



## Sustainability through training

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THIS PAPER SUMMARISES the work done over the last six years to improve the supply of water in rural areas of India through specially designed training for engineers and scientists working in the rural water sector.

The programme came into being as a result of the vision of senior staff of the Drinking Water Mission in the Department of Rural Development of the Ministry of Agriculture in 1990. Since then the support of Mission staff has continued as the responsibility for the activities of the Mission passed first to the Ministry of Rural Development and recently to the Ministry of Rural Areas and Employment.

Financial support was provided for the external input costs to this programme by the Overseas Development Administration of the United Kingdom Government and internal costs were borne by the Mission.

### Mission goal

During initial discussions about the perceived training needs in 1990 it was clear that the Mission was concerned that although most of the 5,86,000 villages throughout rural India had been provided with at least one safe source of drinking water during the Drinking Water Decade, sustainability was proving elusive. Improvement of this situation was therefore of prime concern and the training was to be designed with the goal of sustainability.

### Field situation

A field visit was carried out in September - October 1990 to assess the drinking water supply situation in Gujarat State, as an example. The Gujarat Jalseva Training Institute (GJTI) was chosen as the nodal training centre that would be strengthened by the training programme and more specifically by the training methodology.

Drinking water in the majority of rural areas in India is taken from groundwater sources and Gujarat is no exception.

Here the drinking water supply situation was being seriously affected by deterioration in quality and by over-abstraction, particularly due to heavy irrigation in the Mehsana District. The lowering of groundwater levels by four metres each year in Mehsana highlighted the seriousness of the problem.

In accordance with the wishes of the Mission the training programme was formulated in two distinct modules; an India field study module where a particular problematic rural water supply location would be investigated

and a UK module where improved awareness of new techniques and technology would be generated.

### Training modules

#### India module

For the first training course, the India module was planned in Mehsana with the following elements:

- *Week 1:* Field appraisal by village visit using a standard format appraisal report. This covered water sources, quality, coverage, storage and distribution, sanitation, health, irrigation demand, geomorphology, well details and historical groundwater movement.
- *Week 2:* Data collection from institutions, including census, meteorological and hydrological data, topography, remote sensing, abstraction and recharge, irrigation, cropping patterns and NGO activity.
- *Week 3:* Problem Analysis, including identification of all problems revealed during the rural appraisal and data collection phases, weighting and prioritising of problems and summary of key problems associated with water supply.
- *Week 4:* Solution Analysis including identification of all possible solutions that in some way address the basic problems, assessment of the effectiveness of each solution in answering the key problems and prioritisation of solutions using decision analysis. Presentation of the solutions as a team exercise to an invited audience and expert committee.

#### UK module

The UK training was planned as an eight week programme of lectures, seminars, workshops and site visits, based on discipline modules such as exploration, resource management and conservation. New techniques and technology were to be introduced to the trainees as awareness training aimed at taking the 'blinkers off'. Development of a team approach to problem solving was another important aim of this phase. The following list indicates the areas of emphasis:

- Advanced geophysical methods
- Remote sensing and GIS
- Advanced well drilling and development
- Resource management and conservation
- Legislation and control
- Catchment management planning
- Water and effluent treatment

- Water quality and pollution control
- Modern irrigation systems

Later it was agreed that a phased transfer of the training course to GJTI would be carried out by moving UK modules to India over a three year period. A specially designed training for trainers course was also developed for a core group of senior trainers from GJTI to strengthen their capability and sustain the course in the future.

## Results of the training

### Source of trainees

Trainees were provided by the parent Ministry of the Mission from the disciplines of well-drilling, hydrogeology, water supply, operation and maintenance and planning taken from States across India.

In addition Central Groundwater Board and State Groundwater Boards provided trainees and specialists came from Space Application Centre, National Remote Sensing Centre and National Geophysics Research Institute. This multi-disciplinary mix was essential when investigating complex problems at field level to ensure all sides were represented. Inputs to the field exercise were also sought from local NGO's and Administration Departments, headed by the Collector or CEO. The visits to the villages guaranteed that the villagers themselves were able to provide their own input as key stakeholders.

### Locations for the training

The lecture part of any India-based training was carried out at GJTI Headquarters in Gandhinagar. The field project work was planned in a variety of geomorphological and social settings where rural water supply was a problem for local people, as follows:

- 1991 Mehsana District, Gujarat
- 1992 Kolar District, Karnataka
- 1993 Dewas District, Madhya Pradesh
- 1994 Udaipur District, Rajasthan
- 1995 Sambalpur District, Orissa

### Findings of the fieldwork exercises

The Mehsana study covered over 60 villages in four talukas of the district. It was found that the groundwater levels were being depleted at a rate of 4 metres each year due to uncontrolled abstraction for flood irrigation on a large scale. Drinking water sources were being directly affected by this over abstraction and water quality was deteriorating, particularly due to increased fluoride levels. In the 1960's drinking water was taken from hand-dug wells. Now, after the construction of many thousands of tube wells the water table is too low for any of the hand-dug wells to be sustainable.

In the Kolar District of Karnataka State the field study concentrated on a sub-basin of the River Palar. Poor use of scientific source finding in the granitic rocks resulted in many sources becoming unsustainable in summer. Poor maintenance of handpumps and lack of community

awareness and participation has resulted in communities reverting to traditional open sources that are frequently polluted by animals. Large numbers of surface tanks across the area are being allowed to become silted due to erosion following deforestation. This results in reduced storage, reduced recharge with enhanced evaporation losses.

In 1993 the field study was in the Dewas District of Madhya Pradesh, which has a high proportion of scheduled castes and tribes in the area. High run-off coupled with uncontrolled over abstraction for flood irrigation resulted in the majority of the village water supply handpumps becoming dry in summer. Lack of clarity over responsibility for maintenance of the equipment was further exacerbating the problem.

The following year the field training was carried out in the Udaipur District of Rajasthan where it was evident that scientific source finding methods were not being utilised for siting of drinking water source points. As a result many handpumps became dry in summer, forcing women to walk many kilometres to find water. The lack of legislation to control indiscriminate abstraction of groundwater was considered to be a major contributory factor to the unsustainability of the drinking water sources.

In 1995 the field study of 74 villages in Sambalpur District of Orissa was carried out. A tribal, hilly area with many small habitations relying only on rainfed agriculture was clearly suffering through lack of conservation and community participation. Low levels of literacy were making the task of creating awareness at village level difficult and a number of local NGO's became involved in the fieldwork to help identify methods of creating sustainable sources. Formation of village pani panchayats or water committees was considered amongst a number of other options for improvement.

### A common thread

Over the five year period of training it was clear that the proposals produced by the trainees at the end of each programme, which were designed to address the rural drinking water supply situation in each problem area, contained a common thread of solutions. The following list illustrates the points that repeatedly arose in the proposals:

- Use recharge to increase resources
- Improve management of resources
- Implement legislation and controls
- Improve knowledge of the resource
- Involve communities in operation and maintenance
- Use better scientific source finding
- Reduce abstraction by changing irrigation practices

In addition to the above it was also clear that in every location data were collected on the basis of administrative, and not physical, boundaries. This is particularly important when attempting an integrated approach to water resource management.

The trainees identified the need to approach management of water resources on a catchment basis. This will involve a fundamental rethink of the current data collection methodology and would call for a far more integrated approach from the concerned organisations.

### The next step

The Ministry of Rural Areas and Employment, through the Rajiv Gandhi National Drinking Water Mission, has instigated a programme of formulation of model projects in each of the five locations used for the training programme, that will incorporate the findings of the trainees and would be based on a representative catchment area. Each project will concentrate on a river catchment area of 200-500 km<sup>2</sup> including between 50 and 100 villages and incorporating the following important elements:

- *An integrated approach*, using a multi-disciplinary team, is being recommended; which is unusual in India. Normally organisations work in isolation with limited data sharing and no common approach. The training programme has enabled the trainees to identify the need for change and define the blue-print for safe, sustainable drinking water.
  - *Recharge and conservation* will require both regional and village level activity and the involvement of central and State Groundwater Boards and NGO's for successful implementation.
  - *Awareness and participation* will only improve with the full co-operation between NGO's, village level committees and Public Health Engineering Departments.
- *Changes in irrigation methods* require the involvement and co-operation of Irrigation Departments, farmers and farmer based NGO's.
  - *Improved scientific source finding* approach needs assured inputs from many organisations; SAC; NGRI; NRSA; CGWB in India and possibly from many world-wide centres of excellence.
  - *Management and control* can only be effective with the help of *legislation*. Responsibility will need to be given to one organisation for the management and control of all water resources, with the Nationally stated priority for Drinking Water fully recognised. The Model Projects in the 5 States will hopefully provide the guidelines for future safe, sustainable drinking water in the rural areas of India.

### The lessons learnt

Successful training requires a clear understanding of the needs and the capabilities of the trainees. In this case the needs were clear in the minds of the Mission and were picked up and acted upon by the trainers. It was also clear from the start that the trainees had sufficient capability to solve their own problems. What they lacked was the environment to carry out careful, dispassionate assessments of the true situation in the field. Given that facility and the tools to analyse the findings, the recommendations were arrived at with few arguments. What is now apparent to the trainees is that although they have convinced themselves of the correctness of the approach to safe, sustainable drinking water, a far more daunting task is the one of convincing everyone else.