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### THE DEVELOPMENT AND IMPLEMENTATION OF WATER SUPPLY PROJECTS IN THE SEHAL AREA OF WEST AFRICA

#### INTRODUCTION

The author has been travelling extensively in West Africa for the last nine years. Since that time he has travelled in Senegal, Ivory Coast, Mali, Upper Volta, Niger, Camerouns and Nigeria, but his involvement in projects has been confined to Mali and Nigeria so far. The purpose of this paper is to consider the information that is necessary to develop a water supply service throughout extensive areas in the Sehal region and to develop a system which includes the training of local engineers in construction and maintenance work, it being the intention that completed schemes can be operated satisfactorily and the experience learnt by the local engineers can form the basis of a continuing programme of design and construction.

#### BASIC INFORMATION

When the author first visited West Africa he was fortunate enough to be in charge of a water supply "sector study" for the World Health Organisation, which required the following information to be obtained and correlated:

1. Drawing up an inventory of the water supply facilities in the country which might in some cases be done on a sample basis.
2. Studying the institutions and organisations in the country which plan, execute and operate water supply facilities.
3. Appraise and identify potential financial resources.
4. Make an inventory of existing manpower and study training facilities available in the country.
5. Reviewing the managerial, technical and financial operation of existing water supply undertakings.
6. Assessment of the country's capacity to absorb external technical and financial assistance, identifying factors which might exercise constraint on developing and executing a national programme.
7. Identification of priorities for water supply development in the entire sector, indicating cities, areas and communities.

Shortly after commencing work in the country we were particularly fortunate to be asked to add a further clause to our terms of reference:

8. Making a tour of the country to ascertain the resources and needs of the provincial towns and to identify priorities.

This additional clause is, in the author's opinion, of great importance as it provided the opportunity for the collection of reliable and comparative information by engineers knowledgeable in matters of water resources and supply. As a result of this more intimate knowledge of the problem we were far better equipped for the subsequent discussions on finance and management and were able to keep these matters well controlled because of our detailed local practical knowledge.

#### PLANNING FACT-FINDING TOURS

In Mali three separate major tours were planned which covered nearly every settlement in the country. It is important to plan such tours carefully to ensure as far as possible that the maximum benefit is obtained.

It is not possible in the space available to explain exactly what was done and it may be irrelevant to other countries even in the Sehal area, but the following may be of interest:

- 1) Matters to be considered by personnel undertaking tours.
  - a) Population distribution.
  - b) Water resource distribution.
  - c) Transportation (on a commercial basis).
  - d) Mineral and other natural resources.
  - e) Development of existing commercial and agricultural interest.
  - f) Existing administrative system.

The detailed consideration of these matters formed the basis of a questionnaire which was completed at the time of visiting each town or village, and was signed by the local Mayor or Chief as appropriate.

- 2) Preparation for team.
- a) Staff - suitable staff available for tour.
- b) Number of vehicles available for the tour.
- c) Suitable time of year, bearing in mind condition of the roads and relevant water resource information.
- d) Availability of fuel, food, rest houses etc.
- e) Communications in case of emergency.
- f) Emergency rations, spare parts, de-ditching gear etc.

The length of the tours should be limited within reasonable physical and mental requirements, and we found that tours preferably not exceeding four weeks were acceptable.

#### PREPARATION OF SECTOR STUDY

On the completion of the tours of all towns and villages, and the careful logging of the relevant information and diaries of the visit, an impressive amount of reliable information is available. The first part of a sector study should consist of a clear statement of the basic facts required in the Terms of Reference.

The next section should deal with design criteria which have to be adopted in order to arrive at basic sizes of structures for estimating purposes.

The estimating section of the study is always a problem, particularly in times of high inflation, as even if the estimates are realistic when produced, those schemes of low priority tend to get estimates which will inevitably prove to be unrealistic. This problem can be minimised by giving the final presentation in numerical order of priority, by giving costs of only those schemes likely to be carried out immediately, the remainder being on a comparative basis using a numerical index.

During the preparation of any study it must never be forgotten that its purpose is to provide economic projects which operate reliably and fulfil the basic requirements for which they were intended, and that the study is not an end in itself.

The efficient realisation of projects in the Sehal area may well require more attention and effort than the design. We should be more aware of this as it seems to be quite common to prepare several reports on the same project and nothing is in fact achieved.

#### CONSTRUCTION WORK

The construction of projects in remote areas should be designed to be relatively straightforward.

For schemes of water supply a considerable amount of effort has to be put into the laying of pipelines and services. In pipe-

laying the main problem is to ensure that the pipe is laid carefully on a satisfactory bed. This is a relatively simple operation but requires patience, care, constant checking and testing.

The construction of wells, small pumping stations, river intakes, treatment works and ground tanks can also be relatively simple if carefully designed. The use of complicated construction techniques should not be considered in remote areas unless they are part of a big scheme and can show substantial savings.

On one occasion the author acted as Consulting Engineer for the design of a scheme and then went on, with the assistance of the local Water Department, to carry out the construction by direct labour. This method was originally proposed as the construction work was in a remote area where local contractors capable of the work were not available, and the value of the contract was not sufficient to attract international companies. This method gave very good experience to local engineers, site foremen and others, and enabled the Water Department to undertake maintenance and repair work. It also provided detailed experience for future schemes. The experiment worked well, but the advantages reaped would have been greater had there been continuity of work.

#### TRAINING

It is the author's opinion that a lot of the training going on in his own country, and yours, can be seen to be heavily biased towards academic training, and he does not believe that this present balance is an advantage. It is clearly necessary for those in responsible positions to have a good basic academic knowledge, but it is also vital to have skilled tradesmen available on any construction site.

Practical experience is of prime importance and it is suggested that attention should be given to encouraging young men into the practical side of construction. Consideration should be given to making them feel that it is a useful and socially acceptable job which can form the basis of a rewarding and satisfying career.