a resource which must be preserved for public health and welfare. In the first phase, the struggle is primarily administrative and political; in the second, the struggle is constitutional and judicial. In the first phase, the results are visible; in the second, the battle lines are ill-defined, and the outcome is uncertain.¹

While considering land as a resource rather than as a commodity, correctly indicates the change, it ignores the crucial importance of our property right to own it and to buy it and sell it freely. It is essential that land be treated as both a resource and a commodity. Conservationists who view land only as a resource are ignoring the social and economic impact that would come with any massive restriction on the free alienability of land. Land speculators who view land only as a commodity are ignoring the growing public realization that our finite supply of land

can no longer be dealt with in the free-wheeling ways of our frontier heritage.

The following is a summary taken from a news story in the Maine Times, February, 1973.²

In a recent court case, the Maine Supreme Court ruled in favor of the state law regulating subdivisions called the Site Location of Development Law. The developer relied on individual septic tanks in an area ruled generally unsuitable because of potential ground and surface water contamination. The developers argued that the case should be directed at the person committing the act which does harm and not the person who merely subdivided the land, that the land was taken without compensation, and that the law was unconstitutionally vague and impossible of compliance.

The court answered:

1. The legislature intended the Commission to scrutinize proposals before a harmful act could be done. Suitability of an area should not wait for a local environmental disaster.

2. Under the state's exercise of its police power to protect public welfare, it may justifiably limit the use which some owners make of their property. Our law has long recognized that a landowner holds his property subject to the limitation that he may not use it to the serious disadvantage of the public.

3. Justice Weatherbee returned another decision which literally has tremendous implications: ". . . such property (land) is not the result of production and labor, but is derived solely from the State itself, the original owner; second, the amount of land being incapable of increase, if the owners of large tracts of land can waste them at will without state restriction, the State and its people may be helplessly impoverished and one great purpose of government will be defeated".

4. The court also ruled: "The legislature has determined that an owner of a large tract of undeveloped land may no longer subdivide it, sell the lots and then walk away from the transaction indifferent to the local catastrophe that may result when construction and occupancy reveal the incapacity of the environment to withstand the impact of the development." The court also cited alternatives; "the land be used for another purpose or . . . the impact of the same be diminished."

Rural Land Use Regulations

The term regulatory actions refers to laws, ordinances, regulations, codes and official guides which relate directly to the use of land.

Land use regulation is regarded as an excercise of police power to protect the health, safety and welfare of its citizens. Since police power is the function of state government, land use control also remains largely a prerogative of the state. In most states the power has been
delegated to local municipal corporations. Ordinances regulating land use appeared first in Boston and Los Angeles around 1909. An ad hoc committee appointed by Secretary of Commerce, Herbert Hoover prepared a standard zoning enabling act shortly thereafter which granted zoning authority to states.³

As new laws take a variety of forms, there appears to be a common theme emerging: the need to provide some degree of state or regional participation in the decisions that affect the use of land. There appears to be a growing awareness on the part of local communities that states are the only political entities capable of devising and implementing sophisticated techniques to deal with such resource problems as pollution, preserving agricultural land and controlling large scale land development. Some examples of these are:

Iowa

Iowa Conservancy District Law, 1971.

An act relating to conservation of soil and water resources of the state, and to control water pollution. Establishes six conservancy districts, delineated by the major river basins within the state. Soil loss limit regulations are adopted by each Soil Conservation District. Allowable soil loss range is from two to five tons, per acre per year. A member of the seven man State Soil Conservation Committee represents each district.⁴

³Callies, "State Initiative", p. 32.

⁴Iowa Conservancy District Law; 64th Iowa General Assembly, Des Moines, Iowa, (1971).
Soil Conservation Districts administer this law. Soil loss limits were established by each district. Criteria for estimating soil loss by water from agricultural land, for example is based on the universal soil loss equation.\(^5\)

**Wisconsin**

The Water Resources Act, 1966:

The act contains enabling legislation encouraging counties to enact ordinances that (1) protect shore lands and navigable waters and (2) provide effective flood plain zoning.\(^6\)

(1) definite provisions have been made for a water supply and for a sewage disposal method and (2) hazardous soil and topographic conditions have been identified, and that land uses are compatible with such conditions.

**Hawaii**

One of the first successful land use laws was passed in 1961. It was primarily designed to protect agricultural lands. The State Land Use Commission divided the state into four divisions: (1) Conservation, (2) Agriculture, (3) Rural, and (4) Urban. Land in rural and agricultural districts are used in compliance with local (county) regulations promulgated


by the State Land Use Commission. Land in the conservation district must comply with regulations of the State's Department of Land and Natural Resources. This arrangement has not been without controversy. Land for home building has become extremely expensive.

Pennsylvania

Environmental Quality Board:

The Environmental Quality Board has responsibility for developing and implementing regulations for erosion control and sediment control. The regulation provides that erosion and sediment control plans will be prepared for all land disturbing activities by a person trained and experienced in control methods and techniques.

Maryland

State Sediment Control Program:

To protect the natural resources of the state, the Secretary of Natural Resources adopts criteria and procedures to be used by the counties and the local Soil Conservation Districts there by implementing soil and shore control programs.

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8 Callies, "State Initiative": p. 36.


10 Ibid., p. 16
Florida

Environmental Land and Water Management Act of 1972. The state has concern and control of "areas of critical impact outside jurisdiction of the local government". Processes of local government are preserved. Division of state planning is given responsibility to make recommendations.\(^{11}\)

Vermont

Adopted a Comprehensive Environmental Control Law (Act 250) in 1970, which created a state environmental board, which passes on all major development proposals for the state: for example, subdivisions of lots less than 10 acres and developments above 2,500 feet.\(^{12}\)

Colorado

The Colorado Land Use Act adopted in 1971, establishes a nine man Land Use Commission, and an advisory committee made up of representatives from commerce, industry, agriculture, conservation and natural resources, together with four members of the General Assembly. The Commission develops standards and guidelines for various units of government. The Commission also has responsibility to establish a state-wide planning process, and administer planning funds available to various governmental agencies. The Land Use Act requires all counties to create local planning commissions.\(^{13}\)

\(^{11}\)Callies, "State Initiative", p. 40.
\(^{12}\)Council of Environmental Quality, p. 54.
\(^{13}\)Ibid., pp. 300-301.
Rural Zoning

Zoning has been the primary instrument of land use control, especially in urban areas. It has possibly been more effective in limiting change in land use than it has been in guiding development. Zoning is more a negative than a positive control mechanism. It can prevent many uses under many circumstances, but it is weaker in promoting other uses. Zoning without sound planning, is not effective, nor is planning without effective zoning regulations.

In my experience working with rural, private landowners in Wisconsin, Pennsylvania and Iowa, I have generally found a very negative attitude toward many forms of land use control. Zoning is not a popular or well accepted land use control tool. However, the primary reason for this negative attitude, I feel, is the complete lack of or ineffective land use planning in rural areas. It might also be said, "Zoning is a way of keeping a lot of people occupied while somebody steals the goose."

Zoning is one of several regulatory techniques available to the community for assuring that the land use plan is carried out. In a general way planning embraces zoning and zoning may not entirely exclude planning. But they do not cover identical fields of activity.

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14 Clawson, "A Look to the Past". p. 34.

Zoning powers reside in the state. The state may exercise these powers directly, it may confer them on local units of government, or it may do both.\textsuperscript{16}

All 50 states have authorized zoning of unincorporated or rural areas in more than three-fourths of the 3,000 counties in the United States.\textsuperscript{17} (See rural zoning map of United States on Page 28)

The number and kinds of government units empowered to zone in rural areas varies by state. Included are counties, towns or townships, certain cities and boroughs, fire districts, civic associations, sanitary districts and a few state commissions and agencies.\textsuperscript{18}

The trend towards state zoning continues. In 1967-1970, a dozen legislatures conferred power on selected state agencies to zone designated areas. Four types of areas were involved: roadsides, floodplains, shorelands, and areas where state interests are large.\textsuperscript{19}

The kinds of zoning regulations authorized by most rural zoning enabling statutes fall into four main classes:

1. Use regulations; agriculture, forestry, recreation,
2. Building-tract regulation,
3. Building size regulation,


\textsuperscript{17}\textit{Ibid.} \textsuperscript{18}\textit{Ibid.} \textsuperscript{19}\textit{Ibid., p. 4.}
RURAL ZONING ENABLING LEGISLATION
January 1, 1971

U.S. DEPARTMENT OF AGRICULTURE
EMPOWERED TO ZONE
SOURCE OF DATA: APPENDIX TABLE 2, CHAPTER 1.

- All counties
- Selected or classes of counties
- All towns or townships
- Selected towns or townships
- Any city, extraterritorially
- Selected cities, extraterritorially
- Specified State agencies
- Organized boroughs

Regional planning agencies

NEG. ERS 3145-72 (2) ECONOMIC RESEARCH SERVICE
4. Population-density regulations.\textsuperscript{20}

Most zoning enabling statutes provide authority to establish agricultural zoning districts. This authority does not confer power to regulate agricultural activities.\textsuperscript{21}

Soil Conservation Districts also have regulatory powers, but their regulations differ from zoning regulations. That is, (where enabling laws permit) they may prohibit using land in a specified harmful way or they may order certain practices, or methods of cultivation such as contour plowing, terracing, stripcropping or a shift from cultivation to grass or trees.\textsuperscript{22} Twenty-nine states have such provisions. Two districts have land use regulations in effect: Cedar District in North Dakota, and the Warrenton-Dune District in Clatsop County, Oregon.

The use of zoning power should be clearly distinguished from the right of eminent domain. In the exercise of the right of eminent domain the owner is entitled to compensation. Zoning power, on the other hand, is usually not retroactive and is exerted merely to regulate the use and enjoyment of the property by the owner who is not entitled to compensation for any injury he may sustain as a result.\textsuperscript{23}

\textsuperscript{20}Ibid., p. 15.

\textsuperscript{21}Ibid., p. 70

\textsuperscript{22}USDA, SCS, "A Standard State Soil Conservation District's Law", 1936, p. 18.

\textsuperscript{23}Ibid., p. 16.
Planning and Regulations

The Standard State Zoning Enabling Act declares that zoning "... regulations shall be made in accordance with a comprehensive plan..." 24 Zoning and regulations are tools to help a community achieve its goals.

There is a temptation to start enacting regulatory activities in the name of action without going through the entire planning process. This has caused opposition to regulatory measures rather than looking to them to carry out sound land use decisions that benefit the majority of the people. It has also caused some to think that zoning is planning or that planning is nothing but zoning. This gap needs to be bridged and the two tied together with resource facts. 25 (Use and need of resource data is discussed in Chapter V of this paper.)

Regulatory actions are no better than the plans and policies which they implement.

Regulations - A Limited Tool

Land problems caused by private land uses can, to some extent, be ameliorated by improved state, local or conjunctive state-local land use planning and regulatory programs. However, regulations cannot solve all problems.


State and Federal Constitutions prohibit the taking of private property without payment of just compensation. Courts have refused, almost without exception, to uphold open space regulations which prevent all, or essentially all, structural use of lands. Denial of all economic use is generally considered a "taking" unless it can be shown that all economic uses are nuisance-like.

While the precise limit to the regulatory power is as yet unclear, several conclusions can be based on an extensive examination of case law across the nation. (1) Regulations clearly cannot require landowners to donate their lands to public use or to permit public uses such as hunting, parking lots, hiking and camping. (2) Courts have almost without exception disapproved attempts to hold land open for future public purchase through zoning, although official mapping of streets (but not broader areas) has been upheld.

Regardless of the course of national land use planning, public controls, as indicated, will intensify over the use of public and private lands in the next several years. The increasing demands for land and the increasing difficulty of shifting a parcel of land from one use to another makes increasing public controls inevitable.

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26 Wisconsin, Institute of Environmental Studies, Conclusions and Recommendations for Strengthened State Planning and Management in Wisconsin, U of W., Madison, Wisconsin, 1972, p. 55.

27 Ibid.

28 Ibid.

29 Clawson, "A Look To the Past", pp. 34-35.
Clawson also points out that many land use regulations have been adopted with no plans to guide it in nearly 50 per cent of the regulations in force today. "When it comes to land use control, the proper role of local, state and federal governments becomes highly important. I favor having local government take a major role, but under more guidance and supervision from the states than has been the case until now."

Local government should take a major role in the planning and control of land use, but to greatly extend the power of interested citizens or groups to appeal such plans and action, and with the appeal taken to a unit of government with a broader geographic scope such as a unit of state government. This would give the latter effective supervision over local land use planning and control, but avoid unnecessary detail. By the same token the federal role might be limited to supervision over and guidance to the states.

30 Ibid.

31 Ibid., p. 36.
LAND USE PLANNING RESOURCE DATA NEEDS, CO-ORDINATION, MANIPULATION AND RETRIEVAL

A University of Wisconsin Faculty Land Use Problem Definition Seminar concluded: the lack of sound natural resource, economic and social data was a principle cause of inadequate land use planning and plan implementation.\textsuperscript{1}

The National Association of Conservation Districts recognized the need for collection and interpretation of facts about natural resources. Processes of fact-finding and interpretive processes need to be accelerated and refined.\textsuperscript{2}

Lack of sound data affects every level of management and the planning efforts for private lands, public lands and public facilities. In addition to the lack of relevant data, there is no means for integrating and analyzing data in an efficient manner at state, regional or in many cases local levels. The lack of data and a means of data manipulation, as well as the absence of an integrated modeling function for handling data, prevent the formulation of sound over all policies, the testing of planning and management concepts, the testing of planning and management concepts,

\textsuperscript{1}\textit{Ibid.}, Wisconsin, Institute of Environmental Studies, p. 67.

\textsuperscript{2}National Association of Soil and Water Conservation Districts, \textit{The Future of Districts}, League City, Texas, 1968, p. 6.
and the evaluation of individual projects through environmental impact
analysis or other planning or evaluation procedures. ³

Because of the various planning levels, efforts, interests, environ-
mental impact statements, and other factors relating to decision-making
about the environment, there is an ever increasing need to develop the
capability of coping with the myriad questions and policies concerning the
social and physical environment.

A geo-information system incorporating an automated data system
and system modeling capabilities is a useable tool that might be used to
solve the environmental or planning problems confronting a planning unit.
Over time, the ability to spatially or geo-graphically monitor and predict
change, qualify and locate losses and gains of resources and the effects of
these occurrences on existing and future populations, and predict conse-
quences of project implementation are procedures which are dependent
upon some form of automated geo-information system. ⁴

The need to provide a geo-information system for planning and
decision-making at all levels is important and also needs to be coordinated.
Considerations include:

1. Data currently being collected by public and private groups.

2. Preventing overlap and inefficient use of data.

⁴Ibid., Institute of Environmental Studies, University of Wisconsin,
p. 98.
3. Standardizing collecting systems for better data sharing and interpretation.

4. Developing a compatible geo-information system for all users.

5. Insuring complete coverage and an up-dated system.

A worthwhile geo-information system must always answer two questions:
Where is the location and what are the geographical data?

*Uses of Resource Information*

Uses of a geo-information system are almost unlimited for any land use planning function at any level of planning. I suspect the greatest use initially might be at the state and regional level because of the lack of current overall systems available at the present time in most states.

Current pending federal legislation requires that a system be established as a first priority item at the state level. This legislation will also cause states to be responsible for land use planning at all levels.

Because of the continual increase in amounts of geo-data and the ever growing need to interrelate and account for resource and social data, an automated geo-information system must include not only automated data handling, but also an integrated modeling capability. At present, most interrelating of data is done on a minimum basis. The Wisconsin IES study indicates the feasibility and need for automating geo-information

\[5\text{Ibid.}, \ p. \ 97.\]
systems. Because of potentially high costs, some central agency at the state level might be responsible for coordination, collection, retrieval and use of all data directly related to land use and natural resource planning, however, the system must be totally compatible with the needs of local, county and city planning groups. This is the level at which most land use decisions will be made and it is this level, at which people need information if they are to be a meaningful part of the land use planning programs.

Characteristics of a Geo-Information System

A collection, manipulation and retrieval system should be established with a range of characteristics. Listed here are others not previously mentioned:

1. Computer data bank; compute associated equipment as it evolves.
2. The system should expand and develop the data gathering and generating capabilities of agencies and local units of government.
3. A unified system and integrated collection and recording procedure.
4. Techniques for the monitoring of environmental and land activity changes. Use of observation techniques, such as remote sensing.
5. Inventory of critical resources and data should have first priority.
6. Modeling function to study the interrelationships among human activities and critical environmental resources.
7. System structured to collect data on a state-wide basis but also developed to provide specific data on resource management areas.
and sites, such as a watershed or river basin.

8. System should be able to handle a wide variety of data format.
   In some cases the collection found may require changes.

9. Insure user receives output information within a reasonable time frame.

10. System should be compatible with existing and planned federal data formats. If state information systems are to generate statistics to formulate national land use policy and vice versa, then some commitment to comparability should be undertaken.

11. System should consist of a classification system which would provide for an accounting of natural resources in quantitative terms such as acres, square miles, or bushels. With the aid of a computer manipulation system, create additional data from original data; for example, basic soil data would be used to establish data for agricultural productivity and capability, and also provide interpretations for various other uses, such as highway construction acceptability.

12. The system should provide current land use and land cover data, through the use of a combination of remote sensing techniques. The Earth Resource Technology Satellite (ERTS) data might be used to provide an initial data structures system. Aerial photographic coverage at frequent intervals could also be utilized.
13. The system could include an educational component to relate to demonstration projects, changes, etc.

14. The system should include a research function on various sub-systems, such as data user, aquisition, storage, manipulation, and input-output system.

The most important criteria or characteristic of a geo-information system is that it must be responsive to the user and his needs. Information must be usable to the decision-maker at the lowest level of planning.

An example of a data gathering method for making geologic and natural science information available and useful to planners is a system known as the Spatial Analysis of Numerical Data System (SAND). The Land Use Analysis Laboratory (LUAL) is a multidisciplinary team of geologists, landscape architects, agronomists and botanists working under the auspices of the Agriculture and Home Economics Experiment Station at Iowa State University. The system combines two techniques: the overlay method used by Ian McHarg\(^6\) and computer weighting and mapping.

The SAND system standardizes diverse types of information in a single format which is based on the division of the study area into cells with concomitant identification of the various characteristics for each cell. Once stored in a standard format it can be combined to produce

additional information. Data distribution for each variable can be displayed as a map. This system can deal with problems such as sanitary landfill site location, construction limitations, or septic tank suitability. The solution array is the map generated by the computer using the selected data parameter: the array may consist of one map or a series of maps showing the effects of assigning different values to the parameter.

Land use planning at any level, local, multicounty, or statewide, must begin with a realistic inventory of natural resources to be matched against the needs and goals of the people. With data on kinds and amount of land and water resources, on their suitability for different uses, and on their spatial relationships, it is possible to meet human and economic needs and at the same time maintain or improve the quality of the environment.

Resource data should be gathered and generated where needed along high priority natural resource areas and management systems.

Examples of these are:

1. Flood plains,
2. Wetlands and other special scientific areas,
3. Prime agricultural land from both soil capability and land ownership,
4. Essential ground water recharge areas,
5. Areas with high erosion potential,

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8 Ibid.
6. Areas of special scenic beauty.

7. Areas of special recreational values,

8. Lakes and streams with their watersheds deliniated.

9. Areas with septic tank limitations and areas suitable for solid waste disposal,

10. Mineral resource lands (sand, gravel, coal, copper, etc.),

11. Areas of historic and archaeological importance.

12. Potential impoundment sites and areas where they are not desirable.

The resources considered to be critical on these natural resource areas are: air, water, minerals, forests, other vegetation, fish and wildlife, wetlands, and prime agricultural lands. ¹⁰

These resources are critical to man because (1) they are necessary for his economic, social, psychological and physiological well-being and (2) many are non-renewable, except in terms of geological time spans, and impact upon seemingly isolated resource may have a deleterious effect on other resources. ¹¹

Effective data gathering, data analysis and data retrieval systems are required to meet the immediate program needs of state, federal, but more important, local decision-makers. A primary purpose of resource

¹⁰P. H. Lewis, Jr., Data Needs and Data Manipulation (Report prepared for the Institute for Environmental Studies, University of Wisconsin, Madison, Wisconsin, 1972.) p. 15.

¹¹Ibid.
data is not just for the professional planners, although this is an important use, but rather for local officials and citizens to use and to understand. Many professional resource managers lose complete perspective and importance of this fact. If people are to become and remain an intelligent part of the planning process, this information must be available and understood. 12

Primary emphasis should be placed on gathering basic data useful to ongoing programs in a uniform, usable and easily understood format. This would include land use data concerning existing uses of soils information and interpretations, geology, and vegetation.

There is a great deal of resource information currently available for state, regional and local use. Major emphasis today should be placed on developing a geo-information system that is available and usable at all levels of planning within a state and by all agencies. There are excellent examples of cooperative efforts to develop and share resource information between agencies and units of government, such as soil survey information between Iowa county assessors and soil conservation districts.

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Resource problems are often examined, reviewed and debated from many points of view: ecology, aesthetics, wildlife, water yield, crop production, and others. In dealing with these problems, resource managers often overlook the full value of economic aspect of a practice or situation for several reasons, but possibly because economics is not an exact science and good input data does not always exist. These limitations, of course, apply to any consideration.

Applying "economic facts" in the decision making process may cast a whole new light on the problem. An example of this analysis is illustrated in a Senate Committee Report of Interior and Insular Affairs on the clear cutting forestry practice being carried out in the Bitterroot National Forest in Montana. The practice included clearcutting, terracing and planting. If $50.00 per acre is invested in stand establishment after clearcutting, with no other costs, through the 120 year rotation period, the stand at harvest would have to be worth $17,445.00 per acre, in order to return five per cent on the initial investment in regeneration. If the actual yield were twenty thousand board feet per acre, the stumpage value would have to be worth $875.00 per thousand board feet. Actual stumpage value in 1970 dollars was $25.00 per thousand board feet. Twenty thousand board feet is optimistic for most sites on the Bitterroot Forest.
Sound economic analysis is critical for all land use decisions. The unchallenged dogma of resource scarcity does not justify ignoring economic analysis, it may even point to a more critical need to consider this type of analysis.

Another example of incomplete economic analysis regarding land use is that of urbanization costs. Uncontrolled suburban sprawl requires a larger public investment in service facilities per housing unit served than do more compact settlements, according to the USDA Economic Research Service. In studying urbanization costs in a typical county in California, they found that before each new home—$15,000.00 value—could be built and sold by private enterprise, governmental agencies had to invest $15,000.00 in public facilities, such as roads and schools. These costs are often not considered by the private developer and in many cases appear after the development is established.

Since land resource use and environmental quality have become major national concerns, they may now be approached in conjunction with other national goals and perhaps even compete with economic growth, full employ-

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3 Ibid.
ment, inflation control and income distribution questions. Conversely, they may also join other ills to be remedied such as depressions and unemployment.

Environmental depreciation may not be properly measured, even when an attempt is made to estimate Net National Product. Depreciation of private capital used in business is accounted for and taxes deducted because they are private costs. Depreciation of other public resources which like capital, are the worse for use, have not recieved the "loving attention" given business depreciation.\(^4\)

Lancaster points out that the real problem of environmental depreciation is not that costs are social, it is the fact that these costs go unpaid and uncounted in many cases.\(^5\)

**Land Tenure Structures**

Land tenure influences man's behavior in the use of natural resources through permissive and restrictive conditions within man to man and man to man relationships established in land tenure structure. These structures constitute crucial means for motivating man to exploit or conserve, to pollute or improve resource quality, and to use wisely or unwisely our land resources.\(^6\)

It is important to understand the interrelationships between land tenure and natural use, if these structures are to be responsive to improved

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\(^5\) Ibid.

use and management of our natural resources. Land tenure is a double-bladed instrument that may cause or remedy resource use problems depending upon the particular structuring of tenure arrangements. Influence may be in three ways; by what a resource owner is permitted to do, by what he is prevented from doing and by what he is motivated to do under the existing structure.\(^7\)

Through the functioning of land tenure structures, there has developed a gap between immediate self-interests of landowners and managers and the public interest in the use of natural resources. A laissez faire theory of economic philosophy, freedom of contract, and fee simple theories of property ownership have worked in tandem to emphasize private rights and to disregard both public interests and public rights as well as private responsibilities in the use of natural resources.\(^8\)

There is a tendency for land tenure structures to lag behind dynamic changes because of customs and laws by which they were formed.

**Land Tenure Options**

There are at least three possible options that might be considered:\(^9\)

1. Continue to provide individuals with the freedoms of using

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7 Ibd., p. 6.

8 Ibd.

9 Ibd., p. 9.
Land tenure structures provide a means for expressing a landowner's responsibility for improved use as well as his right to do with his land as he pleases.
resources and the environment as they please in accordance with our traditional concepts of land tenure.

2. Shift ownership to public ownership along with the resources that go with each parcel. Although one-third of all land in the United States is publicly owned, this approach does not appear to be socially acceptable, nor does this approach guarantee the desired land resource use.

3. The third option falls between the first two options: land ownership vested in private, public and quasi-public entities and characterized by responsibilities and duties as well as rights and privileges.

Harris emphasized the necessity for this conceptual change:

The legal, economic, and social setting in which these land tenure principles evolved emphasized rights and ignored responsibilities. At the end of the colonial period a land right was thought of as any title to/or interest in any land that was enforceable by law. The same is true today. This concept fails to emphasize responsibility on the part of the owner, except that in theory any right presupposes a corresponding responsibility.¹⁰

Timmons and McCormack suggest a concept of trusteeship of land resources. This concept is along the same principle of soil stewardship, a concept long promoted by soil conservation districts. This idea is also suggested by Aldo Leopold in his proposed "Land Ethics" in these

words, "An ethical obligation on the part of the private owner is the only visible remedy for these situations."  

The current concern and movement for a change in land use ethics may see courts rule against despoilers, whether they be individuals, corporations or even our own government in favor of man's right to a quality environment.  

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**Economic Growth and Environmental Decay**

Economic growth is measured in terms of an annual percentage increase in the gross national product. Full employment is defined and measured in terms of the proportion of the labor force employed at a particular time. Inflation is defined and measured in terms of percentage increases in money value of a particular amount of goods and services. But no well-defined and agreed upon standard(s) of land resource use and environmental quality exist. Neither are there instruments for measuring and achieving natural resource use and environmental quality comparable to the measures for economic growth and full employment. Without definition and the means of measurement, natural resource use

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and environmental quality, as policy goals, remain obscure and subjective.\textsuperscript{14} It is difficult to visualize strategic interrelationships between natural resource use and environmental quality and other major policy goals, including the trade-off options.\textsuperscript{15}

The means for pursuing particular uses of natural resources and environmental quality are quite different in terms of motivation and consequences for people in different situations. A monopolist can shift added pollution control and resource regulation costs of his project to consumers. But an individual operating in the competitive business of farming must bear these costs himself, at least initially.\textsuperscript{16} In either case, citizens may ultimately bear the costs through higher taxes or higher prices. They may wonder whether they really want improved land resource use and environmental quality as much as they did when they supported those issues as public spirited citizens.\textsuperscript{17} It is important that improvement policies be supported by facts and logic widely understood and accepted by citizens.

The real issues then in economic growth are not whether we will have any growth or at what rate growth will take place. Rather, they relate to the make-up of the output of goods and services and to the de-


\textsuperscript{15}Ibid., p. 39.

\textsuperscript{16}Kelvin Lancaster, \textit{Modern Economics}, pp. 228-229.

\textsuperscript{17}Timmons, \textit{Issues in Land Use}, p. 20.
gree or the way in which environmental costs are assessed against that output or land use. We could have an economic output that places major emphasis on goals with consequent heavy demands on raw materials, including metals and fuels, or we could have an economic output of equal value that places major emphasis on services with greatly reduced consumption of raw materials. We might try to ignore the environmental costs of economic output, as we did for so long, or we might incorporate these real costs into the prices of economic output, thus leading to quite different production and consumption decisions.

The idea of "internalizing" costs of an "external dis-economy" is suggested by the British economist, A. G. Pigou, by taxing operations that generate a dis-economy. A tax on an external dis-economy would, of course, lead to an increased price for the product—which could then express its "true" cost, including the cost of environmental deterioration or of the controls needed to prevent it. Some economists believe that, by this and similar means, the market system can readily adjust to the costs of environmental protection. A business such as farming would have difficulty passing on costs or controlling sediment, feedlot and other

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18 Clawson, A Look to the Past, p. 29.

19 Ibid., p. 30.


agricultural pollutants. There are now and have been, however, govern-
ment cost-sharing programs and technical assistance to assist landowners
to treat and correct many of these external dis-economies. The effects
and success of this voluntary approach are discussed later in this paper.

The market system responds to consumer demand. Their money
incomes direct the system and its performance.

Given the system, the results too often violate other
desires we have, other values and non-monetary demands
we might also like to have fulfilled within the system. Should
we then condemn and advocate scrapping the system? The
answer can only be "no". Instead of scrapping or condemn­
ing the system, we need, through command, merely to ex­
pand the input information that must be used by producers
and consumers in doing their own thing. If we want to prevent
pollution of water, we assign values to undesirable uses
that make it uneconomic to pollute. In this way we allow
the market system to continue its efficient work yet at the
same time, substantially alter the results.22

When the scarce resources are made available at a zero price, and
with no market control of their use, they are often overused and degraded.
The fact they are "free" results in there being no incentive for people to
economize or to allocate it to the highest value.23

A residual charge for pollution control is suggested by Freeman and
Haveman24 as a more effective and efficient means of dealing with pollu­

ment Station, U of M, Sch. of For., Missoula, Mont. (1971), pp. 104-105.

23Garret Hardin, "Tragedy of the Commons", Science 162, (Dec. 1968
1968), 1245.

24A. M. Freeman, R. H. Haveman, "Residuals Charges for Pollu­
A typical Iowa field after the soybean crop has been removed. Field slope, 3-4 per cent, estimated soil loss per acre = 15-20 tons. Note the stream channel in the foreground becoming choked with silt and debris.
tion control than current policies of environmental regulation.

The case for the economic incentives or residual charges rests on the acceptance of two propositions, first, market economy prices play a major role in the resource allocation to the highest value and second, that degradable environmental resources are now outside the scope of the market system and are not subject to guidance of prices.\textsuperscript{25} Environmental resources such as water courses, atmosphere and public lands have no price, because one "one" owns them.

The system of residual charges basically would charge people to discharge wastes or use the environment for their disposal. Dischargers are led to compare the cost of using the environment---as reflected by the residual charge---with the cost of handling their waste disposal problem in another way. The choice of means for dealing with the problem is left with the discharger.

People generating waste will reduce their discharge into the environment as long as the marginal cost of doing so, the marginal cost of waste treatment (or recycling or waste storage) is less than the price or marginal cost of discharging the waste to the environment.\textsuperscript{26}

This concept, of course, leaves many questions unanswered at the present time, such as: What are allowable discharges? How are allocations set up? What are the marginal costs of waste reduction at the level

\textsuperscript{25}Hardin, Tragedy, p. 1246.

\textsuperscript{26}Freeman, Haveman, Residuals Charges, p. 328.
Figure 6
Externality or "spillover" of poor land management. One of the most serious and least appreciated problems associated with land use is soil erosion.
of control required by current standards?

A new environmental strategy which minimizes its reliance on regulation-enforcement and which emphasizes the use of economic incentives to achieve changes in behavior seems desirable on practical as well as theoretical grounds.\(^{27}\)

Initially, society must determine its objectives with regard to the use of land resources and environmental quality relationships to other societal objectives, including appropriate trade-offs to optimize the achievement of all desired objectives.

Purpose linked with choices in using and managing natural resources and the environment involve the development of policy and plans that specify the range of choice permitted or encouraged by the public in achieving desired objectives.

**Economic Implications of Soil and Water Conservation**

Over the years economists have studied and analyzed farmer's attitudes toward conservation.

The failure of farmers to see the economic need for erosion control continues to be a major obstacle to the use of proven soil conservation practices as indicated by a study conducted in Iowa in 1957 by Blase and Timmons.\(^{28}\)

\(^{27}\) Ibd., p. 329.

\(^{28}\) Iowa, Soil Erosion in Control in Western Iowa: Progress and Problems, by Blase and Timmons, Research Bulletin 498, Iowa Agriculture and Home Economics Experiment Station, Ames, Iowa, 1961.
Excessive soil losses have not been a significant factor in recent short-run row crop production. Higher fertilizer application, improved plant varieties, management techniques and improved equipment have enabled farmers to maintain and increase yields. Excessive soil loss is currently a persistent and serious problem on over eight million of Iowa's 26 million acres of cropland.  

Recent studies conducted are showing yield differences on eroded land.

Corn Yields From Research Watersheds at Treynor, Iowa on Eroded and Uneroded Monona Silt Loam, 1970

<table>
<thead>
<tr>
<th>Soil</th>
<th>No. samples</th>
<th>Corn yield in bushels per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monona silt loam</td>
<td>25</td>
<td>110</td>
</tr>
<tr>
<td>Monona silt loam,</td>
<td>19</td>
<td>114</td>
</tr>
<tr>
<td>eroded</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Erosion may become a greater limiting factor as technology, in forms mentioned above, is fully applied or at least the gap between actual applied production technology of most efficient methods known is narrowed.

"Technology is being consumed faster than it is being generated by research."


As this gap is closed, yields will tend to level off.\textsuperscript{31} (See figure following)

Soil loss for the United States is estimated at 4 billion tons each year, 3 billion tons of this total are from agricultural and forested lands.\textsuperscript{32} Four billion tons is equivalent to the loss of 7 inches of soil from 4 million acres.

A 1972 study completed by the Agricultural Engineering Department of the University of Missouri showed that soil erosion in some areas seriously reduced the production of corn and soybeans and resulted in a net income drop of $18.32 an acre on moderately eroded fields and $33.20 an acre on severely eroded fields. Production costs for those farmers rose 20 per cent on moderately eroded areas and 56 per cent on severely eroded fields due primarily to the increased time and cost required to prepare the seed bed.

The sediment dredged each year from streams, navigation channels, estuaries and harbors in the United States, is estimated to exceed 1/2 billion cubic yards. 1967 figures indicate the cost of removing sediment to be about 40 cents a cubic yard.\textsuperscript{33}


Figure 7. A schematic graph indicating that technology is being consumed faster than it is being generated.

Iowa State Univ. 1973
Ames, Iowa
The amount and characteristics of sediment in surface runoff are of concern when determining nutrient loads in streams. Selectively eroded particles are usually higher in organic matter and nutrients than particles not transported. The nitrogen in soils in the humid region is contained almost entirely in the organic matter. Soil varies from about 2 to 7 per cent organic matter; organic matter is typically 5 per cent nitrogen.\textsuperscript{34}

Extremely high losses of nitrogen and phosphorus have been recorded in sediments.\textsuperscript{35} Losses on land continuously in corn production were as high as 66 lbs./acre/year total nitrogen, largely in sediment. Phosphorus losses approached 1 lb/acre/year. Controlling erosion, encouraging water infiltration and water storage will reduce nutrient and pesticide loss from land.\textsuperscript{36}

Although much has been done in erosion control work and other land treatment, the problem as pointed out earlier is still of major consequence when we look at land use planning problems.

Iowa's Conservancy District Law of 1971 for preventing excessive soil losses on all lands, is an attempt to deal with this problem through


\textsuperscript{36}Johnson, Engineering Studies, p. 168.
regulations. The success or effect of this program is not yet known.

**Does Conservation Pay?**

Can an individual economically control erosion or apply the necessary land treatment measures? This question must, of course, be answered before we can expect an individual landowner or society to make land use decisions. There are many considerations with each situation and land resource area presenting different implications. Whether or not a conservation program will prove profitable depends primarily on the costs of the program, the volume of expected benefits, the time period that will elapse before these benefits can be realized, and the discount rate used in their present valuation.\(^\text{37}\) Beyond those factors are also several important items such as:

1. duration of planning period,
2. investment and disinvestment of aspects of conservation plan,
3. choice of alternatives available,
4. and the overall impact of the program on other resources.\(^\text{38}\)

Farmers may choose between a variety of goals and practices when they decide on land treatment measures. They decide in a general way


\(^{38}\)Ibid.
Figure 8

(Photograph: Jefferson Co., Iowa, 1973 by: John Eckes)

An example of soil loss in excess of 20 tons per acre from Iowa cropland. Sediment load is being deposited in highway road ditch.
as to whether they want a program that will build up their soil, merely maintain it at its present productive level, or permit some acceptable amount of soil depletion. Once this decision is made, they can usually decide between alternative means of achieving the goal they have in mind.  

![Diagram of conservation practices and indifference curves]

Figure 9
Use of indifference curves to illustrate range of choices between alternative management programs available to individual operators.  

This simple illustration might also be expanded to a community planning process, by substituting different goals and criteria in the indifference curve.

**CREDIT BASE**

Credit is traditionally extended to use land resources with the title

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39 Ibid., p. 308.

40 Ibid. (Chart reproduced with permission of Prentice-Hall, Inc.)
of land as collateral. Credit is a powerful tool in the development and exploitation of land resources. 41

By shifting from land as collateral to desired resource use objectives as the basis for extending credit in the use of land resources, credit may then become a tool for achieving desired land uses.

As noted, the problem of externalities or spillovers is one of the most serious associated with resource use. In granting credit on the basis of desired land use objectives, it would be extremely important where externalities exist, and the borrower have access to the benefits he creates over space and time. 42 He would also be responsible for any external costs he creates as a condition for or the result of using credit.

Preferential Taxation

At least nineteen states have adopted statutes permitting tax incentives for open space to encourage preservation of agricultural lands, wetlands, forest land, and other types of undeveloped land. Taxes are calculated on existing use value rather than potential development value. 43

Land taxes seldom reflect the current productivities of land resources, which is the theory behind annual land taxes. If the land tax

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42 Ibid.
43 Institute for Environmental Studies, Conclusions and Recommendations for Strengthened State Planning and Management in Wisconsin, working paper, No. 8, U of W, Madison, Wisconsin, December 1972, p. 57.
is excessive relative to productivity, exploitation is encouraged in order
to pay current taxes even at the expense of future productivity. If the
land tax is too low relative to productivity, the user may receive a wind-
fall from exploitation.44

Timmons suggests two fundamental changes appear desirable.45
One change would be to drop completely land taxes for revenue purposes,
achieving revenue instead from income and capital gains taxes which
more nearly reflect current productivity and the values of resources.
Another change would be to use land taxes solely as a means of discour-
aging or encouraging the use of land resources in an acceptable manner.

Taxes for control and taxes for revenue are in direct conflict. If
a desired land use is fostered through tax, revenue is adversely affected.
Similarly, if a tax is levied to discourage a particular use, the revenue
decreases as the land use objective is achieved.46

When there is a reliance upon property taxes for a major source
of local revenue, no matter how equitably administered, they have a
significant influence on land use patterns, producing an economic pressure
to develop lands in a way that will maximize economic patterns.47 While
there has been almost no empirical research regarding the impact of

45Ibid.
46Barlowe, Economics, p. 545.
47Wisconsin, Final Report - Land Resources Committee, Warren
states revenue distribution on land use, it is clear that Wisconsin state
government could significantly influence local decision on land use man-
agement through the way in which it distributes state-collected income
and sales tax revenues to local treasuries. 48

Farnum Alston concludes in his study of preferential taxation in
Wisconsin that preferential taxation is most effective when used in con-
junction with an extensive land use plan. 49 "The rate at which present
land use conversions are taking place and the resulting social dis-econo-
mics and conflicts makes land-use planning imperative." 50 Preferential
taxation of agricultural and open space lands linked to sound land use
plans could be an effective tool for land use control. 51

Public Purchase (Fee or Easement)

Private lands may, in some instances, be acquired to provide pub-
lic parks, protect areas of special scientific, historic or other protective
objectives such as a watershed above a water supply reservoir.

An alternative to purchase fee interests is acquisition of easements
for certain uses. These might include easements for flood control, scenic,
conservancy uses and future water supply sites. Title to this land remains

48 Ibid.

49 Farnum Alston, "Preferential Taxation of Agricultural and Open
Space Land: A Proposal For Wisconsin", paper, U of W, Madison, Wis-
consin, Dec. 1972, p. 27.

50 Ibid. 51 Ibid., p. 28.
with the landowner, but uses are restricted. Easements are designed to permit the continued private ownership and use of lands subject to specified public rights.

Costs are normally considerably less than for acquisition, however, they may not be satisfactory where easement must prohibit all or nearly all structural use. 52

Public easements for certain purposes have proven very successful for many public purposes. Several examples are (1) Wisconsin scenic easements along the Great River Road and easements secured on 200 miles of lake and river frontage and 9,000 acres of wetland at a fraction of the cost. 53 (2) Department of Interior's purchase of small wetlands in Minnesota and the Dakotas for duck habitat. 500,000 acres are currently under easement at a cost of $11.50 per acre, in perpetuity. 54 and (3) Flood control structure site easements are also obtained by soil conservation districts. In most cases these easements are donated by the landowners.

Environmental Conservation Tax Credit Program

Can land use problems, such as excessive soil erosion be dealt with in a manner suggested earlier, of charging for the right to pollute?

52 Environmental Studies, P. 56.


54 Ibid., p. 107.
Quality in the natural resource base is not necessarily obtained by designating and zoning certain land uses in a county or regional land use plan. Quality also equates with management and treatment of this land use.

Land use planning is often considered complete once the final decision of use is made and enforced. Open space for example may not provide the desired social amenities at all, if the land is misused or poorly managed.

If we are to obtain quality in this resource base, we must move beyond the point of mere land use designation to the final treatment of public externalities, such as erosion, pollution and other land misuses by both private and public land users and managers.

An idea I feel may have some merit and application to this land use problem, is a program I will present in brief form. I call it the "Environmental Conservation Tax Credit Program".

This program is not established on the direct premise of charging land owners for using or damaging a public resource, rather it is recognizing and compensating land owners for land use practices that will result in public "goods". In this process, the external dis-economies are recognized, analyzed and treated.

This program has several important advantages over existing and past agricultural programs, for example:
1. All landowners would be involved directly. Existing conservation programs have treated about one-third of our rural land's soil and water conservation problems.

2. A systematic follow-up and maintenance program is established. This is now a major problem facing Soil Conservation Districts with existing land treatment programs. It would place more responsibility with the landowner.

3. This program would be an implementing tool for the Iowa Soil Conservancy District Law of 1971, and land use plans of the city, county, region and state.

4. It would be based on a complete conservation plan for the management unit.

5. The program would be compatible and set up with the Corn Suitability Rating System now in use by counties to assess land in Iowa.\(^5\) The same soil survey data is used to establish soil loss limits and develop the resource plan for a specific management unit. The CSR program is working very well in co-operation with Soil Conservation Districts and the County Board of

\(^5\)The Corn Suitability Rating (C.S.R.) is a system of rating soils based on mapping units of a Standard Soil Survey, for land valuation and assessment. The ratings provide an index for comparing all soil mapping units in the state. The CSR for a soil mapping unit reflects the integrated effect of numerous factors that influence the yield potential and use for row crop production at a specified management level.
Supervisors. Technical assistance is now provided by SCS and Co-operative Extension Service, who work directly with county assessors.

6. A landowner's tax base would not be raised as a direct result of establishing permanent soil and water conservation practices that do provide public benefits. Practices of this nature are: wildlife area development, ponds and flood or erosion control structures, terraces, re-forestation and critical area plantings.

Public acceptance is, of course, unknown, however, this approach is a reasonable substitute for regulations which are not well received by farmers and landowners of Iowa.

Environmental Conservation Tax Credit Program

A system of providing "conservation tax credits" to private landowners (agricultural) in Iowa.

Soil erosion is not adequately treated on over eight million acres of cropland in Iowa. Unpublished studies completed by the Soil Conservation Service on Lake McBride and Lake Darling watersheds in Iowa indicated rates of erosion in excess of one hundred tons per acre per year as not uncommon and long-term average rates are commonly fifteen to twenty tons per acre per year. The effects of soil erosion are well documented and have an adverse effect both on and off-site. Off-

site "bads" are in the forms of pollution and sedimentation. A study conducted in 1970, estimated sediment yields approaching 6,000 tons per square mile in western Iowa.

The goal of this program is to improve the current agricultural land management resource systems, so that they provide quality in our resource base, environment and standard of living. Under this concept a landowner is allowed tax credits for applying certain conservation practices and maintaining a prescribed land use and standards as set forth in a soil conservation district land use plan, developed for this land unit. The basic and first requirement would be erosion control at or below established allowable soil loss limits, currently adopted by each soil conservation district.

The program would be administered jointly by the County Board of Supervisors and the Soil Conservation District Commissioners. Technical resources are currently available at the county level to provide the necessary planning and implementation requirements. The District has technical assistance available from USDA agencies such as the Soil Conservation Service, Co-op Extension Service, Farmers Home Administration, Agriculture Stabilization and Conservation Service, Forest Service, and Iowa Conservation Commission. The County Board of Supervisors would utilize their assessors and engineering offices. A special district resource committee could be organized to co-ordinate the technical assistance necessary.
Technical people would assist land owners in developing land use and treatment plans for their specific land management unit or farm. Plans developed would implement county, regional, and state land use plan objectives and goals.

Land owners would qualify for conservation tax credits as they now do under the Iowa Woodland and Fruit-Tree Reservation Law (Chapter 161 and 441 of the Iowa Code). It will require legislative action to revise the current law.

The following items might be considered under the concepts of this program:

1. Reduction of soil loss limits as set forth in the Iowa Conservancy District Act of 1971, and the Universal Soil Loss Equation limits. Soil loss would be measured for each soil resource area, as depicted by a Standard Soil Survey published by the U.S. Soil Conservation Service and Iowa Agricultural and Home Economic Experiment Station. The soil loss requirement must be met before any other credits would apply.

2. Other possible land uses and practices that may be considered are:
   (a) Wildlife areas, woodland, scenic or unique areas, recreation areas, feed lot pollution control.
   (b) Allowing public access or giving a special land use permit.
   (c) Special use areas, such as future control sites, land fill
sites, etc.

Total credits earned, for example, may amount to one-half of the actual computed tax base per acre. Current value of land in East Central Iowa ranges from $405 to $895 per acre.\textsuperscript{57} Actual computed tax per acre would vary according to rate of levy per township. Actual taxes paid per acre, for example, now ranges from $12 to $20.

A landowner must agree to maintain or keep his plan in force for at least five years and in most cases longer. The Soil Conservation District would certify soil loss and assist landowners with planning and conservation practice application. Soil Conservation Districts would also assist county assessors with plan maintenance and review the program. Administration of tax levy and assessment would be handled by the county assessors office; the conservation program would be administered by the Soil Conservation District.

Costs in terms of administration and actual tax dollar loss would pose an immediate problem to county supervisors and commissioners. However, there are currently several programs available to assist:

1. Federal revenue sharing could be used to off-set the initial revenue loss. Long run benefits of the program however, would be economically sound and more than pay the costs.

\textsuperscript{57}Land Value Survey conducted by Iowa State Univeristy, (Nov., 1973).
2. State and federal cost sharing programs are available to landowners for initial installation of practices.

3. Other sources of funds may become available as the program is adopted.

Landowner Participation

Landowners would be faced with a decision to plan and use their land within prescribed environmental standards or pay the costs of higher taxes.

The cost of holding a cubic yard of soil on the land by soil conservation measures is a fraction of the costs of dredging reservoirs, channels and repairing erosion damages. Erosion that produces sediment can be reduced up to 90 per cent by soil conservation practices without changing materially the basic agricultural pattern.\(^{58}\)

The Environmental Conservation Tax Credit Program would compensate a landowner for the positive externalities created by good land use and soil stewardship. It would also provide an economic incentive for all landowners to practice and maintain good soil management.

Soil Conservation Districts have demonstrated for many years that a sound program properly administered by rational, informed and involved people will be effective.

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An example of a landowner's decision to manage his land without social cost or spillovers. Erosion controlled with application of tile outlet terraces. Estimated soil loss from this field under continuous cropping system, is under 1/2 ton per acre per year. Externalities of this field are now primarily positive: high production, clean streams, quality watershed, land has greater utility, good fish production in ponds and streams, sedimentation is controlled and too, it may even be aesthetically appealing. Public road ditches are free of silting (less maintenance costs.)
CHAPTER VII

THE CITIZEN ROLE AND ACCEPTANCE OF A LAND USE POLICY

While land use planning is appealing, its acceptance by the public in practice remains problematical. Effective planning will require major revision of institutionalized land use practices and management policies.¹

A major obstacle to effective planning is that it seeks implementation in a society in which natural resource conflicts are prevalent and of an intensifying character. Land use planning problems may be more in the socio-political sphere than technical. We may be faced with a "no technical solution problem"² which will require far reaching changes in human values and in established resource managment practices.

Public participation in the land use planning and implementation process will be the critical factor in the success or failure of this entire movement.³ This means citizen involvement at the problem definition stage, continued communication and dialogue between agencies, agency personnel and data readily available at the local level.


²Hardin, Tradegy, p. 1246.

³U.S. Congress Senate Bill, Land Use Policy and Planning Assistance (S 268, 93rd Congress, 1st session, 1973).
As a professional working for the U.S. Soil Conservation Service, I feel all agencies to be involved with the land use planning program should ask themselves with very sincere self-analysis: who most needs adjusting? Should citizen's values and behavior be systematically altered to fit the established goals of public agencies, or should public agencies instead, be renovated or changed so they are more responsive in their programming to emergent public preferences.

Moreover, while environmental decision-making must be based on the best available scientific and technological information, a value judgment—a social decision—is ultimately required. Social decisions must reflect the public will, for the environment belongs to the public, not just to the "experts" in the government agency or industry immediately involved in a particular decision. When risks must be measured against benefits, when economic and environmental values must be weighed and balanced, the public has the right and the obligation to make its views known and in many cases actually make the decision through a vote.

"To put it succinctly, the public wants a big share in land use planning decisions. Because the public pays the bill, people are determined that the product they buy shall meet their needs."

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4 Bultena, Studies of Public Preferences, p. 370.


Public support can only be expected after they are a meaningful part of the planning process, if they are not involved chances are they will eventually become critics.

Without public support, no environment improvement program can succeed. People have been and still are the only constituency for clean water, clean air, improved solid waste disposal, and use of land in the public interest. Citizens may not have the ear of the Commerce or Interior Departments or the White House staff, but citizens have the vote—and they intend to have a voice.  \footnote{Ibid.}

What is public or citizen involvement in land use planning? When should they become involved? How do they contribute something something or what can untrained citizens offer to a complicated land use plan? Isn't the public generally disinterested until the problem is near crisis magnitude? These questions are not easily answered, but certainly deserve thorough consideration by all professional resource planners. Professional planners concerned with private land planning really don't make land use decisions, the people do. The professional's primary job is to provide information, resource data and possible alternatives to a problem.

A major short-coming of land use planning, past and present is the inability of the professional planners to work with people and get them involved in the entire planning process. It does take time, patience, understanding, and an effective organization or planning structure that
allows people to have an input and voice long before alternatives are developed.

Professor Arnold Bolle commented along these same lines:

The professional has the responsibility to provide the public with basic information required to understand problems and to recognize what is involved in the decisions that are made. Once the public has set its goals, the professional can help by applying technical skills in the attainment of these goals. Unless the professional is willing to assume this role as a contributor to the social process and hence to society, the professional may well be one of society's major problems.8

Opportunity for citizen participation requires more than inconspicuous announcements in a newspaper or an invitation a week before a meeting, unaccompanied by even the minimum of needed information. Opportunity for participation means more than a chance to react to a choice already made by someone else, especially a government agency or planning commission.

People must be involved in the development of policy and formulation of alternatives. For example, citizens should be:

a. made part of the earliest planning processes by working with the planning unit on evaluation of planning goals and determination of the need for information,

b. used to gather, assemble and analyze data,

c. consulted on legislative needs,

d. consulted in drafting, adoption and enforcement of standards and regulations following enactment of state legislation.  

There is a tremendous job in a citizen information and education program to be done in all areas of concern. This education process must be continuous and complete before a meaningful planning process can take place. "Who is educated? The answer is the clientele, the planner himself, members of the decision and administration processes, and segments of the public at large. Probably the greatest benefits obtained from planning are the educational ones."

As citizens' understanding broadens and where citizens participate throughout the full course of land use planning and policy implementation, citizen organizations will move beyond their present crisis oriented actions. Because adjustment of conflicting interests will take place all along the way, last minute confrontations will be fewer.

Lindblom discusses an applicable decision making process called "successive limited comparisons" (Branch method) which is basically a process of making decisions one step at a time, and avoids "big jumps" at a goal, and proceeds only after agreement is reached and the decision

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9Sharp, Citizen's Role, p. 130.

is tested.\textsuperscript{11} This appears to be a sound and logical method, especially applicable to the land use planning framework of decision making.

It appears this problem will continue in spite of the well meaning agency's desire to involve people, until they understand it requires some type of a coordinated and organized planning process designed by the citizens themselves.

This citizen organization must be in a position to have access to all information, be able to solicit interest group participation and views plus authority to initiate action. An agency must then realize it is this group that makes the decisions.

The soundness of these decisions will then partially depend on how well resource agencies have provided accurate, timely, and adequate information.

To this point we have indicated the need for public participation and why citizens should be involved.

William Folkman concludes in his paper on public involvement, that to date, no public agency has developed an entirely successful procedure for involving the public, even though an openness and willingness to change is apparent on the part of public agencies.\textsuperscript{12}


Folkman may be correct in his final analysis, however, there are examples of public agencies working with people that have demonstrated reasonable successful results. The Resource Conservation and Development Projects sponsored by Soil Conservation Districts and other local units of government assisted by various USDA state and local groups, have have demonstrated reasonably well that people can be involved, will make good decisions, and move far beyond crisis oriented action.

There are no hard-and-fast "best" procedures for structuring public participation. Those arrangements which will work most effectively depend to a great extent on the specifics of a given situation, for example, the focus and scope of the planning effort; the resources available to planners; the history and problems of the area; and the types of area civic and interest groups that are active, along with the degree of importance they attribute to the planning efforts.

K. P. Warner suggests there are a number of descriptive dimensions that can be applied when discussing techniques for public participation. Among these are:

1. The scope and specificity of focus, for example: how many people and what types of people can be contacted.

2. The degree to which a given type of mechanism involves one-way versus two-way communication of information.

3. The degree to which the mechanism assumes agency initiative for action, public participant initiative for action, or a
[Circled code letters indicate the primary functional emphasis; additional letters indicate very important secondary functional orientation(s)]

Figure 11. Code for Flow Diagram Functional Orientations Designations

A - Informational/Educational (Informing)
B - Reaction/Response (Feedback)
C - Interaction/Dialogue (Informational Exchange)

mixture of both.

4. The planning agencies resources (in terms of funds and staff time commitments) which are required for implementation of each.  

The publics with which a land use planning agency will be communicating are diverse both in terms of their interest in and information about land use planning and in terms of their openness to various channels of communications, a public participation program in order to be effective will have to include a variety of activities.  

The following points are recommendations that might be considered for effective public involvement in the land use planning process:

1. It is important information be made available early and throughout planning studies undertaken by agencies. Such information can lead to greater public understanding and interest. These two factors are critical for effective citizen participation.

2. Effective participatory planning will require an increased commitment of resources on the part of planning agencies, including staff, funds and support materials.

3. Staff training will be necessary. More frequent and direct

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14 Ibid.
contacts with the public will require, in addition to the
technical skills of data analysis and interpretation, a great-
er facility in interpreting people's opinions and reactions.
Planners must be able to ask "meaningful questions" and,
in turn, respond effectively to questions and demands.

4. Possibly measures should be instituted to provide support
to those publics who evidence a willingness to commit time
and effort to various activities. For example, a system of
providing citizen reimbursement for the expense incurred
directly as a result of planning input. Eligibility standards
and performance criteria would, of course, have to be estab-
lished.

5. Increased use should be made of college and university fac-
ilities and research programs.

6. There is also a need for public participation research.

A questionnaire survey sent to 227 public planning groups asked
them to rank, in terms of their usefulness, those involvement mechan-
isms which had been found useful in connection with planning activities.
The three most highly weighted were:

1. Citizen advisory boards,

2. Informal contacts with local officials and citizens,

\[15\text{Ibid., p. 9.}\]
3. Public meetings.\textsuperscript{16}

Other mechanisms mentioned were: newspaper activities and citizen task forces. 229 citizen groups surveyed listed the following points that would enable their organization to be more effective:

1. Legislative provisions,
2. Timing of involvement opportunities,
3. Information provided by public agencies,
4. Involvement mechanisms used by agencies,
5. Funds and manpower available to the organization,
6. Procedures used by public agencies.\textsuperscript{17}

This is only a very brief review of this vast problem facing those planning agencies involved in land use planning. The question today is not whether the public should be involved and at what level, rather how can citizens' groups become an effective part of the planning process at all levels.

\textsuperscript{16}Ibid., p. 13

\textsuperscript{17}Ibid., p. 14.
CHAPTER VIII

SUMMARY AND CONCLUSION

In the preceding chapters of this paper, I have attempted to illustrate and discuss five very important aspects of land use planning today.

While current legislation, regulations, resource data needs and economic considerations are critical inputs to a useful planning process, I feel the greatest obstacle or challenge confronting a natural resource manager today is the citizen's attitude of opposition or indifference to improved land use planning. It is a tremendous challenge and there are no "how to" manuals as yet. It is clear that an appropriate planning process must be developed. The process must face head-on the social, economic, and environmental problems regardless of the difficulties that arise, no matter how unrewarding the early returns.

Perhaps William Whyte best expresses my feelings at this point when he said:

...Let's be on with the job as though there were little time left; let's address ourselves to the needs that are pressing, use the tools we have now, and not worry so much over what will be right for A.D. 2000, The coming of the next millennium is still over thirty years away, and while the current attempt to project this future makes for an interesting intellectual exercise, it is also something of an effort to write history ahead of time and it can be truly diverting.¹

¹Whyte, Landscape, p. 401.
The real pay-off will be on how well land use planning and the plans developed are implemented. Land use planning is the common denominator for getting people and agencies with many varied interests together.
We may be faced with a "no technical solution problem". ²

²Hardin, Tragedy, p. 1246.
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