

Performance indicators in water and sanitation for developing areas

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Abstract There is a move throughout the developed world to introduce benchmarking techniques to the management of water and sanitation systems. The indicators that are being considered for benchmarking purposes tend to cover a broad band of activities that are part of the scope of management of large organisations. Most of the lists that have been prepared do not really cater for the implementation and operation of small rural schemes. The greatest need is the implementation of sustainable schemes for this category of consumer.

The implementation of a rural water and sanitation scheme involves the negotiation in the initial stages with the local community representatives of what the community wants and how it will be provided and operated. This may have to be preceded by a period of empowerment so that the negotiations can be conducted by informed people. At the conclusion of the negotiations a business plan can be prepared that should be implemented in association with the community. The project is at this stage mainly in the control of a professional engineer, responsible for the technical interpretation of the business plan and the management of the construction phase. Finally, after commissioning, a water service provider will be responsible for the operation, management and maintenance of the scheme on a sustainable basis.

The key actions and activities are identified and performance criteria defined. As communication at the beginning of the project is a critical component, the success of this is confirmed by examination and discussion as to how much has in fact been communicated and understood correctly. Other performance indicators for the operational phase are derived from the conventional ones used in the developed world. Finally, it is important that the participants, do not see the measurement of performance as a *threatening* situation, but rather a stepping stone to improvement of not only performance, but also of subsequent reward.

Keywords Benchmarking; developing areas; performance indicators; sanitation; water supplies

Introduction and the need to cater for the small scheme

There is a strong trend in the world of water supply and sanitation to measure the performance of the authority against standardised performance indicators. The purpose of the standardisation is to enable comparisons to be made with similar organisations elsewhere and thus to evaluate in relative terms the strengths and weaknesses of the utility. The intention is to improve the performance through the process of benchmarking.

A number of organisations have set about preparing lists of performance indicators that can be applied by the larger and more sophisticated authorities. The most notable of these is the list prepared by the task group of the International Water Association (Alegre *et al.*, 1999). The World Bank has been responsible for the production of a number of documents (Kingdom, undated; Stephen and Still, 2000) on the preparation of performance indicators. However, many of these are not relevant or even applicable to the smaller schemes that are encountered in the developing world and in particular the rural areas.

Recent figures indicate that nearly half the population of the world lacks adequate water supplies or sanitation. With this backlog it is imperative that suitable means of measuring performance in this vital field be prepared and used to measure the effectiveness of the schemes that are being provided and the success or otherwise of the operation and maintenance of them. Stephen and Still (2000) reported on the use of performance indicators in the

provision of a water supply in rural Kwazulu/Natal. This paper does not address performance of the implementation and confines itself to the operation and maintenance aspects. The Mvula Trust also makes use of performance indicators in the operation of the projects.

The purpose of this paper is to address this problem and to look at the whole process in an endeavour to identify the key issues and to provide a system of measurement that can be applied at the relatively unsophisticated level of the rural community.

History of benchmarking and the need for indicators

It is perhaps pertinent to review the history of benchmarking, which includes the selection and standardisation of the performance indicators. The original meaning of the term related to surveying where a benchmark referred to a point with a fixed height. The sense of the word changed from there to the management concept of a fixed level of performance against which others could measure their performance. The meaning has since advanced to describe a process of performance improvement by comparing the manner in which the performance was achieved with that of another organisation with a better benchmark value. It is not the purpose of this paper to discuss the benchmarking process. It is rather to discuss the possible performance indicators against which performance and improvement can be measured.

The world is becoming increasingly competitive and the public more discerning in its acceptance of a service. Never is this more true than in the community context, where deprivation has led to a clear perspective of what they want. It is therefore important that the service provided meets the needs of the community in an effective and efficient manner. Improvement in performance may be called for in this aspect. The ultimate need is to ensure that the schemes are sustainable.

In the context of this paper, community is to be taken as all the members of the households and not the representatives of the whole community. It is also assumed that the representatives who become members of the various committees are truly representative of the community and the part is not taken for the whole.

Framework for the selection of performance indicators

What is to be achieved and how well should determine the selection of the performance indicators for the project. The definition of this will provide the focus of the measurement or the success or failure of the exercise.

Definition follows the classical project process of:

- defining the objectives of the project and what will be the required outcome
- setting out the actions and activities that must be followed to reach the desired outcome
- identifying the actions and activities that must be accomplished at a high level of competence to achieve the required end result
- defining the level of performance that should be reached in order to achieve the stated goals
- defining the measure by which success can be identified which is another way of defining the performance indicator itself.

There are certain factors to be taken into account in the selection of the performance indicators. The uses to which the indicators will be put determine some of the characteristics that are required. Certain of them will be used internally only in order to compare the performance in any particular activity over time and to measure improvement. Other indicators will be used by an external monitoring and evaluation agency to ensure that the public, i.e. the community is being supplied with a proper service. The final purpose of the performance indicators is for the water committees to exchange information in order to establish benchmark values against which to measure their performance and thus improve.

The following are the criteria to be considered in determining the performance indicator in no particular order of importance:

- a) the set of indicators should cover the full range of activities of the water services provider and be capable of being condensed into one comprehensive indicator
- b) be capable of representing the true situation without bias
- c) be clearly defined with a unique interpretation
- d) should not overlap
- e) be readily calculated from available data, or if not available, readily obtainable
- f) capable of being audited
- g) be easy to understand, by specialists as well as lay people
- h) refer to a defined time period, usually one year.

If the indicators are to be used for external comparisons, they should in addition:

- be referenced to a defined geographical area
- be applicable to the full range of water service providers with different characteristics and stages of development
- be limited in number

The project phases

There are three distinct phases of the project cycle to be considered. The first phase concerns the interaction of the community and the bodies responsible for implementing the project. They must determine if it is indeed the top priority of the community and the extent to which the community understands the impact of the decisions and choices that they will be called upon to make. Any lack of knowledge should be addressed with education and training.

The outcome of this phase will be a negotiated agreement between the authority responsible for the provision of water and sanitation services and the community that is to be served. The key issues for the success of the project are the extent to which the community really understands the outcome of the negotiation and the expectations that this will rouse. These negotiations will result in agreement on the level of service, the terms of payment for the service and the basis therefore. Each family should sign an agreement with the conditions of the business plan. In this the community must understand what they may have to pay for the service. The agreement should pay attention to the tariff, even allowing for a free lifeline component with a progressive scale of charge.

The planning for the scheme should be integrated in with the development plans of the whole district so that it can take advantage of any synergy with adjacent communities.

The extent of the involvement of the community in the construction phase should be agreed, including the training requirements of the community for the subsequent operation and maintenance of the scheme. This includes training in technical as well as financial and administrative competencies.

The second phase is the implementation of the project. This includes the appointment of the engineer, with the support and understanding of the community, the briefing of the engineer in the presence of the community, so that there is a clear understanding of the agreement between the service authority and the community and the engineer can interpret this correctly.

Within this context is the manner in which the project is to be constructed and how much use will be made of local labour and skills. Will the project be used to enlarge the local skills base and in what trades. What training will be given to members of the community and what competencies will be achieved? The latter should be carefully defined so that the performance or level of achievement can be measured in fulfilment of the agreements reached in Phase 1. It then remains for the project to be managed successfully in terms of cost, quality and time of completion.

The final phase is the on-going operation, maintenance and management of the scheme. This it is assumed will be delegated to a water service provider. This may be partially or completely community based. If the latter, the community representatives will have received the appropriate training and education during the prior phases. Key to success at this stage is the level of competence reached. Proper testing to test competence and practical application is essential at the end of each training module.

During this phase, the water committee will assume responsibility for the on-going operation and maintenance of the service. This will involve the technical aspects of ensuring the security of supply through proper operation and more particularly, maintenance, of the system. It will also require good management of the administration, correctly kept accounts, prompt and accurate billings on the agreed system from the business plan. It will also involve debt control and the insistence on prompt payment from all the consumers.

Monitoring, particularly of water or effluent quality will have to be undertaken. It is the responsibility of the water services authority to regulate and enforce the standards and convey the information to the water services provider.

Key issues in the implementation of rural water and sanitation schemes

The purpose of the project and the outcome that will determine whether the project is a success or failure is the long-term sustainable provision of wholesome water to the community or the practice of correct hygiene habits for the safe disposal of excreta.

At the end of the day, which will be many years after the project has been commissioned and handed over to the operators of the scheme the project should have the following properties.

The scheme should be sustainable

- The project needs to be financially self-sufficient, providing adequate funds for its proper operation and maintenance.
- The project should be environmentally sustainable in that it should not be creating any harmful effects that will prejudice the future generations.
- It should depend on renewable water resources.
- The scheme itself must be acceptable to the users.
- The users must have received training on hygienic practices and the use of the technology.

The project must be effective

- The water supplied should be wholesome and comply with acceptable water quality criteria.
- The water supply should be reliable.
- Waste water discharges should comply with the discharge standards applicable.
- The standards of service should be met.
- Create customer satisfaction.
- The population should be aware of the importance of good hygienic practices.

The financial arrangements should ensure that the scheme is affordable

- The tariff charged for the water should be realistic and cover the cost of the service. A lifeline tariff may be coupled to a rising tariff based on consumption.
- The resulting cost implications should be affordable and sustainable to the authorities, taking into account the need to provide similar subsidies to neighbouring communities. The cost implication may cover both overt and hidden subsidies.

The scheme must be manageable

- The administrative system should be performing effectively and carrying out the required duties conscientiously and correctly.

- The technical operation of the scheme should be in accordance with the maintenance and operating instructions left by the engineer.
- Accounts should be correctly made out and delivered to the consumer.
- Payment of accounts should be timely and in full.
- Creditors should be paid on time and in full.
- Proper books of account should be kept which are audited professionally and at intervals not exceeding one year.

If it is a sanitation scheme:

- It should be in good working order, including the individual latrines, which have been explained to the users.
- The effluent or effluvium should not be creating any adverse environmental conditions or health hazards.

Phase outcomes

The critical outcomes for Phase 1 are seen as follows

- The proper empowerment of the individual householders to understand the issues. i.e. the meaning of the level of service. An understanding of the amounts that will be paid by the family units of the community, the basis of the payment for the service, i.e. whether on a meter or a block tariff, the basis of the ongoing operation and maintenance of the scheme etc. Formal agreement signifying understanding and agreement should be obtained from each household.
- The understanding by the water services authority of what the community has agreed to and whether they will have the full support of the community members for the scheme.
- A clearly defined business plan that will set out the level of service, the method of construction, the extent and nature of any training that is to form part of the project, the competencies that are to be gained through the training. The business plan will also set out the scope of the project, the standards to which it will be built and the estimated costs coupled to a cash flow forecast.
- A clear indication of from where the project finance will be coming and the terms and conditions attached to the finance.
- A clear definition of the roles and responsibilities of the parties involved in the project, particularly that of the water service provider.

For Phase 2 of the project there are a number of relatively straightforward results that should be obtained and a few where measurement and the criteria for success may be difficult to define and measure.

- The project should be built in accordance with the scope of the business plan and within the budget
- The quality of the work should be in accordance with the specified standards
- It should be built and commissioned within the time constraints that have been laid down
- The people that are to be trained within the scope of the project should have acquired the stated competencies
- There should have been clear and open accounting procedures so that the members of the community are aware of the deployment of funds
- The works shall have been successfully commissioned and handed over to the team that will operate and maintain the scheme
- The team that will operate and maintain the scheme will be trained and competent to carry out the duties expected of them
- The future operators should be familiar with the performance criteria that will be applied to their activities and understand the purpose and reason for the indicators and how it will assist them in the execution of their duties

During the operating phase, which is the longer in time, the value of the performance indicators will become more apparent as efficiencies in the operation of the project will benefit the finances. This is the period when the water service provider should take over and be responsible for the scheme. It should:

- provide a continuous service without disruption
- provide safe water that is wholesome
- have transparent accounting that is properly audited
- provide rapid response to complaints
- ensure that accounts are delivered promptly each month to the customers
- that the accounts are paid with equal promptness
- ensure the viability of the scheme through effective financial control
- promote the protection of the catchment to prevent pollution
- monitor possible pollution from any waste management scheme
- create linkages to external support and assistance

Performance criteria

The following table of performance indicators that are relevant to the provision of water and sanitation services at the community level is suggested.

The foregoing is suggested as the basic minimum of indicators to assess the performance of a project to supply water services at the community level. The list may be added to or some of the indicators could be omitted to suit the local circumstances and conditions.

Monitoring of the performance

The performance indicators should in all cases be agreed with the community, the service authority and the other stakeholders. The list above should not be regarded as limiting as to

Phase 1 indicators

Activity	Description	Indicator	Unit	Comment
Negotiation of project with community at the household level.	Empowerment on technology	Demonstrated understanding through testing	%	It will be necessary to set test questions to all the members of the steering committee to determine the understanding that has been reached.
	Ditto on management issues	Demonstrated understanding through testing	%	
	Ditto on financial issues	Demonstrated understanding through testing	%	
	Mutual understanding of the other party's viewpoint.	Demonstrated understanding through testing	%	
Preparation of business plan	Check content against check list of required content	Number of points that should be covered and have been	No.	The checklist should follow from the commentary above and cover in particular the training provision and the competencies to be achieved.
	Signed agreement of the householders	Number of householders that have signed / total number of households × 100	%	The householder should demonstrate an understanding of the agreement before signing.

Phase 2 Indicators

Activity	Description	Indicator	Unit	Comment
Design	Engineer's understanding of the community requirements	Scorecard in test questions	%	The engineer should respond to formal questions asked by the community representatives
	Community's understanding of the designs and level of service that is being offered	Demonstrated understanding through testing	%	The community should explain what they understand the engineer is proposing.
	Level of satisfaction with engineer's proposals	Demonstrated understanding through testing	%	The authority should question the community representatives as to the level of satisfaction with the finally understood proposals.
Construction	Compliance with business plan statements concerning timing, quality and budget compliance	Simple scorecard of yes and no answers	No.	Full compliance should be sought in all aspects set out in the business plan including training components
	Quality of training	Percentage achievement of all the competencies set out in the business plan including construction, operation, administrative and financial aspects	%	It is essential in this aspect to ensure that the competencies that are proposed are fully described including the minimum standard for achieving each
	Commissioning	All units tested and complying with design criteria and performance specifications	No	There should be prepared schedules of testing at handover, with the community representatives present and taking an active role in the hand over process

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any other performance criteria that may be important in any project and the priorities should be set by discussion.

In the initial phases, the service authority is likely to have the capacity and the competence to monitor the indicators to ensure due fulfilment of the requirements. As the project progresses the responsibility of monitoring the performance should move to the community with assistance from the service authority.

The indicators should not be used as instruments to criticise or punish. They are there to measure performance in vital areas and ensure that the project continues to operate on a sustainable basis for the years to come.

Conclusion

The adoption and use of performance indicators at the community level should be made a stimulating experience for the players involved. It should introduce an element of competition with self in the initial stages and can lead from there to comparison with neighbouring communities. They should also encourage the responsible authorities in initiating such projects to improve their own performance in the initial stages of the project that are so vital for its ultimate success.

Phase 3 indicators

Activity	Description	Indicator	Unit	Comment
Financial	Keeping accurate books of account	Number of errors at audit	No.	Checking/auditing should be done at relatively frequent intervals
	Income maintenance	Number of accounts sent out/No. of consumers due to pay x 100	%	The performance should be 100% each month
		Number of accounts that are paid / The number of accounts that were sent out x 100	%	The indicator should be measured every month
	Viability	Current ratio	No.	The definitions to accord with standard accounting practice
		Quick ratio	No.	
Profitability	Debt service ratio	No.	Should always be greater than 1	
	Net income/operating revenue x 100	%		
Technical	Water quality	Percentage of samples that fail to meet the specified quality standards	%	The assurance of the quality may not fall within the control of the community water distribution system
		No. of complaints concerning quality, odour and taste per month	No.	Complaints concerning inherently distasteful water should be ignored
	Water quantity	No. of complaints concerning lack of water due to low pressure	No.	
	Reliability	No. of unplanned disruptions to supply in any section of the system	No.	
	Coverage	No. of households actually served/No. of households in area of supply x 100	%	There should be a target to extend the percentage to 100
	Overall monitoring	No. of monitoring activities by the community/potential No. monitoring activities x 100	%	The service authority should monitor this

References

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