

# Measuring sustainability in the water sector

by Joanne Harnmeijer and Sally Sutton

**Most methods of monitoring new water supplies, where they exist at all, rely on sophisticated indicators and, usually, on outsiders. Why not accept that if a community is making the effort to keep the supply working, then it must be a success?**

SUSTAINABILITY IS THE ultimate goal of development efforts, an objective which implies that external agents should leave a community with something that it finds appropriate to its priorities, and that is useable, affordable, and maintainable. If any development has not, on balance, a positive impact on a community, then it will not be sustainable. A programme can be considered to be sustainable when 'it is able to deliver an appropriate level of benefits for an extended period of time after major donor assistance is terminated'.<sup>1</sup> But although sustainability is certainly something to strive for, if the evaluation of its achievement is too complicated, it will require resources that are simply no longer available once the donor has left.

The monitoring of sustainability could both improve the effectiveness of government and community planning for recurrent and capital needs, and provide channels for feedback to communities. It could be similar to the use of mortality rates, which are used as an overall indication of the health of a population at any one moment, but which are of greater value if

regularly repeated to define trends over time. The identification of trends enables donors to see when there is a need for new interventions, such as rehabilitation or further community education, and indicates where changes to, for example, the designs of wells or the education materials may be needed, before any further works are undertaken.

In countries where different donors have used a variety of technical and social designs, a simple indicator of their positive impact will help to identify, at minimal expense, those combinations which offer the highest probability of success.

## What ensures sustainability?

Sustainability can only be proven with the passage of time, so in the short term any evaluation must be based on indirect indicators which aim to show that the vital prerequisites for sustainability have been established. Although the factors which influence sustainability are complex and vary

from country to country and over time, they are summarized in Table 1.

The selection and quantification or qualification of indicators relating to the factors listed above depends on subjective judgement, as most factors are difficult to quantify, and some carry more weight than others, depending on the sector concerned. An approach based on these factors would be difficult and expensive to implement, and would be of limited use once the project was completed. As resources are usually limited for activities which may appear to have no immediate benefit, a simpler and cheaper form of measurement is necessary, and needs to be established and built into recurrent costs as early as possible.

## Functioning as an indicator

Water supplies are meant to function reliably throughout the period for which they are designed, and they must do so to provide the impact envisaged. Short-term impacts are often used as indicators of the probability that the supply will be sustainable. But impact is notoriously difficult to calculate, and usually involves measuring such aspects as the degree to which the supply is used, the benefits in time saved and its use, the changes in patterns of health, etc., all of which are labour intensive to assess, prone to bias during measurement, and require large sample populations to be statistically significant.

On the other hand, whether water is actually available from a supply in the required quantities and quality on a reliable basis is relatively easy to measure. This information can be provided by people with little training, and the channels of communication developed to secure this information can be used for other purposes, such as the emergency reporting of breakdown, or the maintenance of stores of suitable spare parts.

## Measuring sustainability

It requires a great deal of effort to keep wells and pumps in working order, and this effort will not be made and supplies kept functioning for years on end if the supplies are not used and are not regarded by users as having a positive impact on their lives. (The reverse argument, as is argued in the Minimum Evaluation Procedures,<sup>2</sup> is



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*It requires a great deal of effort to keep supplies in working order, and this effort will not be made unless the supply is filling a genuine need.*

**Table 1: Decisive factors that influence sustainability**

- Recipient country policies and commitment
- Institutional capacity
- Finance
- Technology
- Socio-cultural factors
- Environmental and ecological factors
- External factors (economic, natural disasters, etc.)
- Project/programme design factors

perhaps even stronger: impact can only be expected when supplies are used, which in turn depends on functioning.) Water supply programmes should not, therefore, worry so much about measuring impact when those who use and benefit from a supply are making the effort to ensure that it remains in working order.

Whether a pump works or a well has enough water for a growing community is a product of all the factors in Table 1. These are changing all the time. They may be assessed once or twice, but are far too complex for their individual effects to be continuously monitored. It is much easier to measure their combined effect on the supply itself and, when necessary, to analyse the causes for the trends identified. The arguments for using continued functioning as a measure of sustainability are summarized in Table 2.

### Factors affecting functioning

The key factors affecting the proper functioning of water supplies are design, construction, and maintenance. A well that is poorly designed or constructed may let in so much sand, for example, that the pump breaks down frequently, making the supply too expensive to maintain. A pump that is badly designed or built with poor materials will result in a similar situation. If design and construction are adequately addressed in the early phases, the single issue that needs continuous care is maintenance during operation.

The causes of poor operation and maintenance performance are all too familiar. Table 3 summarizes a particular example.

It is worth noting that when the categories that determine sustainability as listed by OECD (Table 1) are examined (with the possible exception of socio-cultural factors), they all relate to maintenance and functioning, but do not affect the levels of water use or impact. Thus the continued functioning of a water supply provides a quantitative measure of sustainability that should replace other less quantifiable and more subjective parameters.

### Functioning over time?

If it were all as simple as this, functioning would be measured more often in water supply programmes. There are at least three reasons why this is not so:

First, responsibility for maintenance does not, in many cases, rest with the department responsible for construction. Maintenance may be in the hands of the local council (as in parts of Zambia, for example) or the local *panchayat* (as in India), so that after commissioning, a water supply is no longer the concern of the organization responsible for its construction. Councils and *panchayats* are part of the administration. Their membership varies with the political tide, and water supply is only one of their concerns, and one that seldom has any potential to provide significant income.

Secondly, few programmes consistently manage to provide any or enough manpower for monitoring purposes. This is not only because of a structural lack of manpower, but also because there is no tradition, structure, or budgeting facility that enables the

departments responsible for construction to stay involved after the supply has been commissioned. Both maintenance and monitoring have a low status, and if they are carried out by centralized (district/*panchayat*) manpower the high transport costs will be too much for either communities or local government.

Thirdly, there is often a long transition time before monitoring and maintenance is handed over to local institutions and users. Monitoring is therefore most important in the final stage, when no outside support is available; yet few donors look back on the results of projects and programmes once their financial commitments have ended.

### Methods of measurement

Sophisticated methods of communication are necessary to update constantly the degree to which supplies are functioning. This is seldom feasible in areas which can only afford water supplies in the form of a bucket and windlass, or a handpump on a well or borehole. It is therefore more common to attempt a periodic collection of information, usually during the driest season, when water levels are at their lowest, the demand for water from reliable sources is at its highest, and accessibility to sites is easiest. As this is also the period of maximum activity in the construction and repair of supplies, there is seldom any spare capacity for monitoring to be carried out using regular employees.



*The key factors affecting the proper functioning of water supplies are design, construction, and maintenance.*

WHO/UNICEF



A vital supply of water will be kept in order by the community.

The alternatives are to employ school-leavers to collect the information on bicycles or on foot, or to ask schools, health centres, village headmen or local councillors to collect the information and feed it back to the district offices. The latter system may take longer to establish, and may not be universally successful initially, but if supported by community education

until some of the benefits become apparent, then it can become a valuable regular activity.

While there are many constraints, continuity in functioning is a suitable indicator for sustainability. For water supply programmes that are still under implementation, among the indicators of functioning, *reliability* must merit special attention. An indicator such as

'proportion of supplies out of order at any one time' tells something about the technical performance of water supplies, as well as about the efficiency of response of both users and maintenance teams.

Given the increased interest in sustainability, funding agencies must consider supporting ex-post evaluations, particularly in the water sector, where one can actually see the proof of real impact — continued functioning. ●

#### Table 2: Continued functioning as an indicator of sustainability

Functioning represents:

- A direct link with the objectives of improved water supply (not operating, no impact)
- A straightforward translation of time-proven sustainability (life expectancy prediction from trends)
- A visible and easily measurable indicator that can be assessed without needing highly literate personnel
- An outcome of successful operation and maintenance, which in turn depends on a range of complex factors that would otherwise be measured to predict sustainability (Table 1)
- An indication of a sustainable level of use and of positive impact (i.e. enough users, with sufficient willingness to cover recurrent costs)

#### Table 3: Causes of poor operation and maintenance (Kerala)<sup>3</sup>

- Lack of revenue
  - low number of private connections
  - poor collection of user fees
  - resistance against user fees
- Shortcomings in technical arrangements
  - inefficient repair arrangements
  - inadequate fault reporting
  - insufficient accountability towards users
- Shortcomings in village arrangements
  - lack of users' involvement
  - lack of regulation regarding proper distribution of water at village level

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#### References

1. Organisation for Economic Co-operation and Development, *Sustainability in Development Programmes: A compendium of evaluation experience*. Selected Issues in Aid Evaluation-1. OECD, Paris, 1989.
2. World Health Organization, *Minimum Evaluation Procedure for water supply and sanitation projects*. ETS/83.1 CDD/OPR/83.1. WHO, Geneva, 1983.
3. The example in Table 3 refers to a Dutch-funded water supply project in Kerala, India (personal communication, M. de Graaf). The list would look slightly different for other water supply projects.

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