

PA-ABE-035  
6/4/86

WATER AND SANITATION  
FOR HEALTH PROJECT



1611 N. Kent Street Room 1002  
Arlington, Virginia 22209 USA

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The United States Agency  
For International Development

Office of Health  
Bureau for Science  
and  
Technology

**EVALUATION METHODOLOGIES FOR MANAGERS  
OF WATER SUPPLY AND SANITATION PROGRAMS**

by

Raymond B. Isely, M.D., D.T.M., M.P.H.  
and  
Dennis B. Warner, Ph.D., P.E.

of the  
Water and Sanitation for Health (WASH) Project  
Camp Dresser & McKee International Inc.  
Arlington, Virginia

Prepared for presentation at the  
Annual Conference  
of the  
National Council for International Health  
11-13 June 1986

Water and Sanitation for Health Project  
Contract No. 5982-C-00-4085-00, Project No. 936-5942  
Is sponsored by the Office of Health, Bureau for Science and Technology  
U.S. Agency for International Development  
Washington, DC 20523

## Introduction

Managers of water supply and sanitation programs often are required to evaluate the progress and performance of their projects. The types of evaluation methodologies to be employed depend upon the needs of the sponsoring organizations. In selecting a methodology, it is necessary to keep in mind that evaluation is a process involving identification, measurement, and judgment. Identification occurs in the selection and definition of subjects to be evaluated; measurement implies the determination of differences between subjects or changes within subjects, and judgment is the basis for assessing the importance of changes.

In the area of water supply and sanitation development, evaluation is a broadly-defined term that encompasses project review, management control, performance measurement, and outcome assessment. Although the primary function of evaluation is to determine the extent to which project objectives are being or have been achieved, there are a variety of related purposes to which evaluation methods can be applied to assist project managers. This paper will review the main types of evaluations currently used in water and sanitation programs and indicate how they can be employed by project managers to assist in project implementation.

## Evaluation Framework

The evaluation of water supply and sanitation projects, or for that matter any type of development project involving a combination of both capital development and technical assistance, can be better understood if viewed in terms of project effects and their linkages. Figure 1 provides a basic framework for organizing evaluation activities.

Each level of Figure 1 represents an order of effects that is dependent upon all previous effects. The initial efficiency level consists of the immediate or direct consequences of project development, which include all project inputs, operations, and physical outputs under the control of project managers. These consequences can generally be assessed in straight-forward physical units. Since the efficiency level contains all of the primary inputs of money, personnel, and materials and the direct activities of the participating development organizations, it represents the technical "functioning" of the project.

The secondary effectiveness level involves the more complex consequences of project performance, or the use of project systems. This includes the water use and sanitation practices adopted by the project communities as well as the type of health education and maintenance support the communities give to the new systems. Project officials cannot directly control these consequences. They can only hope to favorably influence the behavioral patterns in the recipient communities. Similarly, because of the difficulties in measuring behavior, surrogate or indicator measures often must be employed. The behavioral changes occurring at this level constitute the practical objectives of most projects. They usually are observable and capable of being measured and quantified. For these reasons, this level represents the output "utilization" of the project.

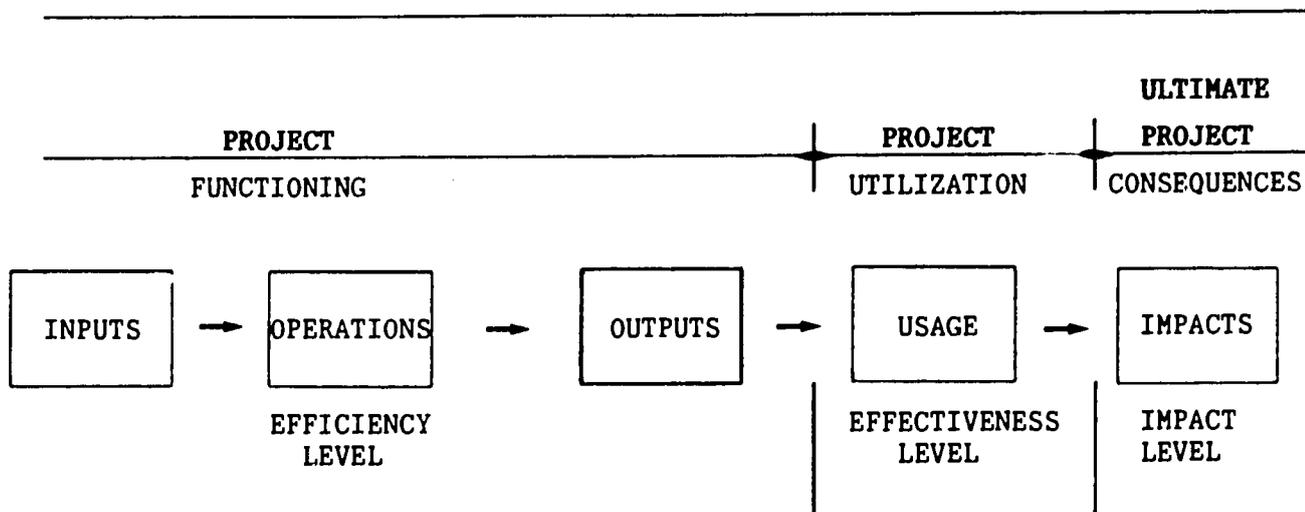


Figure 1: General Evaluation Model for Water and Sanitation Projects

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The third and final level is the impact level, which includes the ultimate health, economic, and social consequences of the project. To the policy maker, these are the long-run benefits that water and sanitation projects are intended to achieve. The existence of these impacts is dependent upon the occurrence of project outcomes at the earlier efficiency and effectiveness levels. Measurement of project impacts, however, is extraordinarily difficult and may require a disciplined research approach with strict project controls to produce meaningful results.

In brief, evaluation can be broken down into three basic levels: an efficiency level involving the functioning of project inputs, an effectiveness level involving the utilization of project outputs, and an impact level involving the ultimate benefits to human welfare.

A more detailed expansion of the general evaluation model is shown in Figure 2 for a rural water supply and sanitation project involving a range of donor inputs, supporting activities, and the construction of facilities. All evaluation issues can be incorporated into the model within the following five areas:

1. Project inputs (the funds, personnel, materials, equipment, and labor contributions of all participants in the project).
2. Project operations (activities intended to strengthen institutional capabilities, such as the improvement of project design methods, training, research, information systems, maintenance etc.).
3. Project outputs (the construction of new water and sanitation facilities in project communities).

4. Project utilization (the actual use and maintenance of water and sanitation facilities in project communities).
5. Project impacts (the ultimate health, economic, and social benefits resulting from the utilization of system facilities).

One of the advantages of the above model is that it classifies project effects into distinct levels. Depending upon the stage of project implementation that may exist at a particular time, managers can select an evaluation methodology that assesses the specific levels of project effects in which they are interested.

### Types of Evaluation Methodologies

There are a variety of methods currently used to assess water and sanitation projects. The three most common methods are audits, process evaluations, and impact assessments. All three can be related to the evaluation model shown in Figures 1 and 2. Two additional methods are not considered to be evaluation procedures as defined in this paper. They are project appraisal, which is the process of assessing project design before actual implementation, and project monitoring, which is the routine collection of data for use in day-to-day management of the project. Project appraisal is an essential component in the acceptance of a final project design. It occurs before project construction and, therefore, is independent of the subsequent functioning, utilization, and impact generation of actual project implementation. Project monitoring occurs during the implementation stage and contributes to both day-to-day management operations and the data needs of specific evaluations. By itself, routine monitoring provides no conclusions regarding project performance, but it can serve as input to subsequent evaluation procedures. For these reasons, neither project appraisals nor routine project monitoring approaches will be considered further in this paper.

The three common types of evaluation methodologies available to project managers can be described as follows:

1. Audit evaluations generally deal only with project inputs and how they have been converted into quantifiable project outputs. In the narrowest sense, a financial audit, for example, may look only at the accounting records of budgets, billings, invoices, and expenditures. More commonly, however, project audits in the water supply and sanitation sector assess project compliance in terms of planned inputs and projected outputs. These evaluations tend to be highly quantitative and use specific financial and engineering criteria to measure expenditure levels, resource disbursements, facility construction, and adherence to schedules. Project audits may take place during implementation or following project completion, but they normally do not look at secondary effects or how project outputs are utilized by the recipient communities. Because of their emphasis on the input aspects of project implementation, audits are generally restricted to the realm of project functioning.
2. Process evaluations, on the other hand, are concerned with the performance of projects and how project outputs are being utilized. Project objectives regarding behavioral changes in, for example, water use, water



consumption, sanitation practices, and household cleanliness become important in process evaluations. In most cases, a process evaluation must assess both system functioning and utilization. The first issue, of course, is whether the system is functioning as planned. Is the water system in place, the latrines properly constructed, and all facilities in operational condition? Can the water system deliver the desired flow rates specified in the engineering design? These are all questions which pertain to the functioning of the system.

System utilization is the key component of process evaluations. This includes an assessment of the behavioral patterns and attitudes of the populations using the facilities. How do people use and care for the water and sanitation facilities? How many times a day do they frequent a given facility? How have their former habits of water use and sanitation changed as a result of the project? What kind of committees, rules, or other social mechanisms do the communities have to maintain the facilities and encourage their proper use by the people? These questions probe the utilization of the project outputs. They do not deal directly with the ultimate health, economic, and social benefits the project is expected to generate. Nevertheless, by looking at the more easily-measurable intermediate variables of behavioral changes in water use and sanitation practices, these questions provide a surrogate set of measures for ultimate benefits. Process evaluations can be carried out during project implementation, in which case the results can serve to redirect or even redesign project approaches, or following project completion, in which case the results can provide guidance for the development of future projects.

3. Impact evaluations deal with the ultimate consequences of project utilization. In general, they are concerned with long-term benefits in the areas of health, economic improvement, and social welfare. In practice, impact evaluations tend to focus on a limited set of outcomes in one or another of the above areas. This is because impact assessment is extremely difficult to perform well. The expected long-term benefits of water and sanitation projects are affected by so many internal and external factors that the overall costs of a comprehensive assessment are beyond the means of all but a handful of well-funded research investigations. Within the area of health impacts, the measurable outcomes include diarrheal morbidity, anthropometrical measures of weight and body size of children, and the incidence of water-related skin infections. Most impact assessments, however, even those limited to a small number of outcomes, are basically research studies intended to test hypotheses and develop new methodological techniques of benefit measurement. Although many development organizations justify project investments in terms of expected health, economic, and social benefits, none has any formal evaluation methodologies suitable for assessing these outcomes.

#### Evaluation Approaches Used by Development Organizations

All of the main bilateral and multilateral development organizations carry out some form of evaluation on their projects. Most require a variety of evaluations to be carried out at different times during project implementation.

Audit evaluations are the most common form of assessment. In most cases, these are simple progress reports at specified intervals. PAHO, for example, requires periodic progress reports on each project. These reports are straight-forward accounts of activities and disbursements and are prepared by project personnel. An audit on a USAID project, however, involves an outside office, usually the Office of the Inspector General. These audits are carried out on selected projects on an as-needed basis. They formally review all aspects of project disbursements, activities, outputs, and scheduling and develop, when necessary, recommendations for project modification or improved implementation procedures. Within the World Bank, project audits also are undertaken on an as-needed basis by an outside office. These audits are carried out by a separate evaluation office approximately one year after project completion. The emphasis in World Bank audits is on project inputs and the operational uses of these inputs for project and loan implementation.

Process evaluations are less common among the major development institutions, although most organizations make some attempt to assess project utilization and performance. The World Bank includes some performance assessment in its audit reports which are carried out a year after project completion. UNDP and USAID both have formal guidelines for various types of process evaluations that can occur during project implementation and after project completion. The more formal of these evaluations are carried out by experts drawn from outside the implementing office. An evaluation plan is designed into every USAID project, and on large projects there will be formal mid-term and final process evaluations. WHO has prepared guidelines, termed a Minimum Evaluation Procedure, for the evaluation of the functioning and utilization levels of rural water and sanitation projects (WHO, 1983). These guidelines set out criteria and corresponding data requirements for community water supply facilities, household latrines, and hygiene education.

As mentioned earlier, no organization has formal evaluation procedures for true impact assessment of water and sanitation projects. Most organizations, however, describe their project objectives in terms of ultimate impacts and claim that their evaluation procedures are intended to assess the resulting impacts. To date, impact evaluation remains an area of research inquiry. Despite a quarter century of concerted effort by researchers around the world, methodological problems continue to persist and practical methods of impact assessment, especially of health benefits, remains to be developed (McJunkin, 1982; Blum and Feacham, 1983). Current research is focusing on the case-control approach, whereby selected samples of patients at health care facilities are studied to determine the statistical correlations between their illnesses and the levels of water and sanitation development in their communities (Briscoe et al, 1985).

#### An Example of Process Evaluation as Applied to the Malawi Rural Piped Water Program

The use of process evaluations can be illustrated with the example of the Malawi Rural Piped Water Program, which USAID since 1980 has been supporting with a \$6 million grant. Through self-help water supply projects, improved sanitation practices, hygiene education, and research activities, the program was designed to improve the basic living conditions and health of over 200,000 rural villagers. The USAID grant called for a mid-term evaluation and a final

project evaluation, but specified no particular methodology at the time of project design. The mid-term evaluation was needed to determine if project inputs were sufficient to achieve project outputs and to recommend, if necessary, remedial actions over the remaining life of the project. The final evaluation was charged with determining the extent to which the project had measurable health and economic effects on project beneficiaries and the extent to which project outputs led to the broader project purpose of assisting the Government of Malawi in providing safe water to a significant percentage of the country's rural population.

In selecting an evaluation methodology, the compliance requirements of the mid-term assessment called for a project audit while the performance requirements of the final assessment indicated a process evaluation. Both assessments, however, had to be conducted as process evaluations because of the need to establish baseline data procedures and information for use in the final evaluation of health and economic benefits. The evaluation model outlined in Figures 1 and 2 was adopted as the basis for both evaluations. This allowed a comparison of the same variables over the three-year interval between evaluations. In the mid-term assessment, primary emphasis was placed on the project functioning aspects of project inputs, institutional activities, and project outputs, and lesser emphasis on the areas of project utilization and ultimate impacts. In the final evaluation, the baseline data collected during the mid-project evaluation and from subsequent research investigations allowed the primary emphasis to be shifted to issues of project utilization with a relatively strong secondary effort on issues of health impacts. Both evaluations were carried out by the USAID-financed Water and Sanitation for Health (WASH) Project.

The following summarizes the main issues that were assessed in the two evaluations:

#### Level 1: Project Functioning

##### Inputs:

1. USAID inputs (total funds and schedule of disbursements for construction, maintenance, monitoring, coordination, and evaluation).
2. Government of Malawi inputs (funds for salaries, overhead, and maintenance).
3. Community contributions (value of easements and self-help labor for construction and maintenance).
4. Other impacts (value of commodities and technical assistance from other donor agencies).

##### Institutional Activities:

1. Project development activities of the Ministry of Works (procedures for project planning, design, procurement, construction, and promotion of project committees).

2. Project development activities of the Ministry of Health (staff responsibilities; promotion of project committees).
3. Water systems maintenance (routine and major maintenance activities).
4. Staffing and training (in both the MOW and MOH).
5. Community support (status and coordination of committees).
6. Information systems (data collection, storage, and retrieval in both the MOW and MOH).
7. Monitoring and evaluation (routine project monitoring procedures; special evaluation studies).
8. Research activities (investigations into engineering, health, and social issues).
9. Interministerial coordination (roles of key officials and organizations).

**Outputs:**

1. Construction status (system status, selection procedures, and construction schedules).
2. Operational status (current status of water quantity deliveries, water quality, system reliability, system accessibility, and sanitation facilities).

**Level 2: Project Utilization:**

1. Household water use (water sources, uses, and consumption rates).
2. Household sanitation practices (water-related uses; latrine usage).
3. Community support practices (local enforcement of rules; community inputs for construction and maintenance).

**Level 3: Project Impacts:**

1. Health impacts (incidence of diarrheal diseases; impacts on other water-related diseases).
2. Economic impacts (time savings; increased agricultural and industrial production).
3. Social and institutional impacts (community experience in project development; demonstration effect of cooperative

activities; role of women).

The application of the above evaluation model and the results of the mid-term and final evaluations can be found in WASH Field Reports Nos. 105 and 186 (Warner et al, 1983; Warner et al, 1986).

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