

Estimating Contributions of Natural Resource Investments to Objectives in Regional Economic Development*

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MY principal purpose is to assess the status of methods for estimating contributions of Federal water resource development projects with respect to regional economic objectives. Emphasis is upon problems experienced both by the Federal agencies and by those with responsibilities for assisting in economic evaluation of the projects.

Two theses underlying this paper are: (1) Appropriate procedures in benefit-cost analysis, as applied to regions, require a foundation in relevant concepts and theories of regional economic development; and (2) efforts to develop methods for estimating the more dynamic effects of water projects should be preceded by the development of defensible measures for the less dynamic effects.

Objectives of Water Resource Investments Relating to Regions

A recently released report of a special task force of the Water Resources Council advocated measurement of effects of water projects in terms of four sets of "national" objectives—national income, regional development, environmental, and well-being [5, pp. 16-25]. Regional development objectives included increased regional income, increased regional employment, improved regional economic base, improved income distribution within the region, and improved quality of services within the region. The expressed regional development objectives are not mutually exclusive; if values are assigned to each objective, there is a possibility of multiple counting of benefits by the agencies. This danger of multiple counting is accentuated when several agencies claim benefits to projects within the same region and interregional or interindustry distributional effects are ignored. A view apparently taken in the task force report was that water projects could be designed to accommodate any of a large number of combinations of national and regional objectives [5, pp. 72-73]. I wish to challenge this view.

In our optimism about beneficial economic effects of water projects, we often neglect the limits imposed by their physical purposes—flood control,

* Comments and suggestions from Robert Boxley, William Heneberry, Harold Marshall, Morris Weinberger and Gene Wunderlich were used in developing this paper.

navigation facilities, irrigation, water supplies, power, etc.—and the highly functional nature of the planning necessary for their achievement. The limited scope and content of physical objectives—for example, usually what can be obtained by a system of reservoirs in a watershed or river basin—suggests that water projects may be inefficient or ineffective as public instruments for achieving many of our major economic objectives, including those for regions. I suggest also that the highly functional nature of these purposes severely limits management of the indirect effects by water project designers. The failure to fully and explicitly recognize such limitations of water projects could deter public consideration of more relevant programs and policies for attacking our major economic problems.

I propose that we restrict ourselves to three dimensions of regional development; namely, (1) increase in aggregate income within the geographical area designated as the region, (2) increase in income of those people within the region who fall in the lower income classes nationally, and (3) increase in efficiency in the use of the region's resources. Parallel views of regional development are discussed by Leven [2, pp. 1–12].

An increase in the aggregate income of a region is the objective sought by those identified by Leven as the self-interest group. Proponents of the second and third objectives mainly are interested in national rather than strictly regional (self-interest) economic objectives. However, these also are objectives in regional economic development because each relates to levels and distribution of income of people within a region.

The task force does not adequately distinguish or relate three types of income distribution: geographical, within-region personal, and national personal. Also, the sharing of benefits and costs of water projects permitted by law apparently was equated with a national objective in income distribution [5, p. 24]. In my view, national personal distribution of income is the central consideration in any national objective about income distribution. Other types or attributes of income distribution are relevant considerations only to the extent they affect the national personal distribution. One possible consequence of the failure to distinguish types of income distribution is the implication that projects built in economically depressed or low income regions automatically contribute to a national objective of achieving a more equal distribution of personal income. This implication occurred in the volume by Maass and associates in the discussion of trade-offs between national economic efficiency and regional income redistribution [3, ch. 2]. It now is apparent that direct farm program benefits going to our lowest income states often accrue mainly to the more affluent people both within those states and in the nation. The beneficial effects of water projects in low-income regions could be distributed in a similiar way.

Appraisal of a Regional Orientation

We now turn to some issues, activities, and experiences relating to effects of projects upon regional economies. Up until about a decade ago, the principal concern of economists about water resource development was whether agency practices in estimating effects of the projects were consistent with criteria for increasing national economic efficiency. This still is a major concern. However, beginning with Senate Document 97, published in 1962, official Federal policy was to encourage evaluation of projects in terms of a number of objectives, including regional economic development. Agency practices in benefit-cost analysis did not change drastically in response to the new policy—in fact, major reorientations in agency practices since 1962 have occurred only in the Corps of Engineers' proposed water resource development projects in Appalachia, and these practices were more in response to the interpreted goals of the Appalachian Regional Development Act of 1965 than to SD-97. Nevertheless, the procedures developed by the Corps threaten to become a part of the standard operating procedures of all agencies and for all regions; and, because of that threat, this brief account and assessment is limited to some notions underlying these practices.

The central element in the proposed procedures is an assumed expansion effect due to the projects. This is a new kind of secondary effect—not “stemming from” or “induced by,” as defined in the Green Book, and not a multiplier effect relating to regional export base theories or interindustry analysis. Rather, this new creature arises mainly from a projected expansion of primary or user benefits of water project services consistent with the interpreted goals of the Appalachian Regional Development Act. If the goals of the act are assumed to be (1) rates of regional development consistent with achievement of per capita personal incomes of people in Appalachia equal to that of people in the rest of the nation by the year 2020, and (2) job creation within Appalachia at rates necessary to employ the existing labor force and the natural increase thereof, then something phenomenal in the way of added economic activity within the region would be required within the next 50 years.¹ With three additional assumptions, all of this expanded economic activity net of associated costs of private capital investment could be attributed to the water resource projects. These assumptions are: (1) Investments in water resource development are perfect complements to the aggregate of all other investments, public and private, necessary for achieving the goals of the act; (2) the public component of these investments will be made regardless of

¹These correspond approximately to the first category of goals of the act, as discussed in the main report of the Office of Appalachian Studies [6, pp. IV-4 and IV-5].

the amount invested in water resource development; and (3) the private component will be made if the water resource projects are built. The assumed fixity in relation between proposed investments to develop water resources and other investments is as absolute as is the assumed necessity for accomplishing the goal of the act. The two become related imperatives.

One could grant that if expansion in economic activity within Appalachia must take place in locations specified by the Corps of Engineers—i.e., in the vicinity of the proposed water projects—development of some flood protection and industrial water supplies may be necessary. However, this approach ignores the possible existence of alternative locations within Appalachia for expanded economic activity that are not hampered by water supply or flood hazard problems. Also, even if water resource problems were the kind of obstacles supposed by the Corps, the basic approach assumes away the possibility of the existence of even more important obstacles to the economic development of Appalachia in accordance with the assumed goals of the act.

Most of the major ideas for the Corps approach in evaluating water projects in Appalachia were provided by Spindletop Research, Inc. [4].² In turn, Spindletop claimed a major source of their ideas was the unbalanced growth doctrine as presented by Hirschman in his discussion of investment for economic development in underdeveloped countries [4, phase 1, pp. 12–15]. This doctrine states that, in a growth process, sectors of an economy advance unevenly, and this very unevenness is the source of investment incentives underlying growth. It is a conception of growth arising from disequilibria—a seesaw produced by excessive investment by some sectors (and subsequent catching up and “over-investment” by the other sectors). As applied to public sector investment for economic development, the implication of the theory is to choose those investments with the best prospect of creating external economies (or investment incentives) to the private sectors. Hirschman sets forth a clear warning about the possibility of lack of success of some public sector investments in some locations within a country in inducing private sector investments [1, pp. 92–95].

The Spindletop group seemingly interpreted Hirschman’s unbalanced growth theory negatively—that lack of investment in particular sectors of an economy acts as a “bottleneck” or near absolute deterrent to further development. This, along with the implied complementary relations among investments, is the basis for the ring of authority in the Corps’ expression

² Some responsibility for the approach taken must be attributed to the Harvard study [3] completed in 1962, especially to the orientation toward regional economic objectives. Other contributions to this approach, both conceptual and empirical, are too numerous to mention.

of the necessity for particular water resource projects. Although this "bottleneck view" of the unbalanced growth doctrine, I believe, in erroneous, the more serious error was an application, without modification or adjustment, of the unbalanced growth theory to an economically depressed region, such as Appalachia, within the United States. Growth is less geared to a larger economic setting in an underdeveloped country than in an underdeveloped region such as Appalachia. Urban-industrial development within a single region must compete with urban-industrial development elsewhere in the national economy. My hypothesis is that all of the proposed public investments specified in the Appalachian Regional Development Act, if made, would not eliminate this comparative disadvantage of the region for urban-industrial development.³ In partial support of this hypothesis, I suggest that most of the instruments provided by the act long ago were available or were used in the Tennessee Valley portion of Appalachia, yet that area does not appear to be developing at the rate necessary for it to catch up with the rest of the nation in per capita incomes within 50 years. In fact, according to census reports for 1960, the percent of the families in Tennessee with incomes below \$3,000 exceeded that for West Virginia (38.3 percent, compared with 32.6 percent).

Any methods of estimating contributions of water projects to regional economic development will provide erroneous results if based upon mistaken conceptions of regional economic development and of the role of water project outputs or services in that development. The unbalanced growth doctrine may provide an adequate explanation of economic development of the nation, or of particular regions. However, the specific public and private sector investments contributing to these processes are yet to be determined. Thus, the knowledge base necessary for developing defensible procedures for estimating the contributions of water projects to regional economic development does not exist. This absence of knowledge is a major reason professional economists are largely ignored in the process of evaluation, authorization, and construction of water projects. To the agencies that want to construct water projects and to the people who want them, projects are considered economically justified in the absence of definite proof to the contrary.

A Concluding Assessment

After about 30 years of activity to develop and improve methods in benefit-cost analysis, where do we stand? What have we accomplished and what remains to be done? My remarks up to this point emphasize the

³It is not my purpose to develop alternatives to the provisions of the Appalachian Act—however, my approach in such an endeavor would be a direct and major attack upon the human resource problems of the people in the region with a minimum of attention given to developing physical resources.

lack of knowledge of regional development necessary for specifying methods for measuring the more dynamic effects of water projects. Perhaps we should approach the matter differently and ask if we have developed defensible methods for measuring the lesser dynamic effects of water projects. My contention is that we have not.

If we know how to estimate national efficiency gains from water projects, we have not been successful in getting this knowledge established in agency practices. Documents such as the Green Book and the special task force report, as well as agency directives, define primary benefits as net (direct) user benefits of project services. Then these benefits, net of project costs, are purported to represent gains in national efficiency (income). Additional gains in national efficiency are said to be the employment of resources that would be unemployed without the projects. The possibility that primary benefits, as defined, may be inconsistent with the national efficiency objective is not recognized. Agency procedures would count net income to farmland development in the benefit column of the national accounts without an adjustment due to induced interarea or interindustry distributional effects or to the added cost of farm programs. The interarea or interindustry distributional effects would be more severe for products with the most inelastic demands, such as farm products. However, inland navigation displaces some rail and other transportation services, public power displaces some private power, public recreation displaces some private recreation, etc. We need to know what fraction (if any) of primary benefits, as presently defined, should be entered into national efficiency accounts. The portion of primary benefits not entered in the national efficiency accounts would be distributional effects—those project benefits accruing to one area at the expense of one or more other areas, or one economic sector gaining at the expense of another. But there are other income distributional effects of the projects. We need to know the national employment effects and the regional location of these effects, the position of the primary and secondary beneficiaries on the national personal income distribution scale, the position of the losers on this scale, and the division of project effects into those consistent with national social objectives and those contributing only to a regional self-interest objective.

Given this state of our knowledge, efforts to develop procedures relating to “regional dynamics” of water resource development may be premature. A baby should not be expected to run before it has learned to walk.

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