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**Project Progress Report**

Development of

**NATIONAL TRAINING DELIVERY SYSTEMS**

**FOR WATER SUPPLY AND SANITATION**

**IN DEVELOPING COUNTRIES**

**(N.T.D.S.)**

ir. R.E. Brasseur

September 1982

204.2-82DE-717

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INT 82  
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ISBN 717  
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## I GENERAL BACKGROUND

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### 1. INTRODUCTION

Apart from day to day operational problems in connection with their planning, design and construction of water supply and sanitation facilities, operational agencies in developing countries must also overcome structural constraints such as the shortage of manpower for planning and project preparation, the availability of only a limited range of technologies, often not appropriate in comparison with social and economic circumstances, the absence of methodologies to trigger community motivation and participation, the lack of materials and facilities to train and educate the necessary manpower and the lack of good maintenance schemes and other managerial requirements.

It is against this background that the IRC, after consultation with a number of developing country governments and international organizations, decided to formulate a proposal for a project that aims at the establishment of National Training Delivery Systems for Community Water Supply and Sanitation in Developing Countries in which close collaboration between a limited number of developing countries is an essential element. It may be superfluous to state that such a project, if successfully implemented, could form a vital part of the International Drinking Water and Sanitation Decade activities (1980-1990).

### 2. OBJECTIVES

The long term objective of the project was to support the creation or reinforcement of national structures in developing countries for the development of human resources required for the community water supply and sanitation sector and to improve the competence of staff at all levels in rural as well as urban situations, primarily to benefit the poorer part of the population. Ample attention would be given to aspects of intersectoral and multi-disciplinary cooperation.

The immediate objectives of the 2½ years project were:

- to identify present and future training needs in developing countries participating in the project, primarily for improvement of the community water supply and sanitation of the poorer part of the population;
- to create conditions for effective development of a national training delivery system for the sector in developing countries;
- to design and implement training programmes for community water supply and sanitation staff needed to improve conditions primarily for the same target group as mentioned above, and fitting in a national framework for training development for the sector;
- to stimulate and facilitate the exchange of experiences, knowledge, trainers and training materials between participating countries;
- to use information generated in the project and make it available to all countries and organizations which are in need of such information.

It was suggested that eventual follow-up of the project in the participating countries or possibly in other countries who may like to join, would be given shape on the basis of a project evaluation that would be carried out toward the end of the 2½ years project.

### 3. STRATEGY FOR IMPLEMENTATION

The proposed 2½ years project was focused on strengthening and accelerating manpower development activities in a few developing countries, spread over the different developing regions, who had shown by their own initiative an interest in training. Thus, it was expected to demonstrate results quickly. These countries, each developing their own National Training Delivery System (NTDS) would mutually benefit by sharing experiences, training materials and expertise. It was believed that this could be accomplished through active collaboration between the countries, which is in line with the promotion of the Technical Cooperation amongst Developing Countries concept (TCDC). Based on the experience gained by these countries during their development of a NTDS, it was intended to prepare a detailed manual for use as a guide by other countries entering the same process. Through this interchange and acceleration a multiplier-effect would be achieved so that it would not be necessary for each country to "re-invent the wheel" so to speak at each development stage.

The project was expected to be executed in five consecutive stages, including the following activities to be carried out with, between or in the participating countries:

I Preparatory phase

- final selection and involvement of participating counties;
- agreement on workplan for each participating country;
- meeting of all participating and supporting countries and agencies.

II Diagnostic phase

- carrying out of a nation-wide manpower inventory;
- inventory of training resources;
- identification of training reference materials and teaching aids available;
- study of existing training policies;
- study of existing personnel policies;
- analysis of manpower data taking into account existing and future (say 5 years) needs;
- analysis of inventory of training resources in relation to human resources requirements (present and future).

III Design phase

- preparation of a manpower forecasting/planning model;
- definition of inter-related training and personnel policies;
- definition of the organizational structure, functions and procedural details for the National Training Delivery System;
- specification of details regarding arrangements with training institutions for full utilization, wherever feasible, of facilities, courses and instructors;
- definition of budgetary requirements and funding sources;
- definition of the training methodology;
- identification of and request for training reference materials;
- design of a "basic" course with which to initiate employee training, primarily for lower and middle echelon staff;
- adaptation of applicable training material;
- definition of details of an "accountability" system.

IV Implementation phase

- dissemination of staff newsletter;
- creation of a NTDS library;
- development of a multi-disciplinary "pool" of instructors;
- initiation of the "basic" course, primarily for lower and middle echelon staff;
- proceeding with performance-oriented courses on a priority basis;
- evaluation of courses;
- adjustments;
- on-the-job evaluation of trainee's performance;
- adjustments.

V Evaluation of project

- evaluation of project effectiveness and results against practical measurable objectives;
- re-orientation on strategy for implementation during eventual follow-up activities;
- identification of follow-up projects and activities.

## 4. PARTICIPATING COUNTRIES

Within the group of countries that reacted favourably to the proposed project, Sri Lanka and Tanzania seemed to meet the suggested selection criteria quite well, while the inclusion of ten small Eastern Caribbean countries had the additional advantage that a link could be made with an on-going model type training programme for the community water supply sector, with which the IRC has collaborated from the start in 1977, and which could function as a demonstration site in the collaborative training project.

## 5. IRC'S INVOLVEMENT

The activities of the IRC during the initial years of the collaborative project are viewed as an extension of their supportive role to community water supply and sanitation programmes in the developing countries. As a

consequence, when each of the National Manpower Development Committees would have a fully operational National Training Delivery Systems, IRC cooperation would be withdrawn.

To initiate the development of National Training Delivery Systems in the participating countries, IRC would provide a number of inputs, for example:

- to coordinate the collaborative project activities as detailed in the joint working agreement of the countries and the IRC;
- to facilitate an information inter-change through the exchange of training experiences, dissemination of manuals, etc. and through international seminars;
- to monitor training developments in the developing countries of each region and recommend ways in which a broader multiplier-effect can be realized;
- to maintain a roster of human resources specialists available to provide advisory services; and
- to identify countries which could be potential participants in a later stage in the collaborative project and keep them informed of progress and developments in presently participating countries.

## II IMPLEMENTATION OF THE PROJECT IN THE PARTICIPATING COUNTRIES

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### A. THE 10 EASTERN CARIBBEAN COUNTRIES

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#### 1. PROJECT HISTORY

##### First phase

In 1975, the Canadian International Development Agency (CIDA) and the Pan American Health Organization (PAHO) began a programme of joint collaboration with seven Eastern Caribbean countries -- Antigua, Dominica, Grenada, Monserrat, St. Kitts/Nevis, Saint Lucia and St. Vincent -- in the institutional development of their water utilities. The programme emphasized a.o. the upgrading of management and technical skills through the provision of fellowships.

##### Re-assessment

In early 1977, PAHO undertook an assessment of the programme. A majority of political leaders and utility managers indicated the need for more training within the utilities or at appropriate local institutions. They wanted to strengthen local training capability through the preparation of manuals and other training aids for waterworks personnel.

It was decided to develop a new programme emphasizing training at the operational and first-line supervisory levels. A local and regional self-sustaining training capability would be created as an extension and support to the first phase of the project. This capability, described as a "Training Delivery System", would systematize deployment of technical skills available in regional water utilities and technical colleges. With the initial support of consultants fielded through a PAHO/CIDA project, arrangements would be made for the regional dissemination of skills and knowledge and the development of training know-how in the islands. Manuals and job-aids would be prepared to meet the specific needs of local conditions.



### New strategy

The post-1977 strategy of the Caribbean Basin Water Management Project was to encourage development of a self-sustaining regional training delivery system, linked to corresponding national systems in the participating countries. The thrust of the project was summarized in four main objectives:

- a. To develop a self-sustaining training delivery system (TDS) for water utilities of the Eastern Caribbean, making optimum use of appropriate existing institutions and technical expertise;
- b. To train trainers, by providing technically trained individuals with the communication skills and instructional techniques, so that home-country training can be substantially increased;
- c. To develop appropriate training/job manuals, focusing on "need-to-know" rather than "nice-to-know" information, and
- d. To stress manager/supervisor training.

### Second phase

In 1978, ten countries requested PAHO/CIDA support for a two-year extension of the training development project. The original seven participating governments were joined by Anguilla, Barbados and the British Virgin Islands. Funds were made available for the second phase, with the additional collaboration of the Netherlands' Government through the IRC.

Institutional arrangements for implementation of this phase included:

- a. A national and regional Office of Training Coordination in the former Barbados Waterworks Department staffed with a Regional Training Coordinator, and a Secretary.
- b. A project management office in the PAHO subregional office in Barbados, staffed with a Project Manager and a Secretary.
- c. Training Coordinators appointed on a full-time or part-time basis in each of the water utilities.
- d. Personnel in each participating utility, equipped with the communications and instructional skills to train staff.

## 2. EVALUATION

Documentation supporting the second phase of the project anticipated a comprehensive evaluation at its end.

The evaluation team assembled in May 1981 reached agreement as to the objectives of the mission, namely:

- a. To assess the relevance of the project to the overall objectives of the water utilities of participating countries.
- b. To assess project effectiveness in development and implementation of indigenous, self-sustaining regional and national training delivery systems in the water utilities of participating countries.
- c. To assess the efficiency of the various contributions to project development and the utilization of time and financial, material and human resources.
- d. To identify the factors that may have facilitated or deterred achievement of the project objectives.
- e. To assess the need for, and make recommendations regarding, any future action required to ensure realization of an indigenous, self-sustaining regional training delivery system.

## 3. EVALUATION MISSION CONCLUSIONS

At the end of their data collection and survey mission, the evaluation team concluded the following:

- a. The project remains relevant to the overall objectives of water utilities in participating countries. The approach adopted in the development of training activities and materials has been effective. However, the institutional and managerial arrangements appear to have become increasingly inappropriate to the objective of transferring ownership of the project to the participating countries.
- b. The project has not yet achieved its objective of establishing an indigenous, self-sustaining regional training delivery system. Both the subsidiary objectives -- to create a pool of skilled trainers and to

produce performance-oriented training aids <sup>1)</sup> -- have been achieved, and the more recent activities aimed at improving management skills have already had limited success.

- c. Project efficiency in terms of output relative to internal and external input has been high.
  
- d. Factors facilitating achievement of project goals have included:
  - A homogeneous group of participating countries experiencing many common problems.
  - Some earlier experience of cooperation among water utilities, especially in identifying the need for this project, as well as earlier evaluations carried out by and for this project.
  - The concentration of project objectives on training alone.
  - The high degree of involvement of Caribbean nationals through visits, and the exchange of experiences gained in the course of project implementation.
  - The important role of PAHO in project management and administrative support.
  
- e. Factors deterring achievement of project goals have included:
  - The high degree of centralization of decision-making and activities (though this often proved instrumental in meeting the requirements of technical training programmes).
  - Some confusion over project "ownership".
  - The absence of a project steering committee that would be representative of all the participating governments and agencies, as called for in the memoranda of understanding.
  - The lack of appropriate mechanisms to transfer project management and accountability to an adequately constituted Office of Regional Training Coordination.
  - Insufficient allocations of national funds to support training at the island level.

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<sup>1)</sup> See list of training material and other project publications in annex.

#### 4. RECOMMENDATIONS OF THE EVALUATION MISSION

In consideration of the objectives, findings and conclusions of their mission, the evaluation team made the following general recommendations:

- Project achievements to date should be consolidated.
- Objectives of a further project phase should be agreed upon.
- Documents for a revised and restructured three-year project (1982-1984) should be considered and approved by the participating governments.
- Urgent consideration should be given to the necessary steps to be taken between participating governments and interested agencies.

#### 5. PRESENT STATE OF THE PROJECT

As the second phase of the project came to its end in 1981, the Project Manager Eng. N.F. Carefoot left the project <sup>1)</sup>. Soon after PAHO initiated negotiations with the participating 10 countries' governments and with the Caribbean Development Bank on the actions to be undertaken and commitments to be made for the next phase consisting of a three year project (1982-1984). As soon as an agreement will be achieved, a.o. on the project management, a detailed workplan is expected to be drawn up on the basis of which a request can possibly be formulated for further IRC involvement.

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<sup>1)</sup> He is presently responsible for Human Resources Development for Water Supply and Sanitation at the Division of Environmental Health (ETS) of the World Health Organization in Geneva, Switzerland.

## B. SRI LANKA

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### 1. BACKGROUND

During the Decade to 1990, the Government intends to supply piped water to the entire urban sector. Rural coverage through drilled and dug wells (80%) and piped schemes (20%) is planned to serve half the rural population by the end of the same period. Piped sewerage will be limited to a few main cities, but sanitary conversion of all latrines will be promoted through subsidies, health education and community participation.

The National Water Supply and Drainage Board (NWS&DB) is responsible for construction of piped water and sewerage schemes, ground water drilling programmes in rural areas, and backstopping of overall sectoral development programmes. Operation and maintenance of completed schemes generally rests either with the NWS&DB or the local authorities. Increasingly the Board is called upon to carry out maintenance of all water and sewerage schemes. Other Ministries and Agencies have important responsibilities for various aspects of water resource identification and exploitation, and provision of hygienic sanitary facilities, but they usually rely on technical support from NWS&DB in the construction, operation and maintenance of the larger schemes.

During planning and design the sector performance has suffered from lack of systematic advance studies of service levels, technology, community involvement and economic viability of new coverage programmes. Construction, operation and maintenance of schemes has been deficient in qualified personnel, organization, logistic support and management.

The Government is now adopting policies designed to extend service coverage while promoting adequate support programmes to overcome past difficulties and to sustain viable water supply and sanitation services for the future.

In 1980 a strong need was felt to improve the performance of existing sectoral manpower at all levels, while simultaneously training enough new staff both to replace those who leave, and to design, construct, operate and maintain the new and extended facilities being provided.

## 2. THE MANPOWER STUDY AND TRAINING PLAN

It was felt that considering the circumstances in Sri Lanka the best way to meet IRC's NTDS project objectives and to provide effective support to the development of a National Training Delivery System was to start with assisting the Board in drawing up a Manpower Study and Training Plan. To that effect a team was formed consisting of Board staff members and WHO advisors, as well as consultants under contract with IRC (National Institute for Business Management, Colombo, and Industrial Training Service, London).

The July 1981 Manpower Study and Training Plan for the Drinking Water Supply and Sanitation Sector in Sri Lanka, on which a Project Proposal was based, analysed present manpower constraints, and forecasted quantitative and qualitative skilled manpower needs over the first quinquennium of the Decade period.

Owing to the unpredictability of general manpower trends towards the end of the Decade period, the manpower study and training plan confined its projections of training needs to the period to 1986. Estimates of the skilled manpower requirement were based on specific committed and planned sectoral development projects to which known ratios of manpower need by size of scheme were applied, with due allowance for anticipated wastage rates. To this requirement for training new and replacement staff were added estimated numbers of existing staff requiring retraining.

It was nevertheless regarded as important to identify the key jobs, and the scale of likely training requirements to which the sector's specific needs give rise. This would then form the basis for a sectoral manpower development and training plan to support investment programmes. The needs are both quantitative and qualitative at each level.

The training plan includes some important principles underlying the proposed training schemes:

- a. Senior management commitment, and involvement in promoting training as an integral management activity.

- b. Decentralization of training skills and resources to the Range level where appropriate in order to reach areas of priority training need.
- c. Training based on accurately updated assessments of need, quantitative and qualitative, reflecting developing operational priorities.
- d. To respond to this assessment, a flexibly planned training system in which resources can be speedily switched to meet new priorities.
- e. Availability of a central nucleus of skilled trainers with adequate physical and financial resources to operate training programmes.

The training plan is primarily designed to meet NWS&DB needs, but the proposed facilities should be available to other agencies with training needs in water supply skills, reflecting the Board's pre-eminent sectoral role.

### 3. THE PROJECT TO IMPLEMENT A NATIONAL MANPOWER DEVELOPMENT AND TRAINING PROGRAMME

#### Objectives

The project aims to assist the Water Supply and Drainage Board in implementing a 5 year national support programme for manpower development and training in the water supply and sanitation sector. Reflecting indicative Decade coverage targets, and specific projects approved for implementation to 1985, the project has the following objectives:

- a. To train a sufficient number of new and existing staff to support the construction, operation and maintenance of water supply schemes.
- b. To provide systematic training of a scale and quality appropriate to meet the sector's identified priorities over the first half of the Decade period.
- c. To achieve these aims through the allocation of adequate resources, and to evaluate regularly the efficiency of their utilization.

### General Description

The project will train over 4,600 new and existing staff at all levels from managers to skilled craftsmen over the 5 year period 1982 -1986. The duration of training programmes will range from one to sixteen weeks off the job, supplemented by longer periods of in-post planned experience and on-the-job follow-up training under the guidance of skilled supervisors and instructors.

The July 1981 Manpower Study and Training Plan sets out the detailed training strategy. It is estimated that total project cost over 5 years (including provision for escalation) will be Rs. 81.3 million (US \$ 4.5 million) and that it will cost Rs. 2.4 million (US \$ 132,000) at 1981 prices, to operate the project in a full year.

The project provides for appropriately equipped buildings to be constructed to house a central training facility at or near NWS&DB headquarters. Staff needed to operate the scheme will be trained and paid from project funds. The project proposes financing the purchase of consumable training materials over the 5 year period, and a programme of fellowships is provided, mainly to support the training of training staff. Technical assistance by qualified specialists will be funded through the project. Wherever possible, these will be recruited from among qualified Sri Lankan organizations and individuals.

Provision is made for the project to be regularly evaluated, to ensure that it meets its immediate training goals, as well as the Board's longer range operational skilled manpower needs.

#### 4. IMPLEMENTATION AND EXTERNAL FUNDING

USAID has shown its interest in providing funding for the implementation of the project. Negotiations have started in October 1981 and it is likely that soon an agreement will be reached. However, the project proposal has been revised taking into account the present severe budgetary limitations.



##### 5. THE PILOT STUDY ON TRAINING FOR OPERATION AND MAINTENANCE

In March 1982 the Board requested IRC to assist in refining the recommendations of the above mentioned Manpower Study and Training Plan as far as training requirements for operation and maintenance is concerned. The study is to be undertaken in September-October 1982 by a team consisting of NWS&DB staff, assisted by WHO consultants and two IRC appointed consultants from ITS (Industrial Training Service, London).

### C. TANZANIA

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Since the first country project workplan for the development of a National Training Delivery System was drawn up in July 1979, little progress has been made. Attempts were made both in 1981 and 1982 to revise the workplan in cooperation with the executing agency, the Ministry of Water and Energy (MAJI). Still no commitment could be obtained from MAJI that would be sufficient a guarantee for the project to be started.

Since all the officials interviewed were agreeing on the need for increased effort in the field of manpower development and training, the reason for the delays is probably not lack of interest. The most likely reason for the failure to reach an agreement could be the fact that the Directorate for Manpower in MAJI is only one of the many agencies dealing with this subject. It has no mandate to take the lead on other national agencies or to efficiently direct the regional water engineers. Decision making is made even more difficult because of slow moving reorganizations in the water and sanitation sector.

The most influential donors and international agencies have kept pressing for a more consistent and forceful policy. Hopefully the latest WASH report commissioned by USAID will trigger off new development which may set the stage for a fruitful cooperation between IRC and the Government of Tanzania.

### III INTERNATIONAL EXCHANGES

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In the project's original proposal the preparatory first phase included a meeting of all participating countries and agencies. This meeting did not take place, mainly because of the delays in reaching an agreement in Tanzania. Instead, the exchanges between the participating countries were achieved through the intermediary of the IRC project manager, and, at a later stage, through exchange of the project's documented outputs and through the services of the consultants working in the country sub-projects.

As expected the documents produced in the Eastern Caribbean, mostly consisting of training material, were distributed not only in Sri Lanka, but also in the IRC supported Manpower Development Project in Indonesia.

In March 1982 the Task Force for Human Resources Development, which was set up by the Steering Committee for the International Drinking Water Supply and Sanitation Decade met for the first time in Geneva. This first meeting resulted in the publication of a Basic Strategy Document, which stresses among others the need for guidelines for Human Resources Development. In agreement with other Task Force members, the IRC decided to organize a workshop where, in line with the objectives of the NTDS project, the participants of this project would meet to share experiences and to make the first move in the direction of the production of guidelines as mentioned above. It was decided to invite also participants in the Manpower Development Project Indonesia.

The workshop took place from 13 to 17 September 1982 at IRC headquarters in Rijswijk. During the workshop the contents of the guidelines were discussed. It was agreed that before March 1983 a first outline of guidelines would be prepared. The guidelines would mainly be aimed at senior managers in the water and sanitation sector in developing countries. It was also recommended that an international seminar would be held in the second half of 1983, that would bring together representatives of countries where IRC projects related to HRD are implemented, representatives of other countries with positive experience in HRD for water supply and sanitation, as well as representatives of countries with little or no experience with systematic HRD. The list of participants would be drawn up in collaboration with other Task Force members.

The last recommendation of the workshop concerned training material. It was recommended that a catalogue would be made of selected training material for water supply and sanitation in developing countries.

The three recommendations are presently being worked out in detail, while a first exploration is being made of possible sources of financing.

#### IV ACTIVITIES IN 1982 and 1983

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The delays which were met in starting the project are making it necessary to continue its implementation beyond 1982. Except if a breakthrough can be achieved in Tanzania, in which case the project activities may continue till 1984, the project will probably come to an end in 1983.

As mentioned above, the workshop on Human Resources Development at IRC headquarters in September 1982 has resulted in three main recommendations. All three are related to IRC's support role and to the dissemination of the project's experience and its documented output to other countries. IRC however will probably not be alone in implementing the workshop's recommendations.

It is expected that support from other agencies involved in the International Drinking Water Supply and Sanitation Decade's Human Resources Development Task Force will come in the form of additional funding, consultancy services or organizational support. Tentatively it has been decided that a first draft of guidelines for HRD would be presented at the next Task Force meeting, which is expected to take place in March 1983. The guidelines' publication and dissemination are scheduled for the second half of 1983.

The preparations for the international seminar on Human Resources Development have already started. An inventory is being made by the workshop participants of organizations or individuals likely to contribute in writing the seminar's working papers. An inventory is also being made of countries to be invited to send participants. The seminar's location has yet to be decided. It is hoped that it can take place during the autumn of 1983.

As far as the Catalogue of Selected Training Material is concerned, IRC's Information Section has presently been requested to make a first inventory of sources of training material and to make a detailed proposal for a programme aiming to publish, disseminate and periodically revise such catalogue. Simultaneously the possibilities for setting up or to participate in setting up a training modules library for water supply and sanitation will be further studied.

The objectives of the NTDS project were numerous and ambitious. Neither in Sri Lanka nor in the Caribbean they have been completely achieved. Some objectives, like the publication of national training newsletters, have not yet been initiated. In addition to giving support aiming at increasing the self-sufficiency of the national executing agencies, during the last part of 1982 and in 1983, IRC will continue to stimulate the executing agencies to achieve the project's objectives. In this context, IRC will provide information services and as far as the project's budget will allow, also limited consultancy.

ANNEX 1: List of Project DocumentsGeneral

- Project Proposal for the Development of National Training Delivery Systems for Water Supply and Sanitation in Developing Countries (NTDS), March 1979, revised September 1979.

Caribbean Water Basin Management Project

- Observations about the Eastern Caribbean Training Project (AMRO 2174). (Annex 2 lists all other project documents, including proposals and reviews.)

Sri Lanka

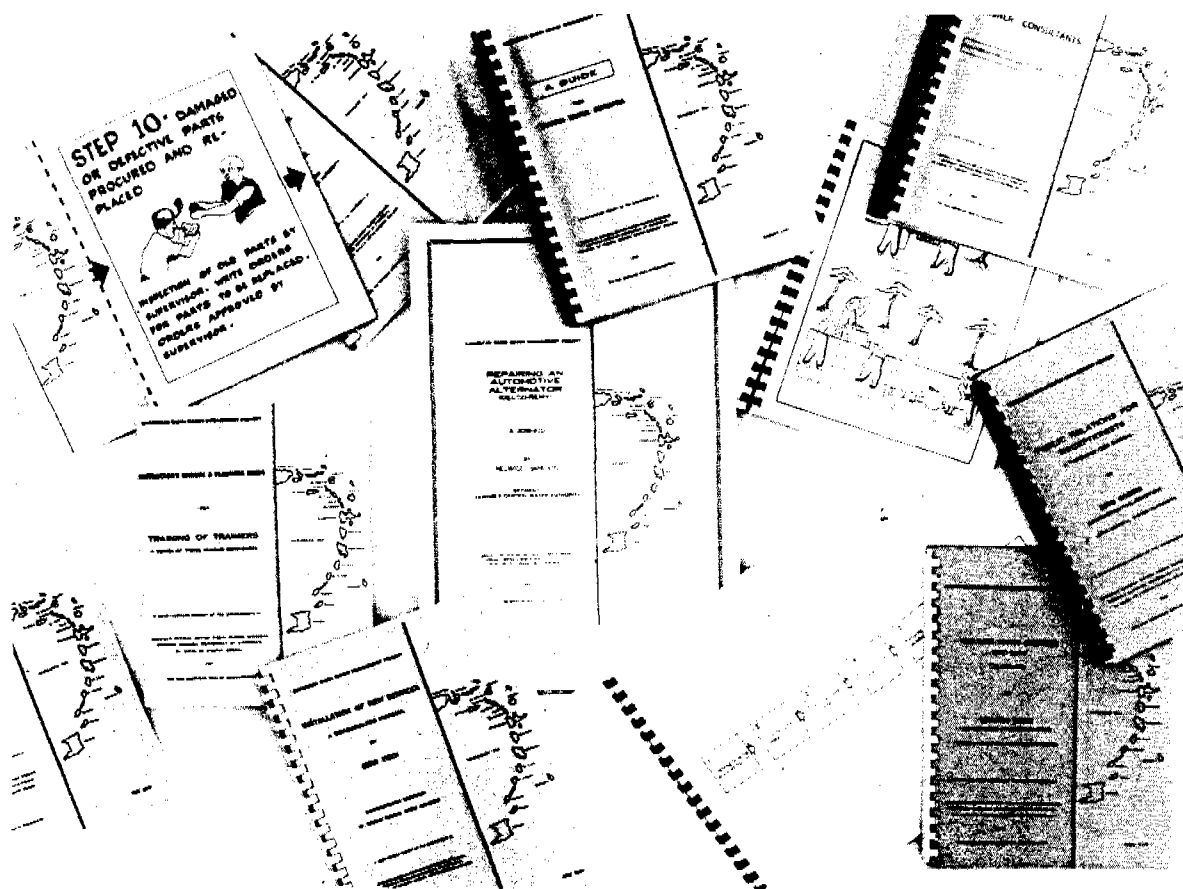
- Country Project Workplan for the Development of a National Training Delivery System for Community Water Supply in Sri Lanka, August 1979.
- Report on the Project to Set-up a Manpower Study for the Water Sector in Sri Lanka, ITS (C. Chapman and W.T. Anderson), 24 February - 15 March 1981.
- Manpower Study and Training Plan for the Drinking Water and Sanitation Sector, Sri Lanka, July 1981.
- Draft Project Proposal to Implement a National Manpower Development and Training Programme in the Water and Sanitation Sector, Sri Lanka, July 1981.
- Proposal for a Pilot Study: Management Development and Planning for the Training of Personnel for the Maintenance of Water Supply Schemes in Sri Lanka, March 1982.

Tanzania

- Country Project Workplan for the Development of a National Training Delivery System for Community Water Supply in Tanzania, July 1979.
- Country Project Workplan for the Development of a National Training Delivery System for Community Water Supply in Tanzania, February 1982.

## CARIBBEAN BASIN WATER MANAGEMENT PROJECT

# PUBLICATIONS LIST



A JOINT-VENTURE PROJECT OF THE GOVERNMENTS OF:

ANGUILLA, ANTIGUA, BRITISH VIRGIN ISLANDS, BARBADOS  
DOMINICA, GRENADA, MONTSERRAT, ST. KITTS/NEVIS,  
ST. LUCIA, ST. VINCENT, CANADA, UNITED KINGDOM, HOLLAND

AND

THE PAN AMERICAN HEALTH ORGANIZATION



## NOTE:

The April/77 assessment of the Caribbean Basin Water Management Project revealed that appropriate instructional materials oriented specifically toward the training of waterworks personnel did not exist. Existing texts and other teaching aids were oriented toward increasing the trainee's knowledge rather than improving his performance. It was concluded therefore that manuals which could be utilized for training purposes and which would later serve as a reference for the trainee at his job, i.e. Training/Job (T/J) manuals, were highly desirable. The development of appropriate T/J manuals was therefore one of the major recommendations of the April/77 Assessment Report.

The development of T/J manuals and Job-Aids was initiated in June/78 with the following objective:

TO PRODUCE PERFORMANCE-ORIENTED INSTRUCTIONAL MATERIAL AND USER MANUALS ON- SITE WHICH ARE APPROPRIATE TO THE LOCAL CONDITIONS AND THE ADACEMIC LEVEL OF THE TRAINEES.

Topics selected were based on the training priorities already identified by Eastern Caribbean water utility Managers and Chief Engineers at a meeting in September/77.

## MANUALS:

- *BASIC WATER QUALITY TESTS FOR WATER TREATMENT PLANT OPERATORS*  
by VICTOR CENAC, Laboratory Technician  
Grenada Central Water Commission
- *BILLING & COLLECTION PRACTICES*  
by CECELIA THORPE, Accountant  
Barbados Waterworks Department
- *DRILLING & DEVELOPING A WELL*  
by JEROME PINNEY, Inspector of Pumps & Well Drilling  
St. Kitts Water Services Department
- *INSTALLATION OF NEW SERVICES*  
by GLENN LYNCH, Instrument Technician,  
St. Vincent Central Water Authority
- *INSTALLATION, OPERATION & MAINTENANCE OF A FLOATING CHLORINATOR*  
by KARL LEWIS, Laboratory Technician  
Montserrat Water Authority
- *LEAK DETECTION IN A WATER DISTRIBUTION SYSTEM*  
by PEARSON FRANKLYN, Sr. Superintendent of Works  
Barbados Waterworks Department

## MANUALS (cont'd)

### ■ MAINTENANCE & TESTING OF DOMESTIC WATER METERS

by WINSTON RAMSAY, Laboratory Technician  
Antigua Public Utilities Authority

### ■ OPERATION OF A 2+4 PBX

by SONIA FRANCIS, Supervisor of Telephone Operators  
Antigua Public Utilities Authority

### ■ OPERATION OF THE LA GUERITE RAPID SAND FILTER

by CLIFFORD THOMAS, Inspector of Treatment  
St. Kitts Water Services Department

### ■ PREVENTIVE MAINTENANCE ON ELECTRICAL SWITCH GEAR

by JOSEPH SKERRITT, Chief Electrical Inspector  
Montserrat Ministry of Communications & Works

### ■ PUBLIC EDUCATION

by CECIL GRAHAM, Area Supervisor  
Dominica Central Water Authority

### ■ PUBLIC RELATIONS FOR RECEPTIONISTS

by DORIS WARNER, Administrative Assistant  
Saint Lucia Central Water Authority

### ■ RECRUITING NEW STAFF

by DOREEN SOUTHWELL, Personnel Officer  
Antigua Public Utilities Authority

### ■ STORES MANAGEMENT

by CAMELLA FERNANDEZ, Assistant Secretary  
Antigua Ministry of Education

### ■ WATER TREATMENT PLANT OPERATION

by VERE WILLIAMS, Laboratory Assistant  
Antigua Public Utilities Authority

## JOB-AIDS:

- *SERVICING A BOOSTER PUMP*  
by CHARLES MARVILLE, Engineer  
Barbados Waterworks Department
- *SERVICING SPLIT CASING & VERTICAL TURBINE PUMPS*  
by JUSTIN CHARLES, Maintenance Superintendent (Electrical)  
Saint Lucia Central Water Authority
- *REPAIRING AN AUTOMOTIVE ALTERNATOR (DELCO-REMY)*  
by HEDWIDGE SAMPSON, Mechanic  
Dominica Central Water Authority
- *STANDARD DETAIL DRAWINGS -- WATERWORKS*  
by J. CLEVELAND ROYER, Acting Engineer  
Dominica Central Water Authority
- *WATER MAIN LAYING*  
by CYRIL COX, Superintendent of Works  
Barbados Waterworks Department
- *WATER MAIN REPAIR*  
by LEIGHTON TAMAR, Supervisor of Distribution  
Grenada Central Water Commission
- *WATER METER REPAIR FLOW-CHART*  
by HAROLD NURSE, Meter Repair Supervisor  
Barbados Waterworks Department

## GUIDES:

- *A GUIDE FOR TRAINING MANUAL DEVELOPERS (AUG./80)*  
by DONNA FLANAGAN, Consultant  
Port-of-Spain, Trinidad

With Contributions by:

JOHN AUSTIN, Consultant  
Educational Systems for Environmental Control

QUINCY FRANCIS, Acting Senior Vocational Training Instructor  
Jamaica Vocational Training Development Institute

## GUIDES (cont'd)

### ■ *INSTRUCTOR'S MANUAL & PLANNING GUIDE FOR TRAINING OF TRAINERS (OCT./78)*

by JOHN AUSTIN, Consultant (Team Leader)  
Educational Systems for Environmental Control

JEFFREY BARROW, Senior Plumbing Instructor  
Samual Jackman Prescod Polytechnic, Barbados

QUINCY FRANCIS, Acting Senior Vocational Training Instructor  
Jamaica Vocational Training Development Institute

STANFORD GRAHAM, Vocational Instructor  
Jamaica Vocational Training Development Institute

DORIAN WHITTINGTON, Senior Engineering Assistant  
Barbados Waterworks Department

### ■ *MANAGER/SUPERVISOR DEVELOPMENT -- PHASE 2 A GUIDE FOR TRAINER-CONSULTANTS (AUG./80)*

by ROBERT FRANCE, Manager St. Vincent Water Authority ) MODULE  
ATHILL RAWLINS, Manager, St. Kitts Water Department ) **1**

PATRICK MARTIN, Manager, Antigua Water Department ) MODULE  
LENNOX KING, Training Coordinator, Barbados Waterworks Dept. ) **2**

ROBERT BENNETT, Chief Accountant, St. Vincent Water Authority ) MODULE  
ROBERT GOODWIN, Engineer, Barbados Waterworks Dept. ) **3**

MARGARET DYER, Admin. Officer, Montserrat Water Authority ) MODULE  
DORIAN WHITTINGTON, Superintendent of Works, B'dos Waterworks Dept. ) **4**

DAVID PRESCOD, Asst. Engineer, St. Lucia Central Water Authority ) MODULE  
CECELIA THORPE, Accountant, Barbados Waterworks Department ) **5**

CAMELLA FERNANDEZ, Asst. Secretary, Antigua Ministry of Education ) MODULE  
GARY PENN, Engineer, BVI Water & Sewerage Department ) **6**

With the Advisory Support of Stephen Iman & Donna Flanagan

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- *TRAINING OF TRAINERS REFRESHER COURSE -- INSTRUCTOR'S GUIDE & STUDENT'S WORKBOOK (MAY/81)*

by DONNA R. FLANAGAN, Consultant  
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- *TRAINING COORDINATOR'S HANDBOOK (MAY/81)*
- *ACCOUNTING DEPARTMENT HANDBOOK (SEPT./81)*

by LEWIS SIDWELL, Consultant  
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- *ASSESSMENT & RECOMMENDATIONS -- REVISION OF THE CARIBBEAN BASIN WATER MANAGEMENT PROJECT (APRIL/77)*

by NEIL F. CAREFOOT, PAHO/WHO (Team Leader)

JOHN AUSTIN, Consultant

JOHN LAY, CIDA

- *EVALUATION REPORT -- IMPACT OF TRAINING OF TRAINERS (MAY/80)*

by HORST OTTERSTETTER, Consultant (Team Leader)  
Sao Paulo, Brazil

SONIA FRANCIS, Supervisor of Telephone Operators  
Antigua Public Utilities Authority

HENDERSON GREENIDGE, Assistant Training Coordinator  
Barbados Waterworks Department

GARY PENN, Engineer  
BVI Water & Sewerage Department

TREVERNE YORKE, Supervisor of Water Quality  
Saint Lucia Central Water Authority

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- *INTERIM EVALUATION -- MANAGER/SUPERVISOR DEVELOPMENT -- PHASE 2 (DEC./80)*  
by STEPHEN C. IMAN, Consultant  
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- *REPORT ON AN EVALUATION OF THE CBWM PROJECT (JUNE/81)*  
by HORST OTTERSTETTER, PAHO/WHO (Team Leader)  
GARETH HOWELL, WHO/IRC, The Hague  
ERIC MUNRO, Consultant, Dominica  
ALEX REDEKOPP, WHO, Geneva  
DAVID STEINBERG, CIDA

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- *PHILOSOPHY OF TRAINING (SEPT./77)*  
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- *TRAINING OF TRAINERS -- A STEP TOWARD A TRAINING DELIVERY SYSTEM (SEPT./78)*  
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