

THE ROLE OF ECONOMICS IN RIVER BASIN SURVEYS

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This statement emphasizes economics investigations in river basins by the U. S. Department of Agriculture. Emphasis is given to the general economic and policy features that serve as an environment within which these surveys are made. Special attention is focused on both regional studies involving four Federal departments and smaller area studies that involve primarily the Department of Agriculture and the State where the study area is located. Finally, economic aspects of a survey in the Upper Rio Grande Basin of New Mexico are described in some detail.

The Department of Agriculture participates in river basins investigations under authority of Section 6 of Public Law 566, the Watershed Protection and Flood Prevention Act of 1954, as Amended. This section reads in part, "The Secretary (of Agriculture) is authorized in cooperation with other Federal and with States and local agencies to make investigations and surveys of the watersheds or rivers and other waterways as a basis for the development of coordinated programs." Department participation is comprised of representatives of the Soil Conservation Service, the Forest Service, and the Economic Research Service.

River Basins activities by the Department of Agriculture were initiated in 1955. Two of the first investigations were cooperative with the Corps of Engineers in the Lower Mississippi, and with the Bureau of Reclamation in appraising the direct agricultural benefits on participating irrigation projects in the Upper Colorado River Basin under the Colorado River Storage Project Act.

Seven or 8 years ago, USDA initiated river basins surveys cooperative with the respective states. One of the most recent ones is in the Upper Rio Grande in New Mexico. These kinds of surveys are widely distributed over the country. Currently there are 7 such surveys in the West. Large numbers of applications are pending for new starts. These surveys cooperative between USDA and the States have been identified by the Department as Type IV.

Within the last several years, there has developed a Federal-State program of Comprehensive River Basin Planning which is a large investigative effort in water resources. These investigations are

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scheduled to cover the total area of the United States by 1972. The program is a major activity of four Federal Departments--Agriculture, Army, HEW, and Interior.

The summary report (1) of the Senate Select Committee on National Water Resources, published in 1961, included a proposal that the concept of comprehensive development be redefined to include all purposes served by water resources and all measures for meeting prospective demands and that Congress redefine its concept of comprehensive planning along these lines. Further, Congress should request the Executive Branch to submit to Congress a program for preparing comprehensive plans for each of the major river basins or water resource regions, toward the end of providing for the development of plans for all basins, in cooperation with the States. This proposal was approved by the Administration.

In 1962, the ad hoc Water Resources Council, at the request of the President prepared Senate Document 97 (2) on Policies, Standards, and Procedures in formulating and evaluating plans for development of water and related land resources. This document also emphasizes the need for comprehensive basin plans.

The Water Resources Council has been officially established by Federal legislation. The Water Resources Planning Act, PL 89-80, 89th Cong., signed by the President on July 22, 1965, established this Council, authorized the President to establish River Basin Commissions, and authorized financial assistance to the States for comprehensive water resources planning. Among other duties, the Council shall maintain continuing studies of the use and development of water resources.

The Department of Agriculture is now heavily involved in this comprehensive river basin planning program. The Water Resources Council has identified its investigations as Type I or Type II. Type I surveys are regional studies of water resource problems, needs, and general approaches to development; they are referred to as framework studies. Type I surveys comprise five major elements:

1. Studies and projections of economic development.
2. Translations of such projections into needs for water and related land resources.
3. Appraisals of the availability of water supplies both as to quantity and quality.
4. Appraisals of the availability of related land resources.

5. A description of the characteristics of present and future problems and the general approaches that appear appropriate for their solutions.

Type II studies are Type I plus more detailed studies of selected subbasin areas, a major objective of which is to identify projects to satisfy immediate and short-term needs for water developments.

In the West, Type II studies are in progress in the Willamette River Basin in Oregon and in the Puget Sound area of Washington. In order to meet the schedule for completion of Type I investigations, the Council has decided that no new Type II starts will be made at least for several years.

Type I "framework" investigations will be carried out in 16 major water resource regions, embracing the entire area of the 48 states, exclusive of the Tennessee Valley. Comprehensive studies are also proposed for Alaska, Hawaii, Puerto Rico, and the Virgin Islands. Type I studies are currently underway in the Ohio, Upper Mississippi, Missouri, Columbia-North Pacific, and North Atlantic Regions. Plans provide for new starts in fiscal 1967 in the Upper Colorado, Lower Colorado, and California Regions. A type I is scheduled to begin in the Rio Grande in fiscal 1968.

POLICY GUIDES

The following quote from SD 97 (3) is indicative of the policy framework guiding economic investigations by the Department of Agriculture:

1. Reports on proposed plans shall include an analysis of present and projected future economic conditions in the study area and the contribution that comprehensive or project development may be expected to make toward the alleviation of problems and the promotion of economic growth and well-being within the zone of influence. Economic projections will be made to provide a basis for appraisal of conditions to be expected with and without the plans under consideration, and an estimate of the contribution that comprehensive development may make to increased national income and welfare, and regional growth and stability. Such analyses will frequently require a general economic study of the area, a study of all of its resources, an assessment of their functional relationships, their development potentials, possible adverse effects, and the locational situation with reference to resources, markets, transportation, climate, and social factors. Analyses should indicate the significance of the locality and the

region in producing increased goods and services to meet foreseeable needs.

2. These analyses should be as extensive and intensive as is appropriate to the scope of the project being planned. They should provide essential information for identifying both immediate and long-range needs in economic and social terms and these needs should be expressed in a form useful for program formulation. Presentations in reports should identify:
 - a) The relationship between development needs and opportunities and potential water and related land resource use and development.
 - b) The economic and social consequences of complete or partial failure to satisfy these needs; and
 - c) The possible improvements in economic efficiency, alleviation of unemployment, stabilization of production and income, community well-being, and the quality of goods and services that will be forthcoming.

This framework is further emphasized in the responsibilities of the Water Resources Council stated in Section 102 of the Water Resources Planning Act. The Council shall:

- a) maintain a continuing study and prepare an assessment biennially, or at such less frequent intervals as the Council may determine, of the adequacy of supplies of water necessary to meet the water requirements in each water resource region in the United States and the national interest therein; and
- b) maintain a continuing study of the relation of regional or river basin plans and programs to the requirements of larger regions of the Nation and of the adequacy of administrative and statutory means for the coordination of the water and related land resources policies and programs of the several Federal agencies; it shall appraise the adequacy of existing and proposed policies and programs to meet such requirements; and it shall make recommendations to the President with respect to Federal policies and programs.

Within these guides, the Economic Research Service is concerned directly with rural people, with resources used and needed in the agricultural and forestry industries, and with closely related processing and service industries. However, appraisals of these uses and industries

cannot be made independent of other sectors of the economy. Hopefully, the needs for data and analysis of these other sectors will be met by other agencies and investigators. But this is not always the case, so that on occasion, the Economic Research Service may be required to do research, at least to a limited extent, in non-agricultural uses of water and land.

"COMPREHENSIVE" POINT OF VIEW

Senate Document 97, the Water Resources Planning Act, and common usage in water resource agencies of the Federal government, all are oriented to investigational efforts embracing entire river basins or regions. Attention is directed primarily to water and "related land resources". Comprehensive river basin planning has come to include all significant uses of the water and related land resources of a designated region, as well as all purposes of development.

The term "related land" has been a thorny issue in the development of this comprehensive concept. All land is obviously related to water in at least some sense. But with water as a central focus, something less than consideration of all land problems is likely.

The term "comprehensive" also has interesting implications with respect to the economic appraisal of alternative plans. Existing policies and standards for plan formulation provide for full consideration of "all effects, to whomsoever they accrue," both beneficial and adverse; Secondly, plans for water development should reflect full consideration of alternative means of satisfying given markets or needs for products and services obtainable from water resource developments.

Coordinated development of natural resources is feasible only within a common framework of goals, needs, and objectives. If this framework is lacking in terms of definition, understanding, and consensus, "harmonious adjustment or functioning" cannot be achieved.

Possibly a major task in river basins investigations is to achieve a more adequate delineation and description of resource goals for particular regions and the nation and to arrive at somewhat more general agreement about these goals and directions of attainment. Orientation to the point of view identified above as "comprehensive" will facilitate greatly the "coordination" that nearly everyone proclaims.

ECONOMICS OF AGRICULTURE AND FORESTRY IN TYPE I SURVEYS

Within the program of the Department of Agriculture, the Economic Research Service is responsible for:

- a. The economic base survey
 - 1) Analysis and projection of (a) economic activity in the agricultural and related sectors of the economy, (b) other economic activity in rural areas, and (c) the demand for land and water resources in such activities.
 - 2) Assessment of the current and projected demands for goods and services obtainable from the use of water and related land resources and the translation of such demands into economic needs for development.
- b. Studies of problems and needs
 - 1) Analysis of agricultural and rural water problems as they relate to economic activity in rural areas, specifically to the volume and value of production, employment, and income.
 - 2) Economic appraisal of agricultural and rural needs for water and related land resource development.
- c. Studies of impacts and secondary effects.

Appraisal of prospective economic impact of development alternatives defined by the survey on the agricultural, rural, and related sectors of the economy and the economic relationship of these alternatives to the coordinated and comprehensive development of the basin.

One major effort in meeting these responsibilities is a program arranged between the Interdepartmental Staff Committee of the Water Resources Council, the Office of Business Economics of the U. S. Department of Commerce, and the Economic Research Service. This program has two major objectives: (1) Development of a system of data storage and retrieval for use of cooperating agencies, and (2) generation of a consistent set of national-regional economic projections for the U. S. for each of 16 regions.

Projections (1980-2000-2020) being developed by the Department of Agriculture for the Council include:

1. Volume of agricultural and forestry output by product groups

2. Employment and income in agriculture
3. Use of rural lands
4. Employment, income, and other measures of economic activity in those trade, service, and processing activities locationally related to the basic agricultural industries.

The initial regional and subregion projections will be appraised and refined, especially at the Field level, in terms of local economies, availability of land and water resources, and alternative means of development to meet regional and national requirements.

DEPARTMENT-STATE SURVEYS

Initially, the Water Resources Council listed three types of investigations--I, II, and III; the Type III designation has been discontinued. However, in order to identify the USDA-State cooperative efforts, the Department of Agriculture attached a Type IV classification and this is the origin of the Type IV designation. It is not part of the Council numbering or classification system.

Wide variations exist among Type IV activities over the country. A common element is formal cooperation between USDA and the respective States. But from this common starting point, variations have arisen because of particular local problems and needs, associated with the fact that personnel and budget available for individual Type IV surveys have dictated that they be something much less than comprehensive in terms of analysis of uses of water and of alternative means to meet needs for goods and services. Basically, Type IV surveys are small-scale Type II surveys. Both types have elements of overall framework analyses (Type I) and both identify prospective projects. Type II studies, of course, involve four Federal Departments, they are large in scope, and they cover a wide range of kinds of projects and developments. Type IV studies involve three agencies in the Department of Agriculture and the State, they are relatively small in terms of budget and personnel, and they are oriented project-wise largely to Department of Agriculture programs, and especially to prospects for PL 566 projects.

Type IV studies are restricted to encompass:

1. Development of short-term economic projections and their implications with respect to the supply of and demand for, water and agricultural and rural lands,

2. Analysis of agricultural water problems (drought, flooding, land drainage, recreation, etc.), adverse effects on the local economy, and potential benefits to be derived from their alleviation, and
3. Basinwide economic appraisal of alternative patterns of water resource use and development.

UPPER RIO GRANDE

As a concluding section, some more specific features of Type IV surveys will be noted using the economics work currently underway in the Upper Rio Grande River Basin for illustrative purposes. These investigations are being made within the general framework outlined above. They are still in preliminary stages.

A Field Advisory Committee has general responsibility. Its members are Einar Roget, Soil Conservation Service, Chairman, Lowell Woods, Forest Service, and Clyde Stewart, Economic Research Service. Steve Reynolds, New Mexico State Engineer, works closely with this committee.

The investigations are actively carried out by a USDA Field Party at Albuquerque. This Party is composed of specialists from the three Services. One economist is assigned to this Field Party by Economic Research Service. Surely sufficient personnel are not available for a comprehensive survey and analysis of this area.

For study purposes, the Upper Rio Grande in New Mexico has been divided into six subbasins. Initially, detailed efforts are in the Chama-Otowi Subbasin, although activities are not restricted to this subbasin where it seems more efficient to carry along other efforts concurrently. A portion of the Upper Rio Grande Basin is in the State of Colorado. The Department has not passed by this situation. A similar USDA Field Party is located at Denver for Type IV investigations in the State of Colorado. In the relatively near future this Party will likely find time to work on the Colorado State portion of the Rio Grande. Specific plans have not been made, however, for these investigations or for merging the two State activities.

Several important features of the upper portion of the Rio Grande area serve both as guides and problems to investigative decisions and efforts. By most economic and income standards, the area is depressed.

Unemployment is high. Land and water resources are few and development opportunities are limited. The institutional obstacles are difficult and in some instances insurmountable within the next several decades. Available data are meagre and collection of needed data extremely

difficult. These problems have been recognized further by establishment of a Resource Conservation and Development Project in part of the area, which is being integrated with the river basin activity.

Usually in Type IV investigations, study is made of one or more economic resource problems. Two problems in particular are listed in the Upper Rio Grande Plan of Work that relate specifically to economics: (1) Economic development, and (2) land tenure.

Several special areas of investigation are possible under economic development:

1. Analysis of agricultural water problems--their adverse effects on the local economy and potential benefits from their alleviation;
2. Impacts of resource development on employment and income;
3. Recreation uses of water and land, especially demand aspects;
4. Agricultural processing needs and opportunities.

Other special problems that relate to resource appraisals and projections include:

1. Economic appraisal of alternative hydrologies;
2. Competition among alternative major uses of land and water;
3. Resource availability to meet demands.

In the land tenure field,

1. The Plan of Work notes public-private tenure relationships;
2. Another indicated problem relates to urban "encroachment" on agricultural land and efficiency of water use. Apparently this reference is to areas downstream from Albuquerque.

Three likely problems for special study in the two upper subbasins (Chama-Otowi and Red River-Embudo) in the initial stage of our program are: (1) Impacts of a lumber mill on the local economy, (2) potentials and impacts of recreational development, and (3) appraisals of minimum land and water resources needed to meet various levels of income.

The lumber mill impact study would be an appraisal by Economic Research Service under a cooperative agreement for investigations

under the RC&D program. An important element of this agreement is to conduct studies (1) To develop analytical procedures for appraisals of economic impacts in terms of income and employment, and (2) to conduct studies of economic impacts of particular developments, for example, a lumber mill at Espanola. This study will likely be made after construction of the mill and will constitute a before-after analysis.

The local RC&D Project Group several months ago requested that special study be made of the recreation potentials in the area with special emphasis on prospective demand. The decision has been made that the USDA Field Party at Albuquerque will have major responsibility for this assignment. A joint Type IV-RC&D investigation is planned, initially with emphasis on the present supply of recreation facilities, characteristics of present users, and some potentials for development.

Recreation development in the Upper Rio Grande may be one of the best opportunities to improve the economy of that area. Relatively, the agricultural potential does not seem highly promising. The tenure and cultural obstacles constitute an institutional environment within which resource development must be done, rather than try to alter materially. Improvements in agricultural and forestry production can and should be made also. But these adjustments generally will occur slowly in terms of stimulating the local economy, which appears to be a vital need for the near future.

As the Field Party proceeds downstream with its investigations, apparently a look should be taken at the tenure and transition in major land and water uses with respect to their impacts on the economy and on the efficiency with which water is being used. The thesis has been advanced that ownership changes based on anticipated or hoped for adjustments from agricultural to urban uses are resulting in marked inefficiencies in the use of both land and water.

Apparently a substantial need prevails in these upper Basin areas for analysis of water and land resources needed to meet various levels of family incomes. The Department has been asked to make some analysis of these questions, recognizing the dearth of information and the large reliance on informed judgments necessary for this analysis.

Finally, over the period of study, aggregative economic aspects will be analyzed from the standpoint of the total Upper Rio Grande Basin. The national program in connection with Type I investigations should be extremely helpful.

A description of the economic base of the Basin seems essential as a foundation for appraisals, projections, and other purposes. Studies

will emphasize agriculture and forestry, but the total economy will need also to be considered, drawing for the most part on analyses accomplished by the Universities, other Federal and State agencies, and others. A description will be needed of present characteristics and trends of the agricultural economy, including farm production, incomes, population, and employment; trade, service, processing, and secondary activities; forests and forest-based industries; and recreational and multiple uses of farm and forest lands.

If present plans materialize, an appraisal of these resources will be made in terms of needs and requirements for goods and services as a basis for suggesting alternative means and kinds of resource development that will help meet these requirements.

At the present level of operations, the Department cannot proceed far in this Type IV study toward accomplishment of these objectives within the next three or four years. But the initial work will likely later merge into a more complete and comprehensive analysis of these problems.

CONCLUSIONS

Comprehensive analysis of water resources gives rise to several major concerns or problems. In closing, two are noted.

Strictly in terms of resource development and of productivity requirements, interregional competition comes into focus. Not only is this a complicated problem analytically, but it poses questions as to the position of regions or areas in terms of needs and developments for their particular localities.

A second major problem confronts economists and others with respect to meeting data needs and to developing an adequate technique or methodology for analyses and appraisals of alternative major uses of water and impacts of development on economic activity. Basically, investigators are looking at single major water uses independently of relations with other major uses. The need still exists for a workable technique for bringing together all uses into an integrated system to examine interrelationships among the various sectors of the economy and to appraise the impacts and constraints of various levels of water quantity and quality and various levels of resource development. The OBE-ERS Interregional Analysis is directed toward this end. Progress is evident but a major challenge remains for physical and social scientists.

REFERENCES

1. Select Committee on National Water Resources, Report with Supplemental and Individual Views. 87th Congress First Session, Report 29. 1961, pp. 45-47.
2. The President's Water Resources Council. Policies, Standards, and Procedures in the Formulation, Evaluation, and Review of Plans for Use and Development of Water and Related Land Resources. 87th Congress, Second Session, Senate Document 97. 1962.
3. The President's Water Resources Council, op cit., p. 7.