

Appraising the Results of Our Work

Gilbert F. White

Institute of Behavioral Science
University of Colorado at Boulder

An interesting aspect of water resources management during the past century is the relationship of thinking and activity in the United States (U.S.) with that in other parts of the world. The evolution was very similar, with the U.S. often setting the goals that were pursued elsewhere, with many lessons exchanged, and with relatively little activity that was characterized as unique for only one region or group of regions (White, 1998).

One issue in water planning that was persistent and troublesome worldwide was the question of how to reconcile the aims and methods of evaluation of measures, to enhance the traditional economic goals of human society, with the aims of maintaining the health of ecosystems. A second and related issue was the question of how to appraise the actual results of the numerous and diverse efforts to achieve water management.

The first problem still persists in most parts of the world. The second problem has not yet been adequately addressed in any large region.

RANGE OF EXPERIENCE

My own involvement in work on these problems began in the U.S. during the New Deal period of 1934-1942. The national efforts during those years included a first attempt to prepare a plan for management of the waters of the Mississippi Valley (U.S. Mississippi Valley Committee, 1934), and a series of interdisciplinary efforts to canvass the water problems of the 127 river basins into which the nation was divided, for purposes of review (U.S. National Resources Committee, 1937). It also included participation in a number of national efforts to review the roles of low dams, the problems of water pollution, and the opportunities for regional planning. There was wide interest in merging upstream with downstream efforts but those efforts never reached fruition (White, 1997). Exposure to debates over flood control policy led to my writing a doctor's dissertation on "Human Adjustments to Floods" in 1942.

The Tennessee Valley Authority (TVA) had been created in 1933, but no subsequent effort by President Roosevelt to authorize a valley authority for another part of the U.S.

ever received congressional approval. My subsequent activity in the United States included a variety of involvements in national and regional planning efforts (Ruess, 1993).

I also participated in a variety of international efforts at water planning beginning with the United Nations (U.N.) appraisal of basin planning at Lake Success in 1949, leading to a United Nations report on integrated river management revised in 1970, continuing with appraisals of the Lower Mekong Basin in 1969 and the Aral Sea Basin in 1993, and ending most recently with the report by a committee from four national academies of science on *Water for the Future: Gaza and the West Bank, Israel, and Jordan* (National Research Council, 1999).

RECONCILING SOCIAL AIMS OF WATER MANAGEMENT WITH MAINTAINING ENVIRONMENTAL QUALITY

A persistent and largely unresolved problem in water management planning around the globe has been how to reconcile the aims of management for direct social needs with the aims for maintenance and improvement of natural ecosystems. When a stream is channeled for navigation, diverted to provide additional supply for a nearby area, dammed to provide storage for other times or places, or for electric power generation, the availability of water for the service of the biota in the lands otherwise served is altered. Wetlands are not replenished; aquatic and soil habitat is changed; the supply of water in aquifers may be drastically altered, and so on.

Intricate systems of evaluating the effects upon social systems have evolved over the years, and there now are precise methods for computing the benefits and costs for urban water users, transport, irrigation, and flood control. There has been no thorough set of criteria for judging the benefits of floods. Likewise, there still is no established precedent for calculating the social value of treating urban waste water discharge so that it may replenish natural ecosystems and emerge in quality, meeting urban domestic standards. In general, the criteria for dealing with impacts upon human society are more precise and widely used than those for evaluating the effects upon

environmental systems. The new emphasis on national goals for sustainable development is beginning to call for more consistent criteria, but they are not yet embodied in policy directives. However, the Army Institute of Water Resources has begun careful exploration of the problems.

ASSESSING THE FULL IMPACTS OF WATER MANAGEMENT PROGRAMS

Although there is a huge body of information on the physical dimensions of water management programs, there is a distressingly small body of careful appraisal of their effects upon human society and natural ecosystems. We know how much money was spent, what channels, pipelines, dams, waste-treatment plants, and levees were constructed, how many acres were irrigated, how much consumers were supplied with water, and other statistics on public or private programs.

We know very little about how those expenditures have changed the quality of life of the people affected. There is relatively limited evidence on how social systems have changed, how health has benefitted, how flood dependence has been altered, and many other ways in which human society has been affected. Where has investment in water management made communities more economically productive and socially fruitful? If there were more information on those aspects it would be easier to judge the overall effects—positive and negative—of such programs, and also to correct deficiencies or build upon successes in new efforts.

There is even less information available on the consequences of water management for the environments involved. Although in the late 1960s public attention began to examine the effects of man-made lakes, there are still relatively few comprehensive appraisals of the full impact of water development on both terrestrial and aquatic systems.

Only in the last year has a systematic attempt been initiated to inventory all post-audits that have been published. In a report for the World Commission on Dams, the results of a first, but incomplete, search become available (Westcoat and Halvorson, 1999). The results further understanding of what evaluations may be available for the improvement of new planning or for the correction of previous programs. They also help illuminate why post-audits are not undertaken by some agencies, why they often are incomplete, and why it is difficult to incorporate some of their findings into

adaptive management of existing projects (National Research Council, 1999).

It is to be hoped that in the years immediately ahead there will be more searching evaluation of past efforts, and the results can be widely shared with groups responsible for managing existing programs and for designing new ones. The time is ripe for both consistent criteria for judging in the future the value of water management on human and natural systems, and for appraising the full impacts of work undertaken.

REFERENCES

- National Research Council. 1999. *Water for the Future: The West Bank and Gaza Strip, Israel, and Jordan*. Washington: National Academy Press.
- Ruess, M. 1993. *Water Resources People and Issues: Interview with Gilbert F. White*. Fort Belvoir, VA: U.S. Army Corps of Engineers.
- U. S. Federal Emergency Administration of Public Works. 1934. *Report of the Mississippi Valley Committee of the Public Works Administration*. Washington: Government Printing Office.
- U. S. National Research Committee. 1937. *Drainage Basin Problems and Programs*. Washington: Government Printing Office.
- Westcoat, J. Jr., and S. Halvorson. 1999. *Ex Post Evaluation of Dams and Related Water Projects: Patterns, Problems, and Potential; Report to World Commission on Dams*. University of Colorado, Boulder, CO, U.S.A.
- White, G. F. 1998. "Reflections on the 50-Year International Search for Integrated Water Management," *Water Policy*. 1 (1), 1-7.
- White G. F. 1997. "Watersheds and Streams of Thought," in H.N. Barakat and A.K. Hogazy, ed. *Reviews in Ecology: Desert Conservation and Development*. Cairo: UNESCO, 89-93.