Measuring sustainability — recent lessons from Indonesia

Nilanjana Mukherjee

What key factors influence the sustainability of a project? Nilanjana Muherjee examines technical, environmental, social, organizational and financial indicators, and looks at how they can be used to assess projects.

A few of the multi-dimensional determinants for the sustainability of rural water supply and sanitation (RWSS) systems are listed below. These can be broken down into five basic types: social, organizational, technical, environmental and financial factors. They vary between communities, influence and interact with each other, and change over time. All this makes the measurement of sustainability a complex challenge.

Since 1997, the UNDP-World Bank Water and Sanitation Program's regional office for East Asia and the Pacific (WSP-EAP) has been developing, testing and refining methodologies for sustainability and impact assessment. A series of assessments using these methods has been undertaken in Indonesia in projects financed by the World Bank, Unicef, the Asian Development Bank, AusAID and the Government of Indonesia, and through the Participatory Learning and Action (PLA) initiative formed by WSP and the Netherlands-based International Water and Sanitation Centre (IRC). This study presents some of the preliminary lessons learned in these assessments in Indonesia with regard to contents (what to measure to assess sustainability), and methods (how to measure it).

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Inappropriate technology 'choice'

A recent project evaluation in West Nusa Tenggara, Indonesia found that between 95 and 100 per cent of household toilets in one group of villages are being used, kept clean and in good condition, while only 10 to 36 per cent of the toilets in a nearby group of villages are in use. The villages are alike in all ways except the first group have a piped water supply, while the second have dug-wells. Project authorities had chosen technologies for both groups without consulting the end users.

Several villages in South Sulawesi, which were experiencing problems with salinity in their shallow dug-wells, asked for assistance for piped systems or deep tube-wells by submitting proposals through the village development planning process. Fourteen months later, assistance came in the form of a few more dug-wells since that was one of the 'appropriate, low-cost technologies' selected at the central level for country-wide implementation. Deep tube-wells and piped systems were not on the list that year.

The wells constructed by the project dried up in the hot season, and villagers had to climb down their traditional wells to deepen them and keep them functioning. They could not do this for the project wells because they were constructed from cement rings only 80cm wide; villagers cannot climb down wells less than 120cm in diameter without risking their lives.

What to measure

Technical and environmental indicators

The most commonly measured indicators in this category are what functioning systems exist?, what condition are they in?, the technical quality of system design, and quality of workmanship. WSP-EAP's experience in Indonesia suggests, however, that it is also important to measure differences between original and current designs as a result of users' modifications. These differences are likely to be greater when users, not consulted in the early stages, have had to modify a design to meet their own needs. In many cases, these design modifications have led to failure because the user community did not receive technical advice from the implementing agency.

The community's awareness of how various environmental factors affected the quality of dug-well water was also low. Often, despite dissatisfaction with quality (due to unpleasant smell, taste, or turbidity) which had led to less than full use of dug-wells, consumers did not take action to address causes which they could have prevented themselves — such as poor wastewater management around wells, and the siting of wells too close to toilets, polluted rivers or canals — because they did not see the link between these factors and the quality of the water.

Social indicators

Water supply and sanitation coverage in Indonesia was found to vary widely, from 3 to 4 per cent of village households in one project, to between 90 and 100 per cent in

Two-tier management structure

Villages with community water-supply systems based on a network of public taps, often have a two-tier, community-based management structure. The village-level water committee has overall responsibility for the whole network including the source (a spring or deep tube-well), a rudimentary treatment facility (e.g. slow sand filtering system), reservoir with control valves, and pipelines to public distribution points. In addition, there are informal associations of the groups/clusters of households that collect their water from the same public tap — tap-level user groups. They are responsible for keeping the surrounding area clean, making minor repairs to the tap when necessary and they participate in collective decision-making at the village water committee on issues such as timings for supply to each tap, agreeing tariffs, and cost-sharing for repairs to the whole system.

others. House connections of piped water, for example, were found overwhelmingly in the homes of those rich enough to pay; even access to public facilities was clearly biased in favour of the affluent. When relatively few people benefit from RWSS services, the community cannot muster the collective willingness and responsibility to maintain them. PLA assessments have confirmed that systems which are accessible and regularly used by a majority of the community are better sustained than those used by a small minority.

Those systems which bring about a definite shift in water-use patterns were also found to be better sustained by users. For example, in villages with piped water or handpumps, most people had begun using water from these new systems for cooking, drinking and other household purposes. Villages with dug-wells and rainwater collectors, on the other hand, saw smaller changes in water-use because their systems were unable to provide enough decent-quality water on a regular basis. Consequently, these systems were less valued and cared for than systems which operated with taps, handpumps and public hydrants. This finding has been reflected in a new PLA sub-indicator, called 'effective use'; subsequent studies have found 'effective use' to be consistently associated with sustained services.

Assessments in Indonesia also confirm the importance of measuring consumer preferences and satisfaction with existing systems, and have found that communities vary in the demands they make upon different water sources based on such factors as perceived quality of water, nearness and location of the source, available alternative sources and their costs, and the presence of ancillary facilities. To ensure the effective use and sustainability of a new RWSS system, project planners must consult the wider community before designing it. Only then can they ensure informed choice among feasible alternatives to help the community determine which type of system meets its needs, preferences and willingness to pay.

Among the villages observed in Indonesia, those which scored best in terms of effectively sustained systems also had the highest scores for effective use and demand-responsiveness of services, meaning that the services met the demands of rich and poor, and men and women alike, and also had highly positive user perceptions of cost-benefit ratios. It was also found that in cases where services met the demand of all categories (men/women, rich/poor), there was greater user participation in sharing the responsibility for upkeep. These systems also had the highest levels of community participation in planning and finance.

Organizational indicators

Strong links were found between sustainability and the management structure of the new system. Sustainability was higher when the management structure was determined by groups of users and when it provided for universal representation — again, rich/poor and men/women. Villages with the highest scores for effectively sustained services had women-headed tap-level water-user groups, and both men and women serving on the village water committee.

The technical capacity of the management committee is another important indicator of sustainability, particularly for more advanced levels of technology such as piped systems and handpumps. In all the projects evaluated in Indonesia, technical training for O&M was found to be lacking despite high levels of willingness by users to sustain the systems. As both factors are critical for sustainability, technical training must be improved.

Clear rules (for water facility usage and payment of fees, for example) and transparency of financial management were also found to contribute to sustainability by promoting more regular

Handpumps are effective — and fun.

Sean Sprague/Panos Pictures

payment of user fees and collection of funds for system repairs, expansion or replacement. Such transparency of accounting systems, along with public pressure, tends to keep defaulting households in line.

Financial indicators

The likelihood of sustainability can be predicted in part by looking at traditional indicators such as the presence of a designated treasurer, tariffs for operation and management and repairs or replacement, sanctions for non-payment, regular fee payments, and construction cost-sharing. It is also important, however, to recognize the importance of alternative, local methods of finance and contribution, such as labour, time spent on operation and management, and payments in kind. Tariffs are also set very low and are affordable by even the poorest households.

Water fees (which must be paid in cash) are more likely to be paid by all when they reflect differentials in consumption and access, even in the case of public facilities. So, for example, in 1998-9 tariffs ranged between Rp500 to 2500 per household per month for users of public taps and public hydrants; between Rp2500 to 10 000 per household per month for those with household connections; while users of public dug-wells and handpumps only paid for occasional repair and maintenance (£1 = 5000 Rupees for most of 1998).

In programmes which incorporated financial information exchange, 95 to 100 per cent of users paid regularly and sizeable capital had been built up for repairs, expansion or future replacement. In the absence of such transparency, this figure dropped to 80 per cent and it was difficult to establish whether the water committee had accumulated any savings.

Ownership and rights

In several cases, however, systems had fallen into disrepair despite the fact that they were valued by their users, and their communities had both the financial and technical capacity to repair them. The problem was that there had been no formal handing over of facilities to the communities, so the users did not feel that they owned or had the authority to repair them. In none of the Indonesia cases did the users have legal proof of ownership or water-use rights, even when they had paid their share of contributions in cash, labour and/or construction. In two major projects, lack of a sense of ownership also led to a progressive decline in access to public facilities by the poor, as they were often denied access by richer users who had contributed their own private land for siting.

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Neighbours map their village, marking the homes of rich, poor, and middle-income families, showing the varying levels of access to project-built RWSS facilities.

How to measure

The evaluation approach employed by WSP-EAP in Indonesia is based on the belief that community-based programmes are best evaluated by the communities that benefit from them. As this is not possible to achieve using institutional surveys and questionnaires filled out by external evaluators, WSP-EAP has spent the past two years:

- designing an appropriate sequence of participatory assessment tools;
- tailoring them to the socio-cultural contexts of specific projects;
- developing the capacity of Indonesian resource organizations to use these tools with communities; and
- developing and continuously refining ways to synthesize the results that emerge, so that community views are heard and understood by policymakers, donors and government agencies.

The methodology which has been developed so far, and is now being used to measure sustainability, is different from more traditional methodologies in the following ways:

- *Introduction of visual participatory assessment methods*, whereby user communities can analyse the impact of their own projects. These have led to the identification of unexpected

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influences on the sustainability of services, and have increased learning by all stakeholders.

- *Segmentation of the user community during evaluation*, to ensure that the resulting picture includes the voices of women and men, rich and poor, and those who are less vocal. The results show considerable variations in the assessment of project process and impact between the wealthier élite and the poor majority (the real users of public facilities, who are usually poorly represented in management). Variations have also been found between men and women in terms of consumer satisfaction and levels of participation, as men tend to be more involved in community decision-making while women are generally responsible for managing household water-use. Men and women were also found to have different levels of hygiene awareness and different reasons for wanting new RWSS services.
- *Development of methods to quantify the information generated through participatory assessments*, to allow communities to participate in analysis and the drawing of conclusions. Although this area needs more research and review, WSP-EAP's efforts have included predefining categories of service level or success, and asking communities where they think they fit on the scale; using percentage-based, visual evaluation instruments on which community groups mark their positions; and triangulation, or the use of several activities to assess the same concept and then comparing results for consistency.

Above all, project evaluators have emphasized using a combination of technical assessment, qualitative gathering, and participatory assessment tools to measure sustainability, recognizing that sustainability is a composite of its key technical, environmental, social, organizational and financial aspects. ■

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about the author
Nilanjana Mukherjee is the Regional Community Development Specialist in the UNDP-World Bank Water and Sanitation Program's Regional Water and Sanitation Group for East Asia and the Pacific, Jakarta Stock Exchange Building, Tower 2, Sudirman Central Business District, Jl. Jend. Sudirman, Kav. 52-53, Jakarta 12190, Indonesia. Fax: + 62 21 5299 3004. E-mail: < Nmukherjee@worldbank.org>