Social Cost Internalization and Environmental Planning: "Steady State" and "Optimal" Economic Assumptions

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SOCIAL COST INTERNALIZATION AND ENVIRONMENTAL PLANNING: "STEADY STATE" AND "OPTIMAL" ECONOMIC ASSUMPTIONS

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ABSTRACT

The article examines and defines the concept of social cost as it relates to the development and implementation of private and public enterprise decisions and the impacts of those decisions in the social/physical environment. The inherent divergence between planning techniques which accept the central assumptions of the so-called "steady state" or dynamic ecological equilibrium model of production and those which accept the assumptions of the conventional "optimal" economic model of production are examined from a theoretical perspective. Finally, the article suggests the implications of social cost concepts, both as an appropriate analytical tool which requires further development and as a framework from which all planning decisions must be based. The conclusion establishes a listing of research tasks which appear to be functional prerequisites of an applied social cost role in planning analysis.

INTRODUCTION

The current and growing interest in the quality of the physical environment by urban and regional planning agencies is fundamentally the convergence of two related public issues. The first is the very real concern for the quality of the natural environment; attention is directed to the quality of air and water, the rate and form of land development and utilization, the preservation of existing wilderness areas, the retention of architectural and historic areas, and the depletion of finite resources -- fossil fuels, rare plant and animal species, and raw materials of all types. The second public issue under study and analysis by planners is the process of continued development; it is with development and developmental processes in an economic context that planners have more recently come to examine the extremely complex interface between the sensitivities and needs of both the natural and human-made environments.

In the face of these enormously complex issues relating to the physical environment, the operational or practice definition of planning activities in the public sphere has become much more closely associated with the resolution of conflicting demands placed upon the environment by alternative resource/service demands. In addition, it can be observed that -- simultaneous with the development of plans which anticipate the development of an ecological equilibrium state -- planning activities continue to follow the basic assumptions and methods of present economic models, neither of which "fit" the ecological equilibrium state.

The basic planning concept has been and continues to be the acting out of a four-step process: (1) the identification of goals and objectives for the client population; (2) the identification of alternative programs or problem solutions; (3) the prediction of the relative or comparative effectiveness of the alternatives, as they relate to the problem; and (4) the evaluation of alternative programs in the context of the standards and criteria assumed to be inclusive of the goals/objectives of the client population. In most cases of plan development, however, the final evaluation of planned alternatives is a subjective function, open to the judgements of politicians, administrators, special interest groups, public bureaus, and other influence components of the decision-making process.

It is experentially obvious that the four-part planning process is a gross generalization of a much more complex task. In fact, the agenda of planning agencies is a concern for the allocation and distribution of scarce resources and the regulation or shaping of human activities in the process of allocation and distribution. Because allocation decisions are a function of both the public and private sector and because the goals/objectives of each sector may and frequently do diverge substantially in resource utilization, public planning activities are concerned with the processes of regulation and resistance as between the private claim over resources and the public demand over the same or similar goods and services. The expression of this divergence is especially apparent where planning solutions necessitate governmental restraints

on the use of private property and profit maximization, the imposition of extra costs on private groups, or the expenditure of large sums of public revenue.[1]

The advent of the "environmental revolution" has brought into focus, more than any other issue in recent decades, the conflict between private and public claims to physical resources. These points of resistance have become amplified by the increased awareness of policy makers in the public sector and the general public that private decisions about resource utilization -- including the ways in which such resources are converted in the production process -- impose very substantial costs which go unmeasured in the price system and are viewed as "externalities" which must be absorbed within the economic system. The existence of these unpriced, external costs generated by production activities confront the planner with ambiguous data and limited methodological or analytical techniques in the formulation of policy decisions within the environmental area. These ambiguities and methodological limitations are frequently so immense that the planner must be satisfied to circumscribe plan development to conventional measures of cost/benefit or cost/effectiveness which, inherently, preclude the measurement of many significant environmental impacts.

Given this descriptive setting on the state of environmental planning difficulties, this paper is intended to consolidate some of the emerging economic and planning concepts which are of particular concern to the practicing planner and will discuss four salient issues which relate to

the resource allocation function of public planning efforts: (1) the concept of social cost generation; (2) the inherent divergence between planning techniques which accept the central assumptions of the "steady state" or dynamic ecological equilibrium model of production and those which accept the assumptions of the conventional "optimal" economic model of production; (3) the implications of social cost concepts, both as appropriate analytical tools which require further development and as a framework from which all environmental planning decisions should be based; and (4) a listing of research tasks which appear to be the functional prerequisites of an applied social cost analysis as part of the plan-development process.

THE CONCEPT OF SOCIAL COST GENERATION

The most definitive descriptive analysis of social cost was undertaken by K. William Kapp in 1954. In The Social Costs of Private Enterprise, Kapp defines social costs as referring to all direct and indirect losses suffered by third parties or the general public as the result of private economic activities.[2] To this I would add the concomitant costs generated by public economic activities, including the frequent instances of manipulation of public economic decisions by power centers, the expression of institutional or cultural bias in public policy, and the operation of non-decisions. The expansion of the definition to public economic activities includes, for example, the decision by the Federal Government to lease vast amounts of public land in the Green River oil shale formation (Utah,

Colorado and Wyoming), to private oil companies for a minimal royalty and at a time when the energy/fossil fuel reserves of this country are in a serious supply condition.

K.W. Kapp and R.H. Coase[3] suggest that social cost concepts -- as instruments of analysis -- have no specific quantitative connotation and generally arise in two ways. First, some social costs clearly have their point of origin in individual industries and can be traced to particular productive processes. Perhaps the best illustration of this variety of cost is the impairment of the physical health of workers in the productive process, eg., occupational hazards of all types, black lung, painter's colic, and so on. The pollution of water and air resources, the depletion of fossil fuels, and the conversion of land in the development process are further illustrations of social cost extraction in the environment.

The second way in which social costs arise is in the operation of the competitive productive system, especially as that production is facilitated by a framework of generally accepted institutions and governmental policies. These more subtle influences might, for example, be identified with oil depletion allowances which act as an incentive for fossil fuel exploitation or rapid tax depreciation allowances on real estate which acts as a partial incentive for neglect of income properties, especially older properties found in the central urban environment. The rapid depreciation provisions have been one of the causitive factors in the decline of the built environment, allowing owners to take full depreciation on a high-rent investment and resell the same property to another investor who will

go through the same process.

Cursory examination of the social cost phenomenon suggests other attributes of its operation. It is obvious that in some cases the social costs of production are immediately felt, while in other instances the effects may and do remain obscure for relatively long periods of time. It can also be observed that the impact or incidence of such costs may affect losses which are distributed to small segments of the population; where, for example, the income attributes of a poorly-educated person or group of persons precludes mobility, they may be forced to live in the industrial valley of Cleveland or adjacent to the noise and pollution-generating transportation corridors which service suburban areas with high amenities. Finally, it can be observed that the exaction of social costs from productive processes may be distributed so widely over the population that a given member may not recognize the cost, although the cumulative impact may be very great. The existence of air pollutants which are cumulatively hazardous, but emitted at a slow and constant rate, is the most graphic contemporary illustration of the distributional aspect of social costs.

The growing number of "environmental economists" have gone beyond the descriptive analysis of Coase and Kapp to provide a set of theories and terms which elaborate on the social cost concept:

> "Effects upon (persons) not associated with specified purchases or activities, are called externalities. Alternative terms are spillovers, external effects, or social effects."[4]

> "What are now known in the jargon as external effects, or spillover or side effects, first appear in Alfred Marshall's Principles (1925) in connection with a competitive industry's downward sloping supply curve. Using today's economic parlance, Marshall's argument can be paraphrased as follows -- assume, for simplicity of exposition, that all firms in the industry are equally efficient. An expansion of the competitive industry by, say, a single firm lowers the average cost of production to all the firms in the industry including this new firm. Since the total reduction of costs experienced by all the intra-marginal firms is to be attributed to the entry of this additional firm, the true cost of its additional output is not the total cost as calculated by that firm, but this total less the savings in total costs experienced by all the intra-marginal firms.
>
> Constructing a curve marginal to the industry's supply curve, the point at which this marginal curve cuts the demand curve identifies the 'ideal', or optimal output. This concept, and its corresponding construction, was extended in a symmetrical manner to external diseconomies, to reveal that the optimal output of a competitive industry was below the equilibrium output. These external effects were later remarked to have wide application, not only as between firms in determining the optimal size of the industry, but as between industries themselves; nor are such effects confined to industries. They operate as between persons and groups, and as between firms and industries and persons."[5]

In somewhat less complicated structure and relationship with the environmental area, the economist's analysis of depletion or degradation is viewed primarily in terms of externalities which are thought to be accidental or unintended consequences of competition between firms[6] or minor disturbances in the price market system which are reserved for the entry of social welfare solutions. An externality exists when the action of one economic agent affects the welfare of another and the effect goes unpriced in the market.

To the environmental planner or economist, such externalities

are identified in the form of the effects of production processes on the physical and social environment. Upon examination, it will appear that environmental spillovers operate in diverse contexts and at diverse scales within local, regional, national and international parameters. If the externality is considered as having a positive effect, it is regarded as a form of collective good; if regarded as undesirable, as a collective liability. The function of the public planner is to make the distinction between externalities considered favorable and those thought to be unfavorable in the formulation of decisions for the allocation and distribution of resources, typically reflected in the development of a plan.

The task of distinguishing between those externalities as a means of developing plans or as a means of developing appropriate control mechanisms has been the continuing focus of planning activities. The development of cost-benefit analysis (which will be evaluated in a subsequent section of this paper), citizen participation models, social accounting, trade-off models, and a host of other planning techniques have been specifically developed to delineate the acceptability of externalities which can be identified in the environment. The rise of environmental pollution as a high-priority issue has been accompanied by an increase in planning activities which are calculated to define tolerance levels to establish the costs society is willing to pay for the existence of activities which cause unfavorable externalities. There is every reason to suspect that planners will continue to become increasingly

involved in the assessment of environmental impacts.

Before proceeding to an examination of the conflict of assumptions between the two models of economic behavior, it may be helpful to distinguish between the two kinds of externalities which economists view as warranting separate treatment. It should be noted that while the literature of social cost, externalities, and cost-effectiveness distinguishes many kinds of externalities, it is convenient for purposes of this inquiry to think of pecuniary and technological (or nonpecuniary) externalities.

In the process of making a decision whether or not to purchase a particular commodity or service, the buyer generally considers his/her desire for the item, the value of the item as it relates to price, and the buyer's ability to purchase in budgetary terms. It is the rare consumer and the exceptional circumstance wherein the process of making a purchase decision will consider the extent to which a single purchase will contribute to increased demand for the item and, thereby, effect an increase in price. This behavior on an individual level is probably appropriate since the single purchase will have only a minute influence over demand. Nevertheless, the change in prices resulting from the aggregation of individual purchase decisions does result in a price increase and this is viewed as a pecuniary externality because the effect of these purchases is to increase prices -- a situation easily understood as causing an external (uncontrolled) diseconomy on other consumers. Without dismissing the inappliability of this operation in

certain instances, under normal market conditions these diseconomies (or economies in the case of decisions not to buy), present no real problem to the economy. Indeed, pecuniary externalities are necessary to the proper functioning of the market place; changing demands cause prices to peak and trough and these market fluctuations provide the essential benchmarks for the market place to ration the available goods and services in the most efficient manner.[7]

Technological externalities or nonpecuniary externalities represent a much different phenomenon. "These refer to more or less direct effects, other than price changes, that one decision unit might impose on another. Technological externalities can, and in many instances do, prevent the market mechanism from functioning efficiently i.e. giving rise to a Pareto optimum allocation."[8] In these instances, there exists the potential for an improvement in society's betterment. An example might illustrate this point.

If we assume that there does not exist a Federal Water Quality Control Act and a set of water quality control standards implemented and enforced by the individual States and if we assume further that there is no viable method of effecting economic sanctions against polluters on the part of the general public or riparian owners, it is clear that an industry which generates large quantities of waste products in the production process will have little incentive to dispose of those products in the manner which effects the least social cost. To the contrary, the industrial user will seek the lowest cost alternative in the productive process in

order to maximize firm and/or investor profits. Thus, although the producer may view the water as a free resource, the discharge of hazardous effluent will have consequences for downstream owners who may require the water for drinking, production, or recreation. Where the productive process is allowed to use a resource in an unrestrained fashion, i.e., where the resource commands no price in the market, nonpecuniary externalities are the inevitable consequence. It is to this class of externalities to which this paper is primarily concerned and it represents the kind of externality viewed by public planners as their primary problem-to-be-solved.

Despite the fact, however, that planners have come to intuitively recognize the concept of social cost and the significance of technological or nonpecuniary externalities, it clearly appears that both the theoretical and methodological planning techniques designed to make impact assessments and plans which are intended to resolve the operation of such externalities are based upon a highly questionable set of economic assumptions. These assumptions are discussed in the following section.

"STEADY STATE" VERSUS "OPTIMAL" ECONOMIC MODELS

That the so-called environmental movement has had a significant impact on planning activities -- especially regional agencies concerned with air and water pollution -- requires no elaborate documentation. The planning profession has, within the past seven years, seen a very substantial increase in technical planning studies,[9] advisory reports,[10] state-wide plans,[11] and journal articles[12] which focus on the complex

of problems which have been characterized as the "environmental crisis." A survey of this literature reveals that the implementation strategies range from governmental subsidization of industry for control or retrofit purposes to the construction and operation of area-wide recycling plants and "no growth" policies. Frequently, this range of plan strategies is suggested by the same agency or planning task force without any evidence or appreciation for the differences in assumptions about the physical environment they implicitly make.

Planning strategies which place emphasis upon the development of techniques which are designed to recycle the by-products of an industrialized society are subscribing to the so-called "steady state" or dynamic ecological equilibrium axiom. Planning strategies which propose subsidization, direct charge, and regulations as a means of environmental control are following the "optimal economic" model or the conventional optimal marginality model accepted by most economists. Without dismissing the fact that planners -- in practice -- accept and act on assumptions which apply to both models, the purpose of this section is to demonstrate that the two models are antithetical.

The concept of dynamic ecological equilibrium suggests that species succeed and replace each other as environments change over time and that these successions end in a climax community. The climax community will continue to exist in a general state of ecological equilibrium as song as there exist three equations of balance:[13]

"(1) population birth rate equals population death rate,

(2) energy intake equals energy dissipation,

(3) materials intake equals materials outflow."

Each of these conditions constitutes a steady-state requirement and together they define a dynamic ecological equilibrium. According to this theory, if these three conditions are simultaneously operant the community (world) reaches maximum biomass.

As explained by D.W. Pearce, "biomass" is the amount of organic matter at any point in time and productivity is defined as the rate of change in the amount of organic matter existing at a given point in time. If the losses of production/consumption exceed the gains of production/consumption, the ecological system is running down and approaching another succession or ecological disaster. If the reverse is true, i.e., productivity gains exceed productivity losses, there is a net gain in biomass and the system is expanding.[14]

R.H. Whittaker has suggested that a climax community will remain immortal if a steady-state condition in the environment is accomplished[15] and this condition obviously maximizes the probability of species survival. Under the assumption that planners and the general population are fundamentally concerned with their own survival, the dynamic ecological equilibrium model should be the primary objective of planning activities which deal with the socio-physical environment. Barry Commoner's analysis of the causes of pollution, however, graphically illustrates that our net productivity losses far exceed our net productivity gains[16] and, absent the existence of technological

reverse, the community is moving toward a succession or ecological collapse.

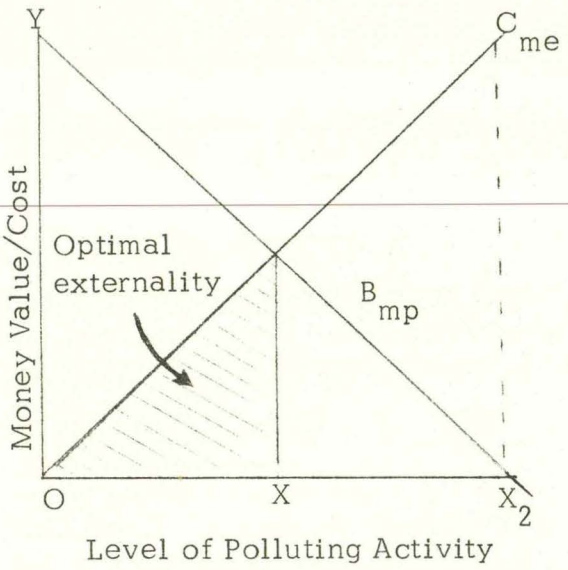
Planning analysis which accepts the dynamic ecological equilibrium axiom must -- to maintain a steady-state for the continuation of the species -- develop environmental plans which will allow the accumulation of organic matter through syntheses and photosynthesis in general equality with the organic matter lost by the system through respiration in the process of energy conversion and decomposition. Such planning is, however, precluded if the techniques applied in the development of environmental impact assessments and alternatives follow the divergent (but prevailing) analytical model -- "optimal externality."

The conventional economic model of environmental problems is approached primarily in the theory of nonpecuniary externalities:

> "An externality exists when the action of one economic agent (a producer, consumer, or legislative body) affects the welfare of another agent, and the effect goes unpriced in the market. Thus upstream polluters who pollute the waters affect users of downstream water -- commercial and recreational fishermen, municipalities taking out water for industrial and consumer use, and firms taking water for industrial use."[17]

Since the resource (water) is viewed as a free resource, there is economic reason for the polluter to internalize these external costs being imposed on other users and the polluter will continue to operate in a way which will maximize profits and the exploitation of free resources. Planners and decision-makers have sought to resolve this problem by the imposition of some social control to minimize the externalities problem, e.g., effluent charges, regulations or performance standards, subsidies.

D.W. Pearce and Allen Kneese have provided a diagrammatic explanation of the reason why -- under the optimal externality model -- the polluter does not stop polluting activity altogether, as shown below.[18]



The Y axis represents the costs or externalities generated by the polluting activity to society and the X axis representing the level of effluent discharge by the polluter. In the figure, the B_{mp} curve illustrates the polluter's marginal private benefits (profits and savings) from using the water without cost and, if we assumed that the polluter will attempt to maximize profits and is uncontrolled, we would expect that agent to maximize personal benefit at level X_2. The curve identified as C_{me} illustrates the marginal external cost of the polluting activity or those costs which go unpriced in the market place and, therefore, are borne by those who receive the impacts of the polluting activity. Thus, the vertical line extending from X_2 to the apex of the C_{me} curve, represents the level of monetary social cost or social value (Y axis) resulting from productive processes which are unregulated.

Economists and economic policies under the optimal externality model attempt to maximize net social benefits or to maximize the difference between the area under the B_{mp} curve and the area under the C_{me} curve.[19] This maximization occurs when $C_{me} = B_{mp}$ and the level of polluting activity and the external costs of the activity are represented at the intersection of the two curves or X. While it is obvious that this intersection still leaves an optimal amount of externality, this is accepted because the benefits (employment, growth, output, etc.) are assumed to far outweigh the external costs imposed by the polluter on society.[20]

When considered in the context of the dynamic ecological equilibrium or steady-state model of analysis, it is clear that the optimal externality model fails to account for a depletion in biomass except to the extent that the market imposes constraints upon modes of production and the range of production choice given the polluting agent. Furthermore, the optimal externality analysis assumes that dollar values can be placed upon the net social benefit and costs of an activity when -- in fact -- there exists no method for associating a dollar cost to the loss of a species of animal, the future depletion of a mineral resource, or the whole range of environmental components which are unpriced in the market. Indeed, if prices did exist for such costs, the polluting agent (including the producer and consumer of a given product) would be forced to internalize or absorb those costs as part of the price for the productive

and consumptive process.*

In the process of developing planned responses to the myriad environmental problems, especially those represented by the externalities problem, planners have adopted a number of the analytical techniques, the primary of which is cost-benefit analysis. Fundamentally, cost-benefit analysis substitutes the marginal social benefits measure for the marginal private benefits measure used by the individual firm. For the costs of the private firm, the substitution of opportunity cost is made or the social value given up when a resource allocation is moved from alternative economic activities into the particular planned alternative(s). An alternative is assessed as feasible by reference to a cost-benefit scheme and the operational assumption or test of cost-benefit is the "Pareto improvement" or a change in allocation which makes either everyone in society better off or makes selected members of society better off without making anyone worse off.[21]

Some analysts and many planners, in the application of cost-benefit analysis, have transposed the definition of the Pareto improvement to mean a test of whether a given action -- when compared with other alternatives -- will result in an improvement to society as a whole. That this re-definition results in gross inequalities can be easily

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*The problem is, however, much more complex than this discussion suggests. For example, the economist and the investor generally consider the short-run economic context of a problem; the consumer, similarly is victim to the so-called "time preference" problem wherein present value of finite goods fails to consider the long-term value of those goods or long-term implications of their consumption.

demonstrated. A change in the tax structure which results in making those in high-income brackets better off by $500,000 and makes the poor worse off by $75,000, still produces an excess gain or advantage of $425,000 and is considered justified by the conventional cost-benefit calculation. If the dollar gains measured by this test are the result of economic activities which go unmeasured in terms of their social costs, the calculation is clearly one which not only results in distributional inequities as between rich and poor, but fails to account for costs not readily measured or quantified.

The difficulty with the cost-benefit method and the underlying Pareto improvement assumption is that the Pareto test very clearly fails to take cognizance of the changes in distribution of incomes or wealth under a given alternative and the test itself assumes that there are costless transfers of goods and/or money within the economy. When this invalid assumption is made about transaction costs and when the cost-benefit method seeks a dollar value to make a selection among alternatives, the appropriateness and the adequacy of utilizing this method of environmental plan assessment is called into serious question. One further point must be made with respect to the divergence between the steady-state approach to planning and the optimal marginality model of analysis.

It must be made clear that this discussion has not proceeded on the assumption that the divergence between the two models necessitate the selection of one or the other as the frame of reference for purposes of

environmental assessment and alternative(s) selection.* In any economy the number of social costs or spillover effects from the production-consumption function into the price system is limited. The reason not all of these costs can be internalized within the price system of firms is explained by Mishan:

> "The answer is simple; in order that a competitive market for such spillovers may emerge, certain conditions have to be met which, in the nature of the physical universe, cannot be met. Firstly, the potential victim of these spillover effects must have 'legal property rights' in say, their ownership of some quantum of quiet and clean air which, if such rights were enjoyed, they could choose to sell to others. Secondly, in order for such rights to be enforceable, it would be necessary to demarcate a three-dimensional 'territory' about the person of each potential victim in order to identify the intrusions of others and take appropriate legal action. Thirdly, in order for a monopolistic situation not to arise, each of these three-dimensional properties within a given area, which can be rented for particular purposes (say, to accommodate the noise or pollution of someone's activity), must be a close substitute for the others."[22]

Finally, we are compelled to observe that while it is fully appropriate and, perhaps, essential to develop methods by which social costs may be measured and calculated within the planning assessment function, the development of one internalization scheme will result in the creation of another externalities phenomenon.

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*For a mathematical examination of the steady state model, note the study of the Walras-Cassel general equilibrium model in Allen V. Kneese, et. al., Economics and the Environment (Baltimore: The Johns Hopkins Press, 1970).

IMPLICATIONS OF SOCIAL COST FOR ENVIRONMENTAL PLANNING

The implications of the social cost concept for the planner are broad, and inclusive of most allocation decisions within the social-physical environment. Existing estimates of social costs generated by air pollution -- although clearly inadequate -- demonstrate that a control or plan decision must include considerations which go well beyond the components of the traditional economic base studies and cost-benefit justifications used in analysis.

It must also be recognized that generally there are very serious disparities between the self-interest of the individual or firm and the interest of the community. Said another way, there are significant discrepancies between the costs and gains felt by each individual alone and the total impact of a decision that cost-benefit or cost effectiveness measures attempt to define. Mancur Olson, Jr. and others have taken note of this divergence, especially as it applies to the multiplicity of small group and interest group claims to resources, their use and distribution;[23] planners have yet to analyze the development of planned alternatives in this way except, perhaps, in the very limited context of advocacy planning efforts.[24]

Conceptually, matching benefits and costs at the "margin" over the range of public and private goods and services yields a test of efficiency in the allocation of resources; however, most local services in the public sector are provided by government rather than private enterprise because of the manipulation of decisions by power centers, because the

price system would work too harshly as a rationing device, or because private purchases -- where there are large external benefits to others in the community -- will lead to a misallocation of resources.[25] The fact that some forms of services are necessary to all members (so-called collective goods), can be cited as another factor.

A second implication of social cost, which transcends the necessity for the development of new analytical tools and methods of decision-making, is the compelling necessity to begin the process of measuring such costs, especially as they relate to environmental issues. The lack of data which measure or attempt to systematically record and display the unpriced, technological externalities of private and public activities may -- in fact -- partially explain the lack of precise analytical tools for social cost and impact assessment of environmental problems.

A third implication of the social cost concept is the mounting evidence that the disciplines of economics and political economy should constitute a substantial part of the professional training which environmental planners receive. Although the role of economists in the "art and science" of urban and regional planning has been considerable and growing, the professional journals in the planning discipline suffer from a paucity of economic frameworks for decision-making issues. The emerging concern for short- and long-range environmental issues should be expected to generate more emphasis on economic analyses.

CONCLUSION: RESEARCH TASKS IN SOCIAL COST INTERNALIZATION

The most obvious conclusion to be reached upon reading this cursory

examination of the concept of social cost as it relates to environmental problems and the assumptions upon which allocation decisions/plans are made, is the necessity for research. Given the low level of technical expertise in economics which appears to characterize most planning agencies and the divergence of individual versus group or collective interests, research emphasis should include applied methods for the application of "social cost analysis" and assessment procedures which can be made available to divergent interest groups for their particular information needs. Among the most important issues for research inquiry include: (1) identification of the constituent elements of social costs; (2) alternative methods of social cost internalization; and (3) an examination of the question of equity, as between one alternative internalization device and another. These three research tasks are discussed in greater detail below to provide definition.

Identification of Constituent Elements.

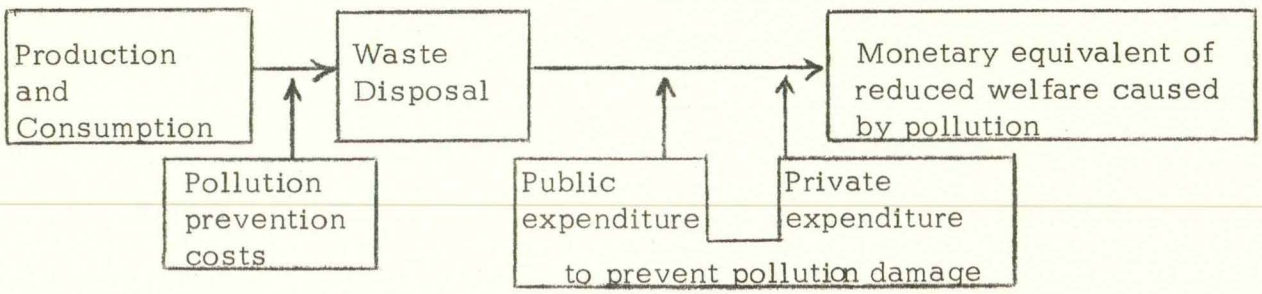
In recent years and especially since 1969, a variety of attempts have been made by economists to define the constitute elements of social costs or externalities which may be linked with one or more economic activities or a combination of such activities. In addition, a number of attempts have been made to divine solutions to the externalities in the context of welfare solutions within the context of the conventional economic theory already discussed as having major conceptual imperfections.

Typically, the spillover or externalities problem created by productive

and consumptive processes have been relegated to two kinds of negotiated settlements, but which are restricted to discrete and identifiable polluters and polluted parties.[26] Where negotiation is possible, two methods of compensating for the effects of externalities are viewed as possible. Either:

> "(1) those affected by externalities pay those who cause them to modify their activities to reduce pollution, or
>
> (2) those who cause externalities pay those affected to endure the effects, the latter having legal rights over those who cause pollution."[27]

As pointed out by G.A. Norton and J.W. Parlour,[28] where the marginal utility of income of those who cause externalities is the same as those affected (i.e., where the factory cannot exist without labor and labor cannot exist without the continued operation of the factory), the allocation of resources under either method is the same, although there are distinct differences in equity. In addition, the nature of environmental problems is far more complex than those situations involving negotiated settlements of disputes between small parties. The diagram below, developed by J.H. Dales,[29] suggests the pervasive nature of the environmental problem and the inapplicability of negotiation as a method of allocation.



Viewed in this way, the four cost components or externalities components require internalization devices which are much more complex than the negotiated settlement technique; furthermore, neither economists nor planners have moved very far in the search for such costs.* Before reliable methods for internalization can be developed, it seems essential that such a search be initiated through applied research.

Alternative Methods of Internalization.

Because convention and necessity demand, most efforts to resolve environmental issues have come in the form of internalization schemes. Whether explicitly or implicitly identified as methods for internalization of externalities, these schemes have generally taken the form of regulation, subsidization, and direct charges. The basic notion behind these methods is simply one of transforming the externality into a joint product and setting a price for the activity which is then absorbed by the consumer or user.

As was discussed in a previous section of this paper, the number of external effects which can be internalized into some kind of pricing system is limited. While planners have, for example, planned for the development of land through zoning regulations, the costs generated by land conversion and development (extension of urban services like schools, fire and police protection, sanitary sewer, etc.), cannot be

*R.U. Ayres and A.V. Kneese have developed some theoretical models for defining or identifying costs in a system in which flows of services and materials are simultaneously accounted for and related to social welfare. See, "Production, Consumption and Externalities", American Economic Review (Vol. 59, 1969), Pp. 282-297.

adequately absorbed without having concommitant impacts. The preferred status of the right to develop private property may be the ultimate determinant of the ability to internalize these costs and regulations over these rights are severely constrained by constitutional limitations.

The point to be made is that planners must not only become more definitive in the identification of social costs, but must consider alternative methods of internalization which reach further than existing market mechanisms or regulatory schemes. Present internalization methods are inadequate, including the analytical methods which have been relied upon to calculate the cost component of public and private economic/policy decisions.

Externalities-Internalization and Equity.

The development of internalization mechanisms for environmentally damaging activities inherently involves the issue of equity. Because of the difficulty in assigning prices or costs to those problems which escape easy quantification, the evaluation of an internalization method per se takes on the complexion of a chameleon. When weighed in the hands of a small group, the "social merit" of a given alternative is almost certain to change when held by a larger community of interests. In such a process, alternatives frequently seek the lowest common denominator among a range of choices and result in unmeaningful change. While such a method may be deemed as inevitable in the nature of values and political conflict, this observation is less than useful if we observe that pollution problems not only are pervasive in nature, but that the

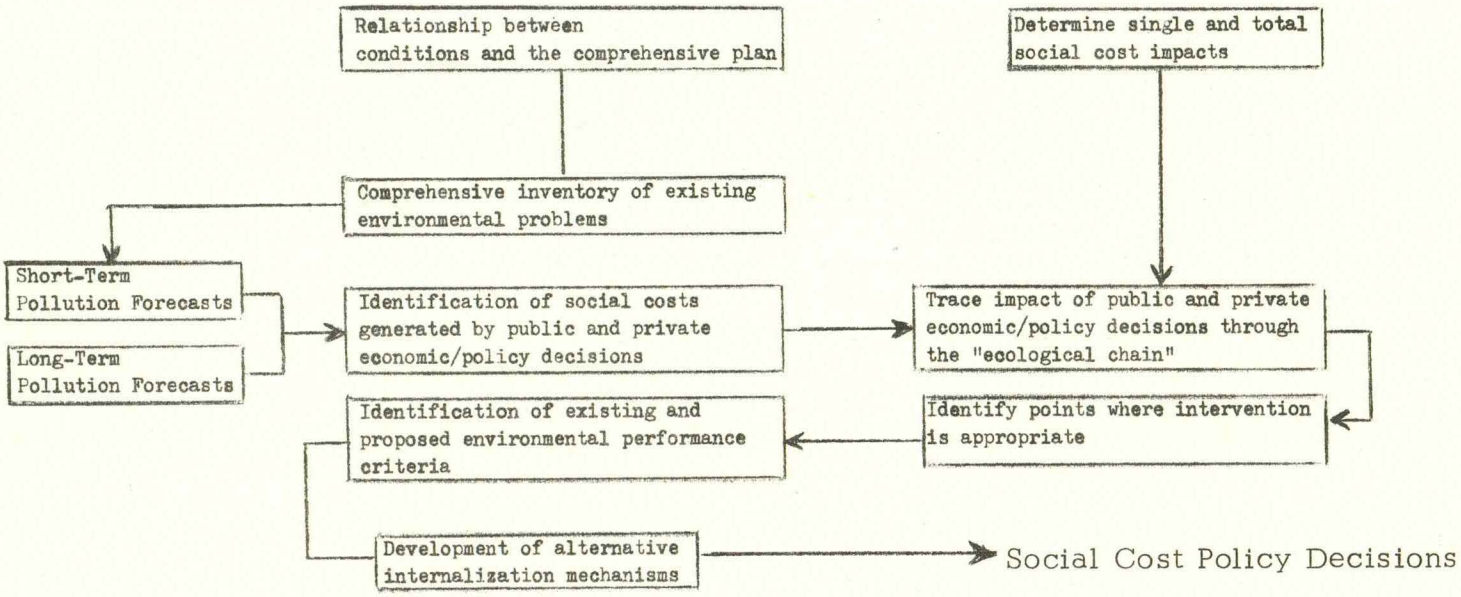
disposal of materials can easily be diverted from one environmental medium to another.[30]

If our investigation of cost assignment and internalization devices is to be more than a mere academic exercise, it seems essential that issues of equity be addressed. While it may be possible to stop environmental degredation entirely through a regulatory device (absolute prohibitions), a subsidization method (totally efficient control devices), or direct charges (absolute control over production), the social and economic consequences of each are vastly different. Questions relating to the equitable consequences of public and private actions have been the focus of much study on the part of political scientists and economists; to some extent, the social implications of spillover impacts have been arbitrarily measured by so-called "social indicators". These units of measurement are complex, differ from one indicator to another, and are just beginning to be formulated. The necessity for the development of more refined indices constitutes a major research task.

Interim Considerations.

The challenge for applied research in the development of responses to social cost generation in an environmental setting is immediate -- this is especially so when environmental degredation is considered from the steady state perspective and taking note of the limitations of the optimal externality model currently employed by the majority of institutional researchers.

In the view of this writer, the next step in the social cost internalization problem is the development of a comprehensive research design which is calculated to carve out specific areas for inquiry. Such a comprehensive research design might, for example, be based upon the following diagrammatic illustration of relevant research tasks and their inter-relationships:



During the interim period, i.e., between the current state of social cost measurement techniques and the development of a comprehensive research agenda, three behaviors are indicated: (1) a minimum obligation for the planner -- assuming an understanding of social cost -- is to reveal very clearly his/her ignorance vis-à-vis the measurement of costs and benefits; (2) the planner should be expressly concerned with a visual or physical description of the externalities problem and offer a range of estimates bearing on the possible outcomes, without making irresponsible guesses; and (3) the development of "contingency calculations",

these consisting of the hypothetical estimates of a critical magnitude for externalities which are sufficient to offset the alleged benefits of a single action or a series of actions.*

*These three behaviors are analogous to those suggested for economists by Edward J. Mishan in Economics for Social Decisions (New York: Praeger Publishers, 1973).

FOOTNOTES

[1] Harvey S. Perloff (ed.), in "A Framework for Dealing With the Urban Environment: Introductory Statement," The Quality of the Urban Environment (Resources for the Future, 1969), p. 3.

[2] K. William Kapp, The Social Costs of Private Enterprise (Cambridge: Harvard Univ. Press, 1950).

[3] Ronald H. Coase, "The Problem of Social Cost," In The Journal of Law and Economics, October 1960.

[4] Otto A. Davis and Morton I. Kamien, "Externalities, Information, Alternative Collective Action," in Robert Dorfman and Nancy Dorfman (eds.), Economics of the Environment (New York: W.W. Norton & Company, 1972), p. 71.

[5] E.J. Mishan, Economics for Social Decisions (New York: Praeger Publishers, 1973), p. 85.

[6] Ibid., p. 86.

[7] Davis and Kamien, op. cit.

[8] Ibid., pp. 73.

[9] See, e.g., Environmental Pollution and Control (Washington, D.C.: U.S. Department of Commerce, National Technical Information Service).

[10] See, e.g., Michael J. Meshenberg, Environmental Planning: Environmental Information for Policy Formulation (Chicago, American Society of Planning Officials, November 1970).

[11] See, e.g., New York State Department of Environmental Conservation, Environmental Plan for New York State (Albany, N.Y.: N.Y. State Department of Environmental Conservation, 1973).

[12] Jerry A. Kurtzweg, "Urban Planning and Air Pollution Control: A Review of Selected Recent Research," Journal of the American Institute of Planners (March 1973, Vol. 39, No. 2), pp. 82-92; and "The Greening of Public Policy: Planning the Natural Environment," Journal of the American Institute of Planners (July 1971, Vol. 37, No. 4), entire issue.

[13] D.W. Pearce, "An Incompatibility in Planning for a Steady State and Planning for Maximum Economic Welfare," in Environment and Planning (1973) Vol. 5, Pp. 267-271.

[14] Ibid.

[15] R.H. Whittaker, Communities and Ecosystems, (London: Collier Macmillan, 1970).

[16] Barry Commoner, et. al., "The Causes of Pollution," Environment, Vol. 13, No. 3 (April, 1970).

[17] Pearce, op. cit., p. 268.

[18] Allen Kneese, "How Much is Air Pollution Costing Us in the United States," in Proceedings: Third National Conference on Air Pollution, (Washington, D.C.: Public Health Service Publication No. 1669, 1967), at Pp. 529-35; and Pearce, op. cit., p. 268-69.

[19] Pearce, op. cit., p. 269.

[20] Mishan, op. cit.

[21] Ibid.

[22] Ibid., at p. 93.

[23] Mancur Olson, Jr., The Logic of Collective Action (New York: Schocken Books, 1965).

[24] Donald F. Mazziotti, "Advocacy Planning: Strategies for Radical Social Change," (Unpublished thesis; Graduate Program in Urban and Regional Planning at the University of Iowa, Iowa City, 1972).

[25] Selma J. Mushkin, "Intergovernmental Aspects of Local Expenditure Decisions," in Howard G. Schaller (ed.), Public Expenditure Decisions in the Urban Community (Washington, D.C.: Resources for the Future, 1962).

[26] See, R. Turvey, "On Divergences Between Social and Private Cost", Economica (Vol. 30, 1963), Pp. 309-313.

[27] G.A. Norton and J.W. Parlour, "The Economic Philosophy of Pollution: A Critique", Environment and Planning (Vol. 4, 1972), P. 4.

[28] Ibid.

[29] See, J.H. Dales, Pollution, Property and Prices: An Essay in Policy-Making and Economics (Toronto: University of Toronto Press, 1968).

[30] Norton and Parlour, op. cit.