



## Performance indicators for rural water schemes

David A. Stephen, South Africa

PERFORMANCE INDICATORS are being used to monitor and evaluate the initial Operation & Maintenance stages of a number of rural water schemes in KwaZulu-Natal, South Africa. Such indicators serve a valuable purpose in determining the success (or otherwise) of an individual scheme being monitored and evaluated using a number of criteria on a regular, on-going basis, and provide the basis for timely and appropriate interventions to assist in the long-term functional and financial sustainability of that scheme.

If suitably structured and consistently measured, it is possible to obtain greater benefit from these performance indicators by comparing the performances of a number of different water schemes, seeking to understand why differences occur, and applying the knowledge gained in order to improve the overall provision of water services.

This paper describes the **Key Performance Indicators (KPI's)** which have been developed and are being used to evaluate the performances of a selection of rural water projects which have been implemented under the South African Government's Reconstruction and Development Programme (RDP) over the past few years and which are now in the operation and maintenance stage of development. The projects are diverse in technical complexity, are situated within different local government areas, and use a variety of cost recovery methods.

The performance indicators fall into three broad categories: (i) Quality of Service, (ii) Financial Health, and (iii) Accountability of the Water Committee. Since they are measurable, they allow comparisons over time.

The positive (or negative) impact which the social, cultural and political environment can have on a scheme's viability and sustainability cannot be underestimated. These aspects are, however, not covered in this paper.

### Selection of performance indicators

In selecting appropriate performance indicators, it was necessary to ensure that they were specific, easily understood and measurable. All performance indicators related to those aspects of the scheme which were under the control and responsibility of the Water Committee.

The following performance indicators were selected (with reference numbers in brackets):

### Service performance indicators (category A):

- Working supply points (A1)
- Water supply reliability (A2)
- Water consumption (A3)
- Water quality (A4)
- Water losses (A5)
- New connection response time (A6)
- Stock control (A7)

### Financial performance indicators (category B):

- Unit cost of water (B1)
- Profit/loss (B2)
- Cash balance (B3)
- Late payments (B4)

### Accountability of water committee performance indicators (category C):

- Financial accountability (C1)
- Accountability "Up" to the water services authority (C2)
- Accountability "Down" to the community (C3)

A detailed description of each performance indicator is given below.

#### A. Service performance indicators

##### A1. Working supply points

**Description:** A simple count of the number of functioning standpipes or household connections is a direct indication of Operation and Maintenance status.

$$\text{Indicator} = \frac{\text{number of functioning supply points}}{(\text{communal and private})}$$

#### Notes:

- Maximum on Y-Axis gives number of homes in the community.

- This indicator also points to the actual benefits that the water supply system provides because it is indirectly related to: (i) the % of the population using the system, and (ii) the per capita water consumption.
- “Functioning” means operational at least long enough every day for users to obtain their water requirements.

### A2. Water supply reliability

**Description:** A characteristic of many rural water supply systems is that the bulk supply is discontinuous, particularly in the case of stand-alone systems reliant on pumps. The cause of the failure may or may not be beyond the control of the Water Committee.

$$\text{Indicator} = \frac{\text{number of days water received}}{\text{number of days in month}} \times 100$$

**Notes:**

- A day can be counted if users received water for long enough to meet normal requirements.

### A3. Water consumption

**Description:** The provision of an adequate quantity of potable water is crucial if anticipated health benefits are to be realised. Consumption is a function of tariff, reliability, distance to supply and availability of alternative sources of water.

$$\text{Indicator} = \frac{\text{litres sold per day}}{\text{population served}}$$

### A4. Water quality

**Description:** A water quality monitoring programme can detect any changes in water quality, which may indicate an Operation and Maintenance problem.

$$\text{Indicator} = \frac{\text{average of quality indices for selected key determinands}}{\text{determinands}}$$

**Notes:**

- The two key determinands recommended for the water quality monitoring programme are faecal coliforms and turbidity. It is recommended that residual chlorine is measured for reference purposes, but that this does not form part of the indicator.
- It is recommended that the quality index for a particular determinand for a sample meeting Umgeni Water’s Class 0 standard be set at 100%, that a Class I be set at 90% and a Class II be set at 70%. The quality index for a determinand which is below Class II standard should be set at 0%.
- It is recommended that at least three samples be taken on at least one sampling trip each month. The samples should be taken according to the prescribed method, and from different points in the scheme.

- Daily recorded observations by the Water Committee (using simple qualitative criteria such as colour, taste and smell) should be encouraged to supplement the formal water quality monitoring programme.

### A5. Water losses

**Description:** Water losses are a useful indicator of the overall integrity of a scheme, both in terms of infrastructure and management.

$$\text{Indicator} = (1 - \frac{\text{water sold}}{\text{bulk water supplied}}) \times 100$$

**Notes:**

- Often the reading of bulk meters and consumer meters do not exactly co-incide, and thus the “loss” figures on a month by month basis can be misleading. A three-month moving average is more helpful.

### A6. New connection response time

**Description:** The Water Committee needs to be responsive to the needs of consumers. The time it takes, from the time of application (and payment) to install a new connection will affect user satisfaction.

$$\text{Indicator} = \frac{1}{\text{average number of months taken to install a new (paid up) connection}} \times 100$$

### A7. Stock control

**Description:** Effective stock control relies on: (i) whether regular stock-takes are carried out, and (ii) whether minimum stock levels of spare parts are maintained. Not having the required parts (especially critical items) in stock may seriously affect the Water Committee’s ability to provide a reliable water supply.

$$\text{Indicator} = \frac{\text{number of necessary items in stock}}{\text{total number necessary stock items}} \times 100$$

**Notes:**

- In order for this indicator to be evaluated it is necessary for the Water Committee to have a list of the stock items considered necessary for the maintenance of the scheme.

## B. Financial performance indicators

### B1. Unit cost of water

**Description:** Knowledge of the real unit cost of water is essential to understanding the financial health of the scheme, and to the setting of appropriate tariffs.

$$\text{Indicator} = \frac{\text{total operation and maintenance costs}}{\text{kilolitres of water sold}}$$

**Notes:**

- The unit cost of water should be compared with the tariff being charged for water.
- This indicator needs to be averaged over a period of time for meaningful analysis. It is suggested that a twelve-month moving average is used.
- The O&M costs included in this indicator are for those costs incurred by the Water Committee. It is recommended that the costs of any externally-funded mentorship or management support services are excluded until the project is functioning smoothly (a twelve-month period may be used as a default), and are thereafter included.
- Another indicator could be introduced to reflect total O&M costs (including mentoring costs).

**B2. Profit/Loss**

**Description:** The Profit/Loss indicator shows whether sales are exceeding expenditure. The Water Committee must receive more money than it pays out each month if it is to remain in business. The scheme is in a break-even position if this indicator is consistently greater than 0%.

$$\text{Indicator} = 100 \times \frac{(\text{total sales} - \text{total expenditure})}{\text{total sales}}$$

**Notes:**

- Accounts receivable (i.e. debtors) are included as part of sales.
- A portion of arrears may have to be written off each year according to the probability of being paid.
- Use a twelve-month moving average to smooth out monthly variations.

**B3. Cash balance**

**Description:** Cash on hand is very important in order for the Water Committee to meet its current expenses. Cashflow problems may be experienced depending on the amount of money tied up, for example, in arrear payments for water. The Cash Balance indicator will indicate positive or negative trends.

$$\text{Indicator} = \frac{\text{closing balance at end of previous month} - \text{payments made in current month} + \text{amounts received in current month}}$$

**B4. Late payments**

**Description:** A Water Committee needs to be aware of trends in its debtor's book. If the ratio of accounts receivable (arrears) versus sales is steadily growing, it means that consumers are getting further and further behind in the payment of their accounts.

$$\text{Indicator} = 100 \times \frac{(\text{total of arrear payments at end of period})}{(\text{total of sales for period})}$$

**Notes:**

- Use a twelve-month moving average to smooth out monthly variations.

**C. Accountability indicators**

**C1. Financial accountability**

**Description:** Good management is not possible without financial accountability. The most basic requirement is that all income and expenditure is recorded in a generally accepted way. From these records, income and expenditure statements can be drawn up and the financial health of a system can be assessed.

Recommended ratings for this indicator are as follows:

0% if the Water Committee either cannot or will not disclose details of their income and/or expenditure.

33% if the Water Committee is willing to open its financial records for inspection, but the records are incomplete and/or inaccurate and/or disorganized.

67% if the Water Committee is keeping complete and accurate cashbooks for both their Petty Cash and their Current Account.

100% if the Water Committee is able to produce income and expenditure statements (using generally accepted accounting principles) from their financial records (including accounts payable and accounts receivable).

**Notes:**

- At this stage, the understanding of the more advanced aspects of financial statements (for example concepts such as fixed assets, current assets, long-term liabilities, etc.) is not critical. In time, however, those Water Committees who prove most competent in their financial management could be given further training and taken onto a more advanced level.

**C2. Accountability "Up" to water services authority**

**Description:** Section 22 of the Water Services Act makes it illegal for a Water Committee to function as a Water Services Provider (WSP) without the written permission of the Water Services Authority (WSA). The Water Services Authority is entitled to obtain information from the Committee regarding the provision of water services to people living within the area of supply. Regular reporting by the Water Committee to the Water Service Authority is therefore essential.

$$\text{Indicator} = \frac{(\text{number of reports submitted})}{(\text{number required to be submitted})} \times 100$$

**Notes:**

- It is unlikely that any reports will be submitted by the Water Committee unless they are requested by the Water

Services Authority. The Water Services Authority will need to take an active and informed interest in the affairs of the Water Committee if it is to get useful reports from them.

- It is essential that the Water Services Authority give clear instructions to the Water Committee as to what is required to be included in the reports, and that the reporting requirements are both reasonable and achievable.
- This indicator could be made more sophisticated by adding a “Quality of Reporting” rating. If reports are complete and accurate, that should earn the Water Committee a 100% rating. Less complete or accurate reports should earn a lower rating.

### C3. Accountability “Down” to the community

**Description:** The Water Committee as Water Services Provider has an obligation to provide adequate water services to the community. Regularly convened community meetings, to which representatives of the Water Services Authority are invited, are considered essential to ensure that problems (and compliments!) are heard.

*Indicator = (number of meetings held/number required to be held) x 100*

#### Notes:

- It is essential that the Water Services Authority give clear instructions to the Water Committee as to what are the minimum reporting requirements for community meetings.
- The most basic requirement for reporting to community meetings is to tell people how funds have been managed.
- As with indicator C2, this indicator could be made more sophisticated by adding a “Quality of Reporting” rating. If reports are complete and accurate, that should earn the Water Committee a 100% rating. Less complete or accurate reports should earn a lower rating.

### Lessons learned

The fourteen KPI’s indicate both the performance of the scheme itself in terms of water services provision (quantity, reliability and quality), as well as the performance of the Water Committee. Taken as a whole, the KPI’s indicate the overall “health” of the scheme. The graphical representation of the KPI’s, plotted as a time-series, serves as a useful tool, or visual aid, for the Water Committee.

One of the major training challenges of any support organization is to create, amongst the members of the Water Committee, an awareness, understanding and appreciation of the importance of the inter-relationships

between the KPI’s. The Water Committee should be encouraged to develop its own management interventions arising out of the interpretation of the various KPI’s.

Incentives to achieve target levels for certain KPI’s (which are within the control of the Water Committee) should be considered. These do not necessarily have to be financial. Perhaps the simplest and most effective incentive to encourage any practice is to monitor it.

Costs relate to the scheme at Water Committee level, and do not include the costs of any external management support services which are provided during the initial stages of the Operation & Maintenance of the scheme.

In order for the scheme to become financially viable at Water Committee level (i.e. excluding external support costs), the unit cost of water must be equal to or less than the selling price. The addition of support costs, and the calculation of the overall unit cost of water, would give a more accurate reflection of the “true cost” of water services provision.

It should be noted that KPI’s should always be project-specific, and should not necessarily be used “as is”. Target levels set for each KPI should be done carefully, depending on the particular nature and characteristics of the scheme.

### Conclusion

In terms of the “Water Services Act” (which was promulgated in South Africa in December 1997), it is the duty of every Water Services Authority to “progressively ensure efficient, affordable, economical and sustainable access to water services” (Section 11(1)). In rural areas, the challenge of achieving functional and financial sustainability of water schemes is well known. The diligent recording of performance indicators cannot in itself produce a sustainable scheme. However, appropriate and timeous interventions by the Water Committee (and others involved in a supportive capacity) which take place as a result of careful assessment and evaluation of the performance indicators will, however, greatly improve the scheme’s chances of success.

### Acknowledgements

The writer wishes to acknowledge the support given by Umgeni Water, and the positive contribution of members of the O&M Management Teams involved with the ongoing management of rural water schemes in KwaZulu-Natal, on behalf of the Department of Water Affairs & Forestry and various Regional Councils.

---

DAVID STEPHEN, RDP Programme Manager, Umgeni Water, P.O. Box 9, Pietermaritzburg, KwaZulu-Natal, South Africa.

---