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**ESTABLISHING PRIORITIES
FOR
PUBLIC INVESTMENTS**

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ESTABLISHING PRIORITIES FOR PUBLIC INVESTMENTS*

There appears to be a disparity between proposals to increase the services rendered by local, state and Federal governments, and the willingness of the taxpayers to furnish the resources necessary to provide these services. Consequently there is public interest in participating not only in an assessment of the relevance of existing programs but also in the formulation of new programs responsive to emerging needs.^{1/} This degree of community participation requires that the public be furnished with relevant and easily understandable information. The purpose of this paper is to outline a methodology which highlights for any proposed investment its contribution to the well-being of some groups, its detrimental effects on other groups and an alternative use of the same resources. The methodologies described herein can be used for the evaluation of many types of public investments. A general description of each procedure is followed by a detailed illustration of its role in the evaluation of water resource projects. Water resource projects were chosen as the basis of this discussion since Federal water resource agencies presently provide the public with a substantial amount of information describing the economic impacts of their projects.

It is assumed that the establishment of priorities for public investments consists, at a minimum, of the following steps:

- specifying the objectives to be attained
- assessing the contribution the investment makes toward the fulfillment of each objective
- assessing the cost of the investment
- soliciting public reaction to the proposed investment

The accomplishment of each of the above steps requires that many value judgments be made; a central thesis of this paper is the necessity of informing the public of the implications of all such value judgments.

*The author is indebted to Allan Schmid and Carlton Cole for their suggestions on earlier drafts of this paper.

1/ Chester Bowles, "Topics: A new Order Of Battle for America's Wealth" (New York, N.Y.: New York Times, September 7, 1968) states: A significant step in this direction might be a National Economic Council appointed by the President under legislation provided by Congress. The members of the Council would include distinguished men and women, chosen by the President with the consent of Congress, who would represent a wide spectrum of American life and interests. They would be supported with an expert staff of economists and political and social scientists. The Council would hold exhaustive public hearings beginning early each year. These hearings would run for several months with maximum television, radio and news coverage. The Council would call a variety of witnesses representing the many claimants on a share of our gross national income - consumer goods producers, national defense authorities, spokesmen for public health, housing and overseas development, and the like.

Step I – Specifying the Objectives Met by a Public Investment

Arguments calling for an explicit statement of the objectives to be served by a proposed investment are common to papers written on the theory of public investment. Great emphasis is accorded to “an informed public debate of the relevant issues”. Many practitioners of public investment analysis have taken this advice and have sought to delineate the objectives served by a particular investment. Unfortunately, in many instances the emphasis accorded to an explicit definition of objectives has resulted in the adoption of one or two extreme positions, both of which have discouraged public participation in the planning process:

One extreme is the use of broad definitions of the multiple objectives to which an investment might respond; the other extreme is the use of a single objective, defined quite precisely, but considered irrelevant by many participants in the decision-making process.

In respect to the first extreme, the use of broad and all-encompassing definitions of multiple objectives, it is not uncommon to encounter literature stating that the objectives of a proposed investment are, for example, to “improve community relations”, and to enhance “community viability”. It is doubtful whether a public debate of these objectives can ever be productive since nearly every conceivable course of action can be sanctioned under these umbrellas of social well-being. The vagueness of these objectives can, however, serve as a vehicle for gaining support of a predetermined position since very few people can argue against them.

The other extreme, the identification of the contribution an investment makes to only one objective, is also misleading. For example, it is not uncommon to discover that the only information in support of an investment is a description of its contribution to national income which is defined as the total value of the goods and services produced in the United States. In a like manner, it is equally popular to find a complete description of what an investment does for the poor but not one word describing what it does for the rich. While the contribution an investment makes to a particular objective might be considered important by a large portion of the decision-making community, its description may give an incomplete picture or be considered irrelevant by a small but influential group in the same community.

Any particular investment can be thought of as producing a set of outputs. Ideally some elements of the set are considered to be beneficial and are maximized; other outputs are judged to be unfavorable and are minimized and still others are considered to be insignificant and are accepted as given. The objectives served by an investment are usually associated with those outputs which are considered beneficial to select groups while the remaining outputs, which are considered to be unfavorable by other groups, are often classified as side effects. Consequently it is difficult to categorically state that a particular effect of an investment is favorable or unfavorable, since these terms have meaning relative to the aspirations of a particular group of individuals, i.e., an effect considered to be beneficial to one group might be considered to be detrimental by another. Therefore, implicit in establishing priorities for some public investments is a decision regarding which groups are to be accorded a preferential treatment relative to other groups.

An identification of the side effects of an investment does not necessarily require that they be described in terms of a conventional benefit-cost ratio; in many instances it is theoretically impossible to do so. What is required is that the side effects of an investment at least be described in physical terms, e.g., number of ghetto youths employed in a program whose primary objective is the extermination of rodents. Elusive side effects, such as the impact, however unfavorable, of an urban renewal project on the cultural patterns of a neighborhood, can be described even though they may not be susceptible to quantification. The failure to identify the side effects of an investment leads to an inaccurate assessment of its merits as well as a solicitation of the views of an unrepresentative sample of the taxpaying public.

More specifically, the failure to identify the side effects of an investment could lead one to overlook that at some later date the original investment might require an additional expenditure of funds. Since neither the magnitude of these expenditures, nor their returns, would be known, it is impossible to obtain an accurate assessment of the merits of the investment. The side effects of an investment could cause its cost to increase when, for example, the construction of an irrigation project requires the simultaneous construction of a pond to collect the runoff. This pond, while intended to serve solely as a collecting pond, might be used as a recreation area. If such a circumstance does arise, and if in the future, due to either changing technologies or unforeseen economic conditions, the runoff can be decreased, there will be an attendant degradation and possible extinction of the collection

pond as a recreation site. If the beneficiaries of the recreation site exert the appropriate pressure, the water might have to be provided for recreation even though the benefits realized for this use of the water might be less than the benefits that can be obtained from some alternative use, e.g., supplying drinking water to a city. In other words, the beneficiaries of a side effect can inject a degree of inflexibility in the planning process and frequently this inflexibility has a price. The above discussion illustrates how the side effects of an investment lead to an increase in the cost of an investment. The converse situation also exists, i.e., the value attributed to the side effects could offset their costs.^{2/}

In respect to soliciting the views of only a select group of taxpayers, an incomplete identification of the side effects of an investment often discourages public participation in determining its priority relative to other investments since some people will not realize that the proposed investment will have a direct impact on them.

For example, a description of the effects of constructing a highway should include not only an estimate of its contribution to national income but also an indication of which, and to what degree, existing business establishments would be adversely effected due to their increased distance from the new transportation corridor. In other words what is a "benefit" to one group is often a "cost" to a different group. If a water resources project is to be built to foster the economic and social development of a particular basin by transferring water from another basin, then a description of the project should include not only its potential for increasing employment in the basin receiving the water, but it should also state how much money might be paid to compensate the region losing the water; this cost estimate should include the payments required to compensate for the elimination of any desirable side effects which were not considered in the benefit-cost analysis. If a research program for space exploration involves the development of a new alloy, those manufacturers whose sales would change as a result of the improved product could be identified.^{3/} Programs designed to subsidize treatment at public medical facilities could be accompanied by a corresponding analysis of their impact on privately owned medical facilities. If postage rates for second-class mail involve a subsidy to select newspapers on the basis that it is in the public

2/ For an example of joint-products in a water resource project consult Jack Goodman, "California's Salton Sea: A Strange Success Story" (New York, N.Y.: *New York Times*, May 11, 1969).

3/ For a discussion of the side effects of space programs consult Carl T. Rowan's article "Space Program Spinning of Earthly Benefits" (Washington, D.C.: *The Evening Star*, May 23, 1969).

interest to disseminate news, other newspapers, as well as other news media, might be interested in the magnitude of this subsidy.^{4/} The list is nearly endless; the point to be emphasized is that a conventional benefit-cost ratio, however accurate, does not highlight many of the side effects of an investment with the result that many people do not comment on it simply because they are not aware of its impact on them.

It is unfortunate that in some instances the delineation of the objectives to be met by an investment and a specification of which of its outputs are to be displayed to the general public represent one and the same decision. The confusion resulting from the lack of differentiation between the objectives and the side effects of an investment manifest itself in arguments which, for example, first assert that public works projects are an inefficient way to redistribute income and then conclude not only that the redistribution of income to lower income classes should not be an objective of these programs but also that their redistributive effects should not be assessed. Obviously if there exist more efficient ways to redistribute income and if such alternatives are politically feasible, then public works projects should not be justified on the basis of their contribution to this objective. However, it does not follow that their redistributive effects – whether to low or high income classes – should not be assessed and presented to the public.

There is a gray line between the objectives met by an investment and its attendant side effects, since as conditions change, a former side effect of an investment may become its primary objective. In order to assess the consequences of emphasizing, at some later time, an output of an investment which is presently relegated as a side effect, alternative uses (plans) of a given amount of funds should be identified. One way to develop such plans is to formulate alternative investment plans responsive to the maximization of mutually exclusive objectives, i.e., the maximization of one objective precludes the maximization of another, or more simply, more of one means less of another. Investment plans, as defined herein, contain not only an identification and assessment of the alternative means for accomplishing each objective but also a complete assessment of the side effects of each investment.

A precise specification of the objectives of an investment provides criteria for assigning each of its outputs into one of two categories, either as fulfilling an objective or representing a side effect. Both the designation of the objectives to be met by a proposed program, as

^{4/} Philip Shandler states (Washington, D.C.: The Evening Star, May 23, 1969): The key Congressman with the responsibility over mail rates has pledged to "make the public fully aware of what it is paying for".

well as an identification of its side effects, represents a public policy decision which emerges from the political process, to which economic analysis provides one, but not all, of the relevant considerations. In other words it is the responsibility of a planner to assess the magnitude of the side effects but not to determine their relevance, for an effect which one person considers important might be considered irrelevant by another.

In summary, the public can probably make the most informed assessment of the merits of a proposed investment when it is formulated and evaluated subject to the following conditions: (a) that a public announcement of either the objectives or the side effects of an investment be restricted to those effects which can be assessed, either qualitatively or quantitatively, (b) that all the effects, whether considered favorable or unfavorable, of an investment be displayed, (c) that each objective or side effect be clearly identified with the aspirations of select groups — whether defined by geographic area, income class or some other criterion, (d) that those members of a community who oppose a side effect resulting from an investment desired by others, be asked to provide an alternative means for accomplishing the primary objective of the investment, (e) irrespective of the particular objective chosen, that all the beneficiaries of an investment be identified not only by income class, but by their respective share of its effects, whether favorable or unfavorable, and (f) that the public be presented with alternative plans responsive to the maximization of mutually exclusive objectives.

One measure of a meaningful investment plan is the ability of the public to understand and appreciate its components. If the adoption of the above conditions leads to a fulfillment of this goal, efforts to insure that these considerations are in fact integrated into the planning process will be more productive than discussing and debating broad, qualitative statements of the objectives to be met by a public investment or in attempts to develop procedures for assigning dollar values to all the outputs of an investment with the result that it is impossible for the general public to be informed of all of its effects.

The following section describes efforts underway to specify, measure and use multiple, but potentially mutually exclusive, objectives in the formulation of the forthcoming Appalachian Water Resource Program. The purpose of the following discussion is twofold, first to highlight the value judgments implicit in the economic analysis of a proposed investment and second to illustrate how an identification of its side effects surface these value judgments.

Illustration: Specifying the Objectives of the Appalachian Water Resources Program

The Appalachian Regional Development Act specifies many goals to be attained as a result of the investments undertaken in this impoverished region. One goal implicit in the act is to increase the well-being of the nation by improving the economic conditions within the Appalachian Region. Other goals implicit in the act are the provision of employment opportunities for the under or unemployed as well as the development of the Appalachian economy.

While the act does not single out any particular goal as being of the greatest importance, it is difficult to conclude that the President and Congress were interested solely in the mountains, streams, and valleys of Appalachia, and not in its people, particularly in the poor people. If in fact this were the case, there would be little reason to single out this specific region as one deserving of special attention in lieu of other areas which have lost their native industries and have witnessed a substantial decrease in unemployment resulting from a continued exodus of its work force, or in lieu of more affluent areas such as Palm Beach, Florida. For this reason at least one of the criteria for judging Appalachian projects should be their direct impact on helping people, particularly poor people.

Although water resource projects can potentially contribute to a spectrum of goals it is impossible to consistently maximize all of their effects. Therefore a choice must be made in regard to the particular effect, or combinations thereof, to be maximized and this decision is a value judgment which must be highlighted. In the Appalachian water resource report, two indices of performance are used to describe the effects of each investment. One index – the national income index – represents the net change in the collective income of all individuals – including those individuals who reside in as well as outside of Appalachia, resulting from an investment in the Appalachian Region.^{5/} The term “net” means that if the investment merely transfers economic activity from one area to another then these effects are not included in the index. The other index, however, does include transfer effects. The other index – the regional employment (wages and salaries) index – represents the change in the wages and salaries of those individuals living in Appalachia, resulting from their employment in industries whose location in the region – whether or not they are

^{5/} This index is frequently referred to as a benefit-cost ratio.

transferred from other regions – is made possible by the above investment.^{6/} In general, the change in the income of the Appalachians will exceed the change in wages and salaries since a water resource project has many income effects, such as preventing flood control damages, which are not included in the change in regional wages and salaries. There is no *a priori* reason for favoring one index over another; for this reason it is best that the technical fraternity present the information but let the political process assess its relevance.

Water resource investments, as is the case with most government investments, transfer income from one group of people to another since the beneficiaries of such investments seldom reimburse the government for their total cost. In this context, a national income index of 2 means that if taxpayers – including those who receive no financial gain from the investment – transfer one dollar of their income to the Appalachian Region, it will convert physical resources having a value of one dollar into goods and services valued at two dollars. An investment having a regional employment index of 4 means that if taxpayers – including those who receive no financial gain from an investment – transfer one dollar of their income to the Appalachian Region, the collective wages of some people working in Appalachia will increase by four dollars. One essential difference between the two indices is that the national income index provides a basis for determining if an investment is an efficient one whereas the regional employment index provides no such information in this regard.

An efficient investment is one for which the target recipients of the transferred resources receive an amount equal to or greater than that sacrificed by the donors of the said resources; consequently with efficient investments the collective income of all regions (the nation) will remain the same or increase while the income of the donors will decrease. In the context of “economic efficiency”, the target recipients are any and all individuals. Inefficient investments consist of those investments in which the target recipients receive amounts less than the value of the resources released by the respective donors, i.e., the collective income of all regions will decrease but the incomes of the recipients of the grant will increase. Since the regional employment index is indifferent to whether the investment made in Appalachia would, in its absence, make a comparable contribution to the output of the nation by being invested elsewhere, it cannot be used to determine if an investment is efficient.

6/ Detailed instructions for calculating this index have been prepared in connection with the Appalachian Water Resource Survey. These procedures were tested and the results published and distributed to the public for review and comment nearly two years ago. (Interim Survey Report, Upper Licking River Basin Kentucky, U.S. Army Engineer District, Louisville, July 1967). The experience gained from this test served as a basis for revising and subsequently utilizing the procedures for the evaluation of all projects considered for inclusion in the Appalachian Water Resource Program.

It is important to recognize that efficient investments are often subsidies. A subsidy can be defined as "the transfer of goods, services, or money by government to special groups in the society (composed of private firms or households) for which no equivalent service or good is directly rendered in return. Any government program that undertakes to provide services, or to create or preserve something of value for a group within the society, for which the group does not repay the total cost to the government of providing this benefit, might be said to be subsidized. By this definition most government programs involve some element of subsidy".^{7/}

In respect to the above definition, the use of the term "directly rendered in return" might be expanded upon. As previously mentioned, cost-sharing policies are such that the residents within the immediate area of a water resource investment seldom completely reimburse the government for the total cost of a project. Considering only direct cost-sharing, one could conclude that the project is a subsidy because no equivalent service is "directly rendered in return". However, a consideration of total tax payments and the impact of other government programs in the same region, might lead one to a different conclusion. More specifically, if the beneficiaries of an investment are not the recipients of any additional government expenditures and if their tax payments exceed the gains realized by the water project, one could hardly conclude that the said group is subsidized. It should be clear that one effect of a water resource investment, whether or not its national income index is greater or less than one, is that the income of some persons is increased while the income of others is decreased — recognizing that the magnitude of these changes need not be equal.

In many instances it is necessary that an inefficient subsidy be granted since it is the only way to accomplish a particular goal. However, in order that a specific goal be attained in a least costly manner — i.e., to minimize the adverse effects sustained by other regions as a result of granting an inefficient subsidy to a particular region or group, it is essential that the least inefficient subsidy be chosen from the set of all inefficient subsidies. In other words, if the size of the economic pie is to be reduced to achieve a more suitable distribution of its pieces, the contribution an investment makes to the income of the other regions must be ascertained. For these reasons, the national income index should be

7/ James T. Bonnen, "The Distribution of Benefits from Cotton Supports", *Problems in Public Expenditure Analysis*, Samuel B. Chase, Jr., Ed., (Washington, D.C.: The Brookings Institution, 1968, p. 224)

displayed, whether it is to be designated as an objective, or relegated as a side effect, is a separate decision.

Unlike the national income index, the basis for formulating the second index, used to judge the redistributive effects of an investment, is not clear and is not supported by prevailing practices. Several alternatives for assessing the redistributive effects of an investment are presented in order to illustrate the importance of highlighting the value judgments made during the economic analysis of a proposed investment.

When speaking of the redistributive effects of an investment it is imperative that the redistribution of income to a particular income class not be confused with the redistribution of income to a particular region. The use of an index based on the change in the aggregate level of income of all inhabitants of the Appalachian Region would probably solicit widespread regional support for a particular investment. This information, however, is of limited significance in relation to the objective of helping the lower income classes since a change in the total income of a region consists not only of the change in regional employment, in which the impoverished can potentially share, but also of the many effects arising from a more effective use of previously employed factors of production. Included in this category is the indirect income realized by the owners of industrial and commercial enterprises who, for example, are protected against flood losses as a result of a water resource investment. In this case the indirect income received by the owners of these enterprises might consist of the money saved by not having to replace inventories and equipment. This indirect income can be converted to cash income if property values are sensitive to these factors.

Therefore in the Appalachian Water resource program, the ability of an investment to create additional employment in the Appalachian Region by encouraging the location of new industrial firms is taken as a surrogate measure of its redistributive effects, assuming that the newly employed do not pay for the project. It is recognized that an increase in regional employment is only a necessary, not a sufficient, condition for the redistribution of income to the poor since the impoverished may not in fact be employed in the new jobs. However, until such time the direct as well as the indirect beneficiaries of an investment are identified by income class, an estimate of the change in regional employment is preferred to alternative estimates of income redistribution such as the change in regional income. Admittedly, a change in the total income of a region could have an indirect effect on the

income of the poor by providing additional sources of tax revenue which in turn could, for example, be used to support welfare programs. In other instances an investment which increases the total income of a region could have a somewhat more direct effect on the income of the poor by providing them with services that they would otherwise pay for. Nonetheless, a direct relationship between an increase in the total income of a region and its attendant redistribution to the poor is tenuous at best. This is not to imply that the change in the total income of a region should not be identified for such information will be presented in the Appalachian Water Resources Report.^{8/} What is emphasized herein is that the change in the total income of a region is not the most direct measure of the impact an investment has on lower income classes, and consequently should not be used for this purpose. It is recognized, however, that the redistribution of income to lower income classes is not without side effects, such as, for example, transferring income from lower income groups in another region or requiring an increase in the taxes of middle and upper income groups.

Lastly, it should be stated that there are uncertainties associated with all economic projections, whether for changes in national, regional or personal income. It is the responsibility of the planner to identify these uncertainties at least in a relative manner, e.g., a particular estimate of the contribution an investment makes to national income might have more uncertainty than does a comparable estimate of its contribution to regional employment. In some instances the uncertainty associated with a particular estimate might be so great that it is misleading, and therefore best not be made. One step in assessing the uncertainty associated with a particular estimate might be to determine if the estimate can be reproduced, i.e., if different individuals working independently arrive with the same value of the estimate.

The purpose of the above discussion is not to determine the "best" indicator of the merits of an investment but to highlight the value judgments that must be made when assessing the contribution an investment makes to a particular objective. It should also be clear that actions taken to judge an investment based upon its contribution to several broadly defined and nonconflicting objectives, or by its responsiveness to only one objective however defined, give an outward sign of completeness, but actually conceal the range of

8/ In addition to the two objectives previously described, namely, increasing national income and increasing regional employment, projects considered for inclusion in the Appalachian Water Resources Program are also assessed on the basis of their contribution to the quality of the environment.

choices available to the appropriate decision-making authorities. For this reason it is essential that the public be informed of those effects of an investment considered to be beneficial by some groups as well as those effects considered to be detrimental by other groups.

Step II. – Assessing The Contribution an Investment Makes Towards the Fulfillment of Its Objectives

Irrespective of which of the objectives of an investment are being assessed, in order to determine the contribution an investment makes to each, it is essential that an estimate of its effects exclude the effects of other investments to be undertaken in its absence. Adherence to the with and without principle is a necessary condition for marking this demarcation. More specifically, the with and without principle states that the effects to be attributed to a particular investment must be determined as the difference between those conditions which would exist if the investment were undertaken and those which would exist if it were not undertaken.^{9/} The evaluation of an investment on a with and without basis differs from an evaluation based upon a before and after comparison since the latter does not provide for an assessment of those changes – from existing conditions – which could occur if in fact the investment were not undertaken.

The emphasis accorded to the with and without principle results from the need to counter the plethora of misleading statements praising an investment on the observation that before the investment was made, conditions A and B prevailed, but after the investment was undertaken, conditions C and D prevailed – giving little consideration to the fact that had the investment not been undertaken, conditions C and D might have prevailed anyway. For example, in regard to assessing the national income effects of an investment, it is not uncommon to hear statements such as “although investment X does not represent the least costly way to achieve a specific increase in national income, it does lead to an increase in the income of the nation and therefore should be undertaken”. This conclusion is based on a before and after comparison. Had it been based on a with and without comparison, one would conclude that investment X leads to a decrease – not an increase – in national income, if in fact the least cost alternative would have been undertaken in the absence of

9/ Otto Eckstein, *Water-Resource Development: The Economics of Project Evaluation* (Cambridge, Mass.: Harvard University Press, 1958, p. 51)

investment X. This decrease in national income results from the returns lost on the marginal funds, defined as the difference between the cost of investment X and the least cost investment, which as defined herein, makes a contribution to national income equal to that of investment X. In other words, undertaking investment X has precluded the adoption of a more profitable investment and the attendant loss represents a decrease in national income. An example of the misinformation resulting from an assessment of an investment based on a before and after basis is given below.

Illustration: Assessing the Value of Preservation

Increasingly, water resource projects have been questioned by preservationists who are concerned about the opportunities for aesthetic enjoyment foregone by building water resource projects in scenic areas of the country. Suppose for example, the opponents to a dam claim that if the dam were not built, the scenic areas would not be flooded; and since the preservation of the area is preferred to its inundation, the dam should not be constructed. This type of argument is based on a before and after comparison, i.e., a comparison of conditions existing before the dam is built and those prevailing after its construction.

A with and without comparison could yield different results. It would be based on a comparison of the situation prevailing with the dam -- similar to the after case described above -- and the condition likely to prevail in the future if the dam were not built. If in the absence of the dam, the presently scenic area would, in the future be lost anyway due to its inundation by subdivisions and commercial enterprises, conclusions drawn from a with and without comparison would differ significantly from a before and after comparison. In other words a decision may be limited to a choice between flooding the area with water -- or flooding it with people. Consequently, in some instances it will be necessary to compare the merits of building a dam with an alternative investment such as public ownership of the scenic lands. In such a circumstance the issue could be more clearly debated if the discussion were focused on a comparison of the social and economic effects of the dam with the aesthetic gains realized from taxing the public to preclude residential and commercial development in the scenic area. A true comparison of the possible aesthetic opportunities foregone from the construction of a water resource investment cannot be determined by assuming a perpetuation of the status quo -- unless deliberate actions are taken to insure that this in fact will be the case. Therefore the public should not only be presented with an

estimate of the benefits and costs resulting from a proposed investment but also with an estimate of what would occur if the investment were not undertaken.

Step III – Assessing the Cost of an Investment

Without an accurate and meaningful identification of the cost of an investment, it is impossible for the public consistently to identify efficient investments, i.e., those investments which meet a given objective with the least amount of resources. Since the selection of inefficient investments leads to a reduction in the quality and quantity of services which the public can receive from a fixed amount of scarce resources, inefficient investments are usually accorded a low priority.

The opportunity cost of an investment – the maximum benefits foregone by not undertaking an alternative investment – is usually expressed as the number of dollars allocated to this activity in a given budget. However, the opportunity cost of an investment expressed in this manner neither provides an explicit identification of those taxpayers bearing its cost nor does it present information which encourages debate on the establishment of its priority relative to other available investments. Consider, for example, a municipality having only two public works programs, Program A consisting of the construction of public libraries and Program B involving the construction of sewage treatment plants. In order that the public library system be expanded, taxpayers are confronted with a \$1 billion bond issue for the construction of two additional libraries. In this case, the cost of building the additional libraries might be expressed not only as \$1 million but also as the benefits foregone from not constructing a \$1 million sewage plant.

In recent years advances have been made in performing benefit-cost analyses of public investments. Consequently, it is not uncommon for the public to be provided – not with the identification of the particular opportunity foregone – but with information such as “if the rapid transit system is approved, the transportation saving to the community will amount to \$3 for every dollar invested”. This type of information, since it provides a basis for soliciting greater community support, is probably most helpful to the immediate beneficiaries of the transit system; it might also provide the opponents of the transit system with a target upon which to center their criticisms. However, the general taxpaying public, who often have no predetermined position on a given issue, can more easily assess the merits of the transit system if they were informed that its cost is, for example, the benefits

foregone from not constructing a hospital.^{10/} The economist's concept of cost to mean all other opportunities foregone is too abstract and needs to be supplemented by a reference to some specific examples of the particular alternatives given up.

While the use of benefit-cost ratios should be encouraged, their uninformed use could have a significant effect on many programs, including those that are not subjected to such analyses. Justification for this concern is based upon the observation that the mere existence, or nonexistence, of benefit-cost ratios often leads to unfounded praise or criticism of a proposed investment. This limitation, along with the difficulty in educating the general public of the value judgments implicit in assigning monetary values to the physical effects of an investment; the problems involved in quantifying its intangible effects; and finally, the lack of consistency in the methodologies used to measure benefits not only preclude a complete reliance on the results of benefit-cost analyses but also suggest that their area of influence should be specified quite rigorously.

It is recognized that there are value judgments and methodological problems associated with the identification of the particular investments foregone. Nonetheless, when the public is informed that the cost of an investment is the opportunities foregone from an identified alternative investment, the range of choice available to them, as well as the value judgments leading to a delineation of these alternatives, are highlighted. This is seldom the case when the merits of an investment are described solely in terms of a benefit-cost ratio.

No pretense is made that the specific opportunity foregone can, or should be, identified in equal detail each time a priority is established.^{11/} Furthermore, it is naive to assume that all of the above analyses can be performed without the approval of the relevant decision-makers or that they can be applied to all investments in the near future. Progress along these lines has been made in at least one Federal program.

10/ It is recognized that in many instances legal constraints preclude the use of some funds, trust funds for example, for purposes other than those for which they were acquired. However, sound analysis will aid in assessing the price paid for these inflexibilities and may provide a basis for their modification if appropriate.

11/ For example, in the case of the Federal budget, one approach could be to begin with the establishment of an allocation between defense and non-defense expenditures. For a decision at this level, an initial allocation between these broad categories might be quite arbitrary recognizing that this initial decision would be revised once its implications are fully assessed. To aid in making this assessment, priorities might then be established between the various non-defense programs such as transportation, housing and public works. As the degree of aggregation – i.e., the level of decision – decreases, the opportunities foregone will become more specific. In other words, the opportunities foregone will be most explicit when priorities are established for the alternative investments within a particular program: for example, an urban renewal program in City A in lieu of City B. Armed with this detailed information, the priorities established at the higher levels of aggregation – e.g., the initial allocation between defense and non-defense programs could be reassessed.

The Opportunity Cost of Public Works

In the Federal Government, an important analytical tool available for delineating the specific investment foregone by a proposed investment is the five-year program prepared by those Federal agencies required to implement a Planning, Programming and Budgeting (PPB) System. The primary components of a five-year program are: (a) a designation of the specific investments to be undertaken in the next five-year period; (b) the financial cost of each investment; and (c) the projected five-year budget level for the program.

In order to illustrate the manner in which the opportunity cost of an investment can be expressed in non-monetary terms, data is drawn from the five-year program of the Army Corps of Engineers. Their five-year program is based on the projected "needs" for water-resource development in each of nineteen hydrologic regions which, in total, encompass the entire nation. While supporting analyses have indicated that a significant portion of the projected needs are economically feasible to meet, additional studies are needed to examine the economic feasibility of the remaining needs. For this reason, the projections have been designated as "needs" and should not be referred to as economic demands. Based upon these estimated needs, a five-year investment program was developed for each of the nineteen regions subject to the constraint that the total cost of all water resource projects included in the program be limited to an assumed five-year budget level based upon a projection of the appropriations received in previous years.

Prior to choosing the particular projects to be undertaken in a given region, a preliminary program was formulated based upon meeting an equal percentage of the needs of each region as originally projected, the aforementioned percentage being limited by the level of the projected five-year budget. In other words, the estimated needs of each region served as a basis for allocating a given budget among the nineteen hydrologic regions. Recognizing the uncertainties in the estimate of needs, these initial regional allocations were modified based on an analysis of gains and losses associated with deviating from them. The identification of the opportunity cost of a proposed deviation played a significant role in assessing its merits. For example, to determine whether the funds allocated to Region A relative to Region B should be increased, the opportunity cost of meeting more of the needs in Region A relative to Region B was determined. In other words, in addition to stating that

it would require that Y million dollars be withdrawn from Region B and invested in Region A, the opportunity cost of these funds could be designated as the water supply project for City B in Region B which must be given up in exchange for the flood protection project in City A of Region A. Obviously, such a statement of the opportunity cost of an investment requires that serious consideration be given to establishing a five-year budget level as well as its attendant allocation among the respective regions.

With the help of electronic data processing equipment it is possible to perform the above type of analysis simultaneously for all regions and for many alternative five-year budget levels. Based on these analyses, a recommended five-year program was developed by determining the opportunity cost of incremental amounts of funds added to a preliminary program having a five-year budget level significantly lower than the five-year budget level ultimately recommended.

The aforementioned process is subject to improvement; nonetheless, the fact that it is being performed does indicate that the specific investments given up can be identified and used in establishing priorities among alternative public investments. It also illustrates that the identification of the particular opportunity foregone is of great use in delineating some of the side effects of an investment. For example, the side effect of building a four-lane highway to service an industrial complex might be identified as not being able to repair a road used for the transport of school children. And lastly, an identification of the particular investment given up lets each citizen participate more directly in an assessment of its benefits and costs since the public need not be dependent upon the value judgments implicit either in its benefit-cost ratio or any other supporting information. In other words, an identification of the investment given up frequently leads to a more intense review of a proposed expenditure than do debates on the criteria and procedures used for its evaluation.

Step IV – Soliciting Public Reaction to a Proposed Investment

The previous sections of this paper identify shortcomings in the information presently given in support of public investments and indicate ways in which these deficiencies can be overcome so as to increase the degree of public participation in the establishment of priorities among alternative public investments. The purpose of this section is to present one

consideration which, given certain assumptions, questions the desirability of community participation in the establishment of investment priorities.

If specific conditions must be met to reach some optimum economic state, and if the introduction of a constraint or obstacle prevents the attainment of one of these conditions, the resulting situation is defined as a second best solution. The solution is defined as second best in the sense that it is attained only by a rejection of one or more of the conditions which lead to the aforementioned optimum. The theory of second best states that "it is not true that a situation in which more, but not all, of the optimum conditions are fulfilled is necessarily, or is even likely to be, superior to a situation in which fewer are fulfilled".^{12/} For example, if the continued existence of one or more large firms were certain, the theory of second best could lead one to be critical of actions taken to foster competition in the market place by opposing all further industrial mergers. In this case, a second best solution might be to permit small firms to merge so as to have a combined influence equal to that of the larger firms.

In a like manner, if there exist obstacles – whether political, institutional, or technical – which preclude community participation in assigning priorities for all public investments, then an acceptance of the theory of second best casts doubt on the merits of encouraging a public review of only a portion of the investments undertaken in the public sector. In other words, subjecting only a small number of the available programs to a critical public review could lead to an inefficient use of available resources since the priorities accorded to some programs may be unduly high or overly restrictive – based not on an assessment of their merits relative to other programs – but solely on the basis that the public can participate in the decision-making process.

Illustration: Community Participation and the Public Image of Water

Resource Development

There are few programs which invite greater public participation, or perform any more detailed benefit-cost analyses of potential investments, than do the agencies involved in the development of the nation's water resources. For example, in some water resource programs the public is involved in every stage of the planning process, ranging from an identification of the major problems to be solved through a series of public hearings on the alternatives

^{12/} R. G. Lipsey, Kelvin Lancaster, "The Theory of Second Best", *The Review of Economic Studies*, Vol. XXIV, 1956-1957, p. 12.

available for their solution. The vehicle for soliciting public review of a proposed water resource investment is frequently a public announcement of the recommendations contained in a report describing its economic impact. The report is forwarded for review by the governors of the affected states, other Federal agencies and any taxpayer requesting a copy. Therefore, while the precision of the analysis in support of a water resource investment is occasionally questioned, an observation which is not debatable is that the public is informed of a potential investment and encouraged to criticize it years before it is undertaken.

In spite of this relatively high degree of public participation, water resource projects are often designated as "pork barrel" investments, while other public investments, having received neither a comparable degree of analysis nor equal examination by the public, escape this criticism. The question unanswered herein, but highly relevant in view of the theory of second best, is whether public review and benefit-cost analyses of only select programs results in an optimal – or an inefficient – use of the nation's resources.

Concluding Remarks

Traditional benefit-cost analyses are based on one definition of the term "benefit", namely the contribution an investment makes to national income. However, even if the maximization of national income were accepted as the primary objective of all public investments, it would still be difficult to express all of the national income effects of an investment in the form of a single ratio since there is far from complete agreement on an operational procedure for measuring the contribution that some of its side effects make to this objective. Furthermore, since the decisions of different individuals are based upon different sets of values, it is impossible to develop a unique definition of the term "benefit" which can be used by all individuals to judge all the merits of all investments. Consequently, it might be helpful to eliminate the term "benefit" – but not the concept of measuring changes in national income – as well as the term "benefit-cost ratio" from the vocabulary of public investment analysis and in their place substitute the following types of information. First, the presentation of several indices of performance each responsive to the different effects of an investment – including those effects considered to be undesirable by some

groups — and second, an identification of an alternative investment given up. In this way it is possible to highlight the value judgments implicit in any particular “benefit-cost ratio”. This type of information might encourage the taxpaying public to participate more directly in the establishment of priorities for public investments and could lead to the creation of a more effective “pricing mechanism” for public goods.

What is the likely impact on a particular program by identifying all the effects of each of its investments? This is a difficult question to answer in the context of a specific program and nearly impossible to answer in general terms. There are, however, a few general observations worth noting. First, that a particular program might be characterized by two parameters, its level — the amount of funds it receives — and its content — the goods and services resulting from undertaking its component investments. And second, that a complete identification of the effects of a proposed investment can change either or both of these parameters.

A complete knowledge of all the effects of a particular investment might have the greatest chance of changing its program level if all programs were subjected to the same degree of analysis and if in fact these analyses were used for the establishment of their levels. Although progress is being made in this direction, analyses performed to date have not covered the wide spectrum of public investments nor have they been overly helpful in allocating resources between diverse programs such as, for example, urban housing and space research. However, until such time that there is a complete delineation and assessment of all the effects of all investments, as well as the existence of institutions that can utilize this type of information, it is unlikely that program levels will be established on the basis of an explicit weighing of the merits of one program relative to the merits of other programs or with complete recognition of the fact that the same programs are competing for the same limited resources. Although steps toward the realization of this goal should be encouraged, efforts to highlight only those effects of an investment which are beneficial to some groups, without identifying those effects considered to be unfavorable by other groups, might well provide bases for informational campaigns but should not be considered as technical evaluations to aid in establishing priorities for public investments.

The most immediate consequence of displaying all the effects of an investment program will probably be a change in its content as opposed to a change in its level. More

specifically, as more effects of an investment become known to the public, a particular investment might receive stronger support, or more criticism, than other proposed investments. Therefore, by highlighting effects heretofore unassessed, some investments previously designated as marginal will pre-empt other investments which would have been undertaken had not the "marginal" investment been eligible for initiation. This is true whether or not the level of a program increases, since a budgetary ceiling is associated with each program, even though its magnitude might not be known. Consequently, whether or not the level of a program changes or whether only certain effects of an investment responsive to the desires of select groups are highlighted, one consequence of displaying the different effects of a public investment is that some individuals will not receive financial gains so that others may reap comparable rewards through alternative investments within the same program.

One standard for judging the merits of the methodologies described herein (many of which have been suggested in one form or another in the earlier writings of others) is stated in the first paragraph of this paper, namely,

"To highlight for any proposed investment, its contribution to the well-being of some groups, its detrimental effects on other groups and an alternative use of the same resources."

It is a personal decision of each reader to decide whether the implementation of the aforementioned procedures would meet this standard, if in fact it is considered desirable to do so. In making these decisions, it is certainly hoped that the methodologies outlined herein not be discussed in the abstract but that they be compared with specific alternatives.



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