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AFFORDABLE WATER SUPPLY AND SANITATION

Quality assurance of water supply in Malaysia

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THE NATIONAL DRINKING Water Quality Surveillance Programme (NDWQSP) was launched and implemented in 1983 under the auspices of the International Drinking Water Supply and Sanitation Decade. It was also implemented as a result of concerns about increasing pollution and contamination of surface waters which resulted in increased frequency and increased incidence rate of waterborne diseases (SIRU, 1991).

The objective of the NDWQSP is to elevate the standard of health by ensuring the safety and acceptability of the drinking water provided to the people. Towards this objective, the Ministry of Health (MOH) provides the leadership necessary for multi-departmental collaboration and coordination. For uniformity throughout the country, procedures and mechanisms of implementation were standardised and guidelines for drinking water quality prepared and documented for reference among health workers and public works staff (Siru, 1991; ED, 1993).

Although the implementation of the NDWQSP has resulted in improved drinking water quality over the years, a greater commitment towards quality was felt necessary in view of the overall nation's strive towards excellence, In addition it was felt necessary to narrow the disparity between levels of quality among the different states in the country. Thus the concept of quality assurance was incorporated into the NDWQSP in December 1992.

The concept of quality assurance, as applied to the NDWQSP, is to reduce the difference between the optimum achievable standard and the standard actually achieved, i.e. to reduce the "ABNA" (Achievable Benefit Not Achieved). To achieve this, a National Indicator Approach was adopted, under which key indicators and targets were selected (ED, 1993).

As a start, the non-compliance rate of three water quality parameters were selected as indicators for the implementation of the QAP. The non-compliance rate is worked out as follows:

$$\frac{\text{No. of samples contravening guideline values for the last 12 months}}{\text{Total no. of samples analysed for the last 12 months.}} \times 100$$

The parameters selected were based on the following factors:

i) all states have the capability to sample and analyse the three indicator parameters.
ii) the indicator parameters indicate incidence risk of waterborne diseases.
iii) the indicator parameters indicate the level of water treatment process control.

Having selected the indicator parameters, the QAP targets were set based on the best annual national average obtained from the NDWQSP database. The indicators and targets set for the first cycle, i.e. January to December 1993 are as shown in table 1 (ED, 1993).

To facilitate implementation, a QAP document was prepared. This document outlines the objectives, the concept and methodology of the QAP as well as providing guidelines on the investigation protocols and remedial measures required. The necessary 2-tier QAP task forces were set up within the existing District Coordination Committee and State Coordination Committee for the NDWQSP. The QAP mechanism requires that reports on indicator performance be submitted monthly from the district to the state level and ultimately to the national coordinator at the Engineering Division of the MOH (ED, 1993).

The premise of setting QAP targets, as propounded in the manual is that they do not remain static, rather they are moving averages. This means that new targets are set on a six monthly interval during which the national average for non-compliance of the three indicator parameters are evaluated for a period of 12 months. This mechanism requires that every evaluation cycle, with the exception of the first, will involve an overlapping 6 month period. This is to ensure continuity of assessment and evaluation.

Evaluation of the first cycle showed that the non-compliance rate for the indicators have been reduced tremendously. In line with the concept propounded in the QAP document, the targets fort the second cycle, i.e. from July 1993 to June 1994 have been reset as shown in table 1 (ED, 1994).

Table 1. Indicators and targets.

Indicators	1st Cycle	2nd Cycle
Residual Chlorine	8.5%	5.3%
Faecal Coliform	2.5%	1.3%
Residual chlorine & Faecal coliform	1.3%	0.5%

The implementation of the QAP has not been without problems. Since the faecal coliform tests were done in the laboratory and on-site in some cases, some confusion resulted as to which results should be recorded and evaluated. It was initially thought that only laboratory results, i.e. those tested by the Department of Chemistry (DOC) should be recorded and evaluated. However on the premise that all surveillance activities of the NDWQSP should be incorporated into the QAP, it was later decided that both test results should be recorded and evaluated. This rectification was easily and quickly done before the setting of the new QAP targets (ED, 1994).

The greatest problem encountered is perhaps the late reporting of data by the ground staff to the national coordinator. This delay somewhat dilutes the impact of the QAP since investigation and remedial measures are difficult to implement when a considerable time has elapsed. To overcome this, a simultaneous top-down and bottom-up approach has been adopted to shorten the lag time between non-compliance and investigations.

Another problem encountered is the frustration faced by the district personnel when the problem identified can only be rectified if full rehabilitation and upgrading of the system is effected. This is not possible in many cases due to financial constraints.

While numerous problems are being encountered, the incorporation of quality assurance in the NDWQSP has nevertheless made its impact. Of paramount importance is the bringing together of the various governmental departments towards achieving a common goal. The QAP for the NDWQSP is unique in that 3 major agencies, i.e. the MOH, the Water Supply Departments (WSD) and the DOC are involved. To ensure inter-agency cooperation, three workshops were conducted during which the principle of QAP was explained. The development of the QAP document was however a joint effort between the three agencies concerned. Hence the QA exercise has brought about greater unity and cooperation among these agencies. With this rapport established, fear and suspicion among the waterworks personnel towards MOH staff has been allayed, quality awareness has improved and efforts have been intensified all of which have resulted in improved drinking water quality. The culmination of this cooperation is seen in the reduced non-compliance rates of the QAP indicators as shown in Table 1.

The QA exercise has brought with it other incidental benefits besides the improvement of water quality. With the QAP targets to meet, there is now a greater impetus to identify the source of non-compliance and to rectify it. This is to ensure that non-compliance will not continue and bring a particular district or state into an outlier status. Thus more diligent investigations at ground level have been able to identify problematic water supply systems or even a particular sampling point. Remedial measures following investigations have in turn resulted in improved maintenance of water treatment plants, better process control and efforts to rehabilitate old pipeline systems.

The strength of the QAP is that it does not impose any additional workload at both the district and state levels. It merely serves as an impetus to implement the various surveillance activities required by the NDWQSP but which hitherto have been implemented in a lukewarm manner. In addition, the implementation of the QAP relies on the utilisation of the existing NDWQSP database. The QA exercise, however, calls for a closer and more effective analysis of data generated to allow for early detection of problems or potential problems. This in turn allows for corrective measures to be taken so that the objectives of assuring the quality of drinking water can be achieved.

The success of the QAP has been despite the problems and constraints faced. It is expected however, that the QAP component of the NDWQSP will be intensified still further to bring about improvements in the quality of treated water while still working within the constraints of available resources. Although the anticipated expansion of the QAP to include chemical parameters may be hampered by the limited analytical capacity of the DOC, it is hoped that the future upgrading and corporatisation of DOC will meet the demand of the QAP and the NDWQSP.

References

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