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Questions of land use have been in the forefront of public policy issues throughout the history of the United States. Until well into the 20th century the dominant problems were those of settlement, of opening up a continent, and of accessibility, first to land and then to markets. Growth was the goal, and land development was measured in acres, miles, and population densities. The depression of the 1930's brought a temporary halt to this expansionary phase of our land use history, but it did not cause any serious questioning of the rightness of the goals.

Beginning after the Second World War and accelerating in the 1960's, growth as a goal has been subjected to increasing attack. It is no longer equated with development. Attention has turned from simple measures of size to questions of quality. The problems of land use have shifted from those of an areal or extensive nature to those of an intensive nature. The spatial element recedes, and the role of time grows in importance.

In this setting the past decade has witnessed an unprecedented emergence of interest in the planning and guidance of land use. But to what end? By whom? And with what tools?

In approaching answers to these questions it will help if we ask first: What have been the principal forces that have generated this expanded interest in questions of land use, specifically in Minnesota and more generally in the United States as a whole?

There are no simple answers. One force has been rising affluence. To the traditional human preoccupation with a search for food, shelter and clothing we have added a fourth dimension: mobility. We have clothed ourselves in metal. The automobile becomes an extended mode of dress, subject to the turns of fashion that in earlier generations were confined to simpler forms of personal adornment.

To an increasing extent, the automobile also dominates our solution to housing problems, with the mobile home as an ultimate combination of motorized clothing and shelter.

And we have become an urban people. The three forces of affluence, mobility and urbanization have made it possible to increase intensities of land use beyond any levels that we knew in the past. We have maximized potentials for congestion. We have achieved critical masses of pollution of air, water and space that have forced our attention to the qualitative dimensions of our environment. This is the setting in which we begin our search for the criteria that will guide us to desirable patterns of land use.

One consequence of these recent changes is a shift in life styles. It has become fashionable to "live in the suburbs" and commute to work. The greater the number who did it, the greater the number who wanted to do it. Suburban living has become a "taste good" or "style good". The automobile introduced a new fashion in living. In this case, the mode of transport was the independent variable.

It is not clear that this process can be generalized to other modes of transport. If busses or mass rail transport are to be the independent variables that will change fashions in living, it is clear that people will have to be forced to ride them by strict land use controls. This has been attempted in Sweden and the United Kingdom. Can it be accomplished in the United States? It will be much more difficult than in Sweden or Great Britain.

Acceptance of strict land use controls in Sweden was helped tremendously by its role as a netural in two World Wars. The possibility of maintaining this role was highly dependent on maintenance of a domestic

food supply base. Prevention of the conversion of good farm land into urban types of use was given tremendous moral and ultimately political support by the desire to preserve Swedish neutrality.

Although Great Britain was not a neutral in the two World Wars, it was acutely conscious of the fact that it could not feed itself from its own land resources. When war broke out in 1939 it was estimated that the British could survive for only 13 weeks from domestic production. By heroic efforts this was raised from 25% of requirements to perhaps 55% at the end of the war (28 weeks) and to about 60% in the immediate post war period. This still left Great Britain dependent on imports for 40 to 45% of her food supply, for virtually all of her fiber supply, and all of her demand for tropical and subtropical goods (citrus, tobacco, tea, etc.). Fresh from threats of siege and blockade, it was relatively easy to promote stiff controls in post-war Britain on the conversion of land from agricultural to urban uses.

This leads to a key question: Is it possible to enforce land use controls in a country producing an agricultural surplus? The countries that have the tightest controls on land use today are countries that have either faced recent threats to their food supply in wartime, or are dependent on imports for a substantial fraction of their food, or both. These forces are absent in the United States.

It is probably true that protection of the environment is the proper criterion to use in developing land use plans for a land-surplus economy. This is especially the case in a political dimension. It is difficult to arouse people by threats of land shortages in the United States. They can be aroused by examples of environmental degradation.

But an approach based on the protection of environmental quality entails risks. One risk is that the definition of environmental quality is highly subjective. Another risk is that the concept of quality can be distorted by the introduction of absolute standards. A quest for quality is always in danger of being captured by purists, who forget that quality is a relative term.

Since 1972 in the United States, fuel shortages and the energy crisis have substituted for the food supply crises that propelled some of the nations of Europe into a consideration of land use planning. The energy crisis reinforced the concern about the quality of the environment that up to 1972-73 had been our most powerful stimulant to land use planning efforts. We are not short of food, nor are we likely to be. The protection of prime agricultural land is a pressing need, but it is impossible to justify it on the ground that we are running out of food.

We do face an impending shortage of petroleum fuels from domestic production. We are now importing almosts two-fifths of our crude oil requirements. These must be paid for, and our agricultural exports are a major source of the foreign exchange with which we can finance energy imports. In this sense, the preservation of agricultural production capacity is a critical variable in the achievement of a healthy trade balance. For this reason, if for no other, it is proper that we should concern ourselves about any loss of productive land.

If pressures on land use can be approached in these monetary terms, why should we be concerned about planning? Why not rely on market forces to accomplish the needed adjustments in supply and demand?

The overriding answer to this question is that markets are imperfect, prices cannot be relied upon to give adequate weight to future goods, and

many of the important attributes of land and the environment are not priced in any market place.

The market system works only if those who reap the benefits also pay the costs. This evaluation of costs and benefits is possible only if communication and transaction costs are not so high as to prevent negotiations between those harmed and those benefitted, in order to arrive at compensatory payments. If transactions costs are too high, it is unrealistic to argue that the persons harmed and benefitted should get together and negotiate away their differences.

The truly difficult problems involve those cases in which either the harm or the benefit is not readily expressed in monetary terms. What is the value to a non-user of the preservation of a wilderness area, or a wild river? What part of the cost should the non-user bear? What is the cost of social problems generated by poor housing, and who should pay? The market place gives misleading answers to these questions.

The best agricultural soils are not necessarily the first in and last out, in agricultural use. In urbanizing areas they may be the first in, but also first out. In many areas, the best land for farming is also typically the best land for housing. If the market allocates land between farms and houses on the suburban frontier in those areas, the best farm land may well be the first to go out of production.

The private-sector land market is also frequently a reflection of public sector activities, or policies. Resulting relative land values reflect public investment goals that can be defeated if land prices are then relied upon to allocate land among alternative uses.

The passage of time exercises a powerful influence on the characteristics of land that are valued in the market place. What we choose

to measure and the units of measurement used are economic decisions, although the characteristics in question may be strictly physical in nature. Consider the permeability of soils. This is a composite of physical and chemical properties that can be measured in units that are independent of the particular economic or political system in which the soil is situated. Permeability is a relatively stable characteristic, changing only slowly over time. It might be thought that it represents a class of characteristics that can be objectively recorded, classified, and mapped for a permanent record.

Not so. Permeability derives its significance from the economic consequences that are attached to varying degrees to which water can penetrate the soil. The significance of this property of soils has changed greatly in the past generation. The possibility of supplemental irrigation in agriculture has been enormously expanded in areas that had not previously considered this feasible. Soil surveys carried out prior to the perfection of large-scale sprinkler irrigation systems are generally deficient in the kinds of information needed to judge the suitability of the soil for irrigation. Similarly, in suburban areas the extensive use of septic tanks demanded information on water tables and permeability in greater detail than was usually available from agricultural soil surveys. Emphasis shifted from qualitative to quantitative tests.

The degree of permeability in the soils in question remained unaltered over this time period, but our perception of the significance of this characteristic changed. This illustrates a major problem in the choice of criteria for the guidance of land use. What we choose to measure and the scale at which we measure it are socio-economic variables. Our choice of criteria is always provisional. The most useful criteria will be those that are

designed to anticipate change. One of the worst errors in developing criteria for land use is to assume that the criteria chosen are complete and unchanging. They are functions of our perception, and that in turn is a cultural variable.

These considerations point up the need to incorporate criteria for the social values that land produces, in any effort to promote better land use. Among the values that are often poorly reflected in market prices are:

Recreational potentials

Landscape

Wildlife habitat

Residential amenities

These are social values that are constantly changing, and in the past have generally been underpriced if priced at all. In recent decades there has been a trend factor in social and amenity values that is difficult to estimate. Our performance to date is a record of consistent failure to anticipate the extent to which these criteria for land use have appreciated in value.

Beginning in 1928, we have had a succession of forest inventories that have been conducted on the assumption that the goal of forestry is the production of timber products. Beginning in 1958, we have had a sequence of inventories of conservation needs for agricultural lands that generally stop at the suburban frontier. We get little guidance from forest inventories to aid in the classification of forest lands for recreational or amenity uses, or as landscape. We get even less guidance from conservation needs inventories in identifying the nature and extent of the loss of agricultural land to urban expansion.

We have approached land use planning in the past as if it were a sequential process. An existing situation was specified, a goal or ideal situation defined, and a series of sequential steps selected to get us from where we are to where we want to be. This was the conceptual approach involved in the preparation of a master plan or an idealized land use map. In practice, the planning process typically degenerated into a debate over the approporiate goals.

More recently, there has been a trend away from the designation of ultimate goals, with discussion focusing on the direction in which we want to go, rather than on a goal that we want to achieve. Is this a significant change, or simply an exercise in semantics?

A parallel might be drawn between Horace Greeley's admonition to "go west, young man", and the emigrant's slogan, "California or Bust". A goal was implied, in Greeley's advice, but it admitted the possibility of multiple solutions. It was not a single-valued goal. It could command allegiance from a larger population. It permitted a pluralistic approach.

"California or Bust" is heroic, but it admits little flexibility. It contains an implication of total commitment that is the antithesis of a process of learning while doing. In the past, much of our land use planning has been of this "California or Bust" variety. It has attracted true believers, missionaries have seized its banners, and attention has been focused on the Ultimate Goal. This has denied the prospect that our perception of the goal might be changed in the process of seeking it.

The search for appropriate criteria to guide land use is thus a search for pluralistic criteria. It takes place in a setting in which the goal is not a plan, but a series of alternative plans, with an explanation of the consequences that might result from the choice of any

one of them. A choice of direction can focus attention on a restricted set of the full range of possible plans. A choice of criteria can equip us with a set of weights to use in evaluating these several plans. But it should be clear that this search for appropriate criteria is an attempt to avoid the immobility that can result from political inability to resolve a means-ends dilemma. Aaron Wildavsky has pointed out that any expert who insists that goals be established before means are determined misunderstands the nature of political controversy.[1/] This injunction applies with particular force to a search for land use criteria in which the determinant variable is the quality of our perception.

One of the most important evolutions in this quality of our perception of land use planning problems relates to a shift in emphasis from a definition of planning directions to a discussion of rates of change. In New York state, the Ramapo plan places great emphasis on the timing of development. In the Twin Cities, the Metropolitan Council places great weight on the time-scale in which sewers will be scheduled. Attention has shifted from the goal to our speed of travel.

A parallel can be drawn from the world of business finance. A shift of attention from a focus on ultimate goals to a stress on timing in land use planning is analogous to the distinction between a balance-sheet evaluation of the ultimate profitability of a business venture in contrast to a consideration of cash-flow problems that may arise in its execution. These are not mutually exclusive alternative approaches. Both are necessary. But it is true that a venture that promises to yield the greatest profit upon completion may lose its first-rank position when

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1/ Aaron Wildavsky, The Revolt Against the Masses: And Other Essays on Politics and Public Policy, New York, Basic Books, 1971

problems of cash flow are analyzed. A focus on timing tends to reduce the decision making process to a human scale. In land use planning, getting there may be more than half the fun.

One measure of the maturity of a method of analysis of developmental processes is the degree to which consideration is given to the direction, magnitude, and rates of change. Land use planning efforts in the past have devoted too much attention to the magnitude of changes desired, and too little attention to the politically and economically sensitive questions of timing. In this sense, the addition of a focus on the timing of land use changes is encouraging evidence of a healthy evolution of workable procedures for the planning of land use.

Another remarkable evolution in our perception of problems of land use concerns our belated discovery of a need for criteria to measure tolerable pollution, or acceptable levels of purity, or allowable soil losses. Early approaches to environmental problems were often phrased in terms of absolute values. We sought clear air, pure water, no soil erosion and uncongested highways at the peak of the rush hours. We are now entering a phase in which attention is shifting to relative problems of permissible pollution or compensable deterioration. The criteria needed to judge environmental quality when conceived in relative dimensions are much more demanding on our data supply and on our research methods. This is nowhere more apparent than in our search for methods of economic analysis that will enable us to weigh and compare subjective valuations couched in relative terms.

This emerges most clearly when water policy is involved in shaping our approach to land use problems and in defining the criteria needed to guide land use. Our most sophisticated tools of economic analysis in the resource

field have been developed with reference to water. In agriculture, there is a close parallel with the sophistication of production economics techniques in applied economic analyses of the use of fertilizers and chemicals. Why?

The answer lies in the nature of the key variables. Water, fertilizer, and agricultural chemicals are:

1) Movable, separable from land, transportable
2) Infinitely divisible
3) Characterized by quality attributes that can be standardized and specified in objective terms

These characteristics lend themselves to the application of principles of resource allocation that are based on the calculus of infinitesimal variables. They invite the use of regression analysis, linear programming, input-output analysis and a systems approach to optimal resource combinations.

In contrast, land is geographically fixed. Although the products of land can be transported, and the users of land can be moved to it, the land itself is immovable. In theory, a tract of land is infinitely divisible. In practice, rights to the use of a tract of land are constrained by market institutions, customs, law and inertia. Over time, the size of tracts can be changed. Use-rights can be parcelized, multiplied, separated from ownership rights, and transferred. But these processes are complex, cumbersome, and long periods of time are required to achieve significant change.

Techniques of study and analysis that require successive additions or withdrawals of small units of critical variables in a production process are least well adapted to a study of the land variable. In the jargon of economics, land is a lumpy input. Changes in the size of the input

unit, alterations in the rate of use, or variations in use rights typically require institutional changes that touch the roots of a culture. The institutions that regulate access to land are in a constant process of change. In these processes, the function of time is more appropriately compared with geology than with chemistry. Yet the techniques of economic analysis that are most highly developed are those that are appropriate to instantaneous chemical processes. The criteria that we select to guide land use decisions will need to accommodate a wide range of differences in the major variables with which we work. Land, water, and air are all resources, but they each have their special characteristics. We are just beginning to learn how to adapt our analytical tools to the job.

A search for relevant land use criteria ultimately involves us in policy decisions concerning the sources of investment capital. The key questions are not confined to judgements regarding relative costs and benefits. A more determinant criterion is: Who should pay? Who should provide the capital?

An example is provided by the controversy over power plant siting. Criteria based on existing estimates of alternative costs supplied by investor-owned utilities reflect the fact that rates are regulated to permit a given return on equity capital. A controlled-rate structure permits private utilities to pass on the cost of retiring bonded indebtedness to their customers, by securing authority to charge rates high enough to retire the bonds. This makes privately financed utilities highly sensitive to the initial or front-loaded capital costs of power generating facilities. In a trade-off, they will prefer a system with relatively low start-up capital requirements and relatively high operating

costs, over one that has high initial capital requirements but relatively low operating costs.

This will affect their judgement regarding the optimum site for a power plant. It tilts the scales, for example, in favor of short transmission lines and long coal hauls. It tends to put the power plant next to the people. A different rate-making system, or a different source of capital, will yield quite a different solution to the question of where to put the power plant.

Where large capital investments are involved, the appropriate land use criteria are very sensitive to the length of time that the capital must be committed. Long term commitments of private capital must be rewarded with high rates of interest. To do otherwise is to divert capital to slow pay-out activities. The private firm has no authority to do this. It cannot ask its investor-owners to sacrifice returns today in the interest of an unidentified public in an unspecified tomorrow. If this is clearly articulated, and public capital is derived by an equitable tax system, then a public firm can claim some authority to make choices that favor tomorrow over today. Without this option, we would have no long-term development projects.

With this background of variation in the choice of land use criteria, it is not surprising that there are quite different views regarding the educational and training requirements for land use planning. To some, the educational task is to prepare professional land use planners. To others, the task is to develop a widely-based educational effort that will explain and explore the need for land use planning.

There is a parallel here with the earlier history of the development of medical education. The focus was almost exclusively on the training

of doctors and nurses. The supply of specialists was expanded out of proportion to the development of widespread support and understanding for a system of public health, and the delivery of private health care. The simplistic judgement was that the achievement of good health was limited by the availability of trained personnel. We have been long in learning that more technicians are no solution until we learn how to use the ones we have. Some balance between reach and grasp is needed.

This lesson is pertinent to the field of land use planning. If a plan is tailored to the existing supply of trained personnel, it will be:

a) Inadequate in its approach to new problems

b) Insufficiently challenging to training institutions as they struggle with the continuing problem of curriculum revision

If the plan is too ambitious in its demands on the supply of trained people, it can only be satisfied by a dilution in quality of staff. We have had this experience with the planning authorized by Section 701 of the Federal Housing Act of 1954.

Our task now is to guard against an excess of planning that could lead to a reaction against it, for which we have already had warnings from the model cities and experimental city programs within the past five years. In a longer view, we should remember the reaction against planning that occurred in the 1940's.

The need at this stage in the development of land use planning is for techniques of analysis and presentation that will set forth a series of alternative plans, specifying:

a) The criteria or premises that guided the formulation of each alternative

b) An indication of the costs and benefits associated with each alternative, quantified where possible

In evaluating these alternatives, we can focus attention on the following key questions·

1) What is the impact of existing and proposed land use plans on the need for trained personnel?
2) What will the impact be of alternative land use planning measures on relations among levels of government?
3) What criteria have been decisive in determining the proper balance between land use planning focused on preservation or protection, and land use planning focused on investment and development?
4) What criteria were used to determine relative instead of absolute levels of.

   Permissible pollution

   Tolerable levels of impurity

   Allowable soil losses

   Acceptable levels of deterioration

   Reasonable degrees of congestion

5) What is the carrying capacity of the governmental structure in terms of administrative and enforcement activity? What criteria have been developed to evaluate the danger of administrative overload?
6) What criteria were used in determining the proper division of responsibility for land use decisions between the private and public sector? A more fundamental question may be: Is

a distinction between the public and the private sector functionally useful?

7) What criteria will enable us to judge the impact of land use plans on the size and structure of governmental units and business firms? How can we avoid land use plans that deny small businesses the opportunity to attempt entry, or deprive us of the virtues of diversity that can be supplied by small and responsive units of local government?

In interpreting these questions, we need to reassure those affected by land use plans that we are not unknowingly stumbling into fundamental changes in the political process. For planning in the final sense is essentially political. And the successful planners may aspire to the epitaph that was granted Pablo Picasso, who distrusted final statements or highly finished summaries. "He takes it as dogma" concluded Jean Cocteau, "that the well done is overdone, an inelegance of the spirit".[2/]

2/ Nigel Gosling, "Picasso -- The Greatest", The Observer, 15 April 1973, p. 29.