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**Netherlands
Economic
Institute**

HSE2177 DMc/bn 12 November 1993

Rada water supply and sanitation project

Evaluation mission

evaluation: final report

**Mr. Douglas McCallum (Netherlands Economic Institute)
Mr. Willem van Gorkum (independent consultant)
Ms. Maria Muller (Waste Consultants)**

Rotterdam, November 1993

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Consortium (EESV)

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Preface

The Evaluation Mission visited Yemen between the 6th and the 27th of June, 1993. The period from 9th through 18th June was spent in Rada, with visits also to Dhamar and to Al Baida. The remainder of the time was spent in Sana'a.

During the entire period, the Mission received excellent support and cooperation, especially from the Government of Yemen (National Water & Sanitation Authority, Ministry of Urban Planning & Housing, Governate of Al Baida, Municipality of Rada) and from the Rada Water Supply & Sanitation Project. The Mission also wishes to express its great appreciation for the friendly reception and generous hospitality shown by so many people in Yemen.

A full Draft Report was written before the end of the Mission's stay in Yemen, reflecting the independent professional judgment of the three members of the Mission and based upon information and knowledge gained during the mission. The Draft Report included a broad assessment of the Rada Water Supply and Sanitation Project and gave advice and recommendations concerning that project and future projects elsewhere.

The full text of the Draft Report was submitted in Sana'a to the Government of Yemen, to the Royal Netherlands Embassy, and to the Rada Water Supply and Sanitation Project; it was given to the DGIS in The Hague immediately upon the Mission's return to the Netherlands. Thus, before the end of June 1993, the Draft Report was in the hands of all key parties. Additional printed copies (dated 5 July 1993) were further circulated in early July.

Following discussions in October with the DGIS, revisions were made in the text (clarifications, supplementations, editing, etc) to produce the Final Report (dated 8 November 1993). The agreed revisions, however, were limited and did not encompass any "up-dating" or incorporation of new analysis or information; the Final Report (like the Draft Report) deals with the situation as it was observed in June 1993. The principal comments and conclusions of the Draft Report, moreover, remain unchanged.

1 Introduction and context

1.1 Background and objectives of the mission

The objective of the Evaluation Mission is to provide an independent assessment of the Rada Water Supply and Sanitation Project (RWSSP), to make recommendations on follow-up activities in Rada, and to advise on other aspects of development project planning and implementation in Yemen. The Terms of Reference of the Mission (attached as Annex Two) are deliberately broad, reflecting the desire of the Netherlands Government to obtain wide-ranging advice, not only about the Rada Project itself, but also about the "lessons" which can be learned from it.

To ensure independence of judgment and advice, the Evaluation Mission is composed of experienced professionals with no previous connection to the RWSSP and with no connection to the consulting firms implementing the project. The members of the Evaluation Mission are:

- Mr. Douglas McCallum: Economist and Head of Mission, from the Netherlands Economic Institute (NEI), Rotterdam;
- Mr. Willem van Gorkum: Civil Engineer, independent consultant, Voorburg; and
- Ms. Maria Muller: Sociologist, from Waste Consultants, Gouda.

The present Mission is the first real evaluation of the RWSSP; the Monitoring Mission, which has periodically reviewed the project since its inception, has played a different role (as discussed below in Chapter 6). This evaluation has taken place five-and-a-half years after the initial mobilization of consultants and one-and-a-half years before the expected completion of the project.

1.2 Nature of the evaluation

The basic purpose of an evaluation is to provide information which is useful for management and planning. Accordingly, this Evaluation Mission has concentrated upon the issues and questions which are important for the management and planning of the Dutch-aided Rada project (RWSSP) and of other projects elsewhere in Yemen. The emphasis has been upon raising and clarifying key questions, analysing and making informed judgments about crucial issues, and formulating advice and recommendations which are relevant for Government decision-makers.

The nature of the evaluation activities has been determined by the time and resources available. In accordance with its Terms of Reference, this Evaluation Mission has relied upon three sources of information: *first*, a review of the available documentation; *second*, site visits at the project and elsewhere; *third* - and most important - intensive interviews with relevant persons and institutions (as listed in Annex One). Neither time nor resources were available for any new survey or data-gathering exercises; only existing information sources have been reviewed and analysed.

Despite these limitations, the Mission believes it has obtained sufficient information and evidence on which to base its evaluation. Cross-checking of information from a

variety of sources has proved valuable in assisting the Mission in reaching appropriate and sound conclusions. Inevitably, due to the short time available, there will be a few points which are missed and a few which are not fully understood. Nonetheless, the Mission is quite confident that it has a clear over-all picture and that its general conclusions and recommendations, as given in this Report, are correct.

The Mission included in its work an assessment of the position and role of women as compared to men; at different points where appropriate, this Report includes comments on the position of women. The RWSSP documents and other materials, however, do not provide gender-relevant information, so a full analysis as suggested by DGIS guidelines is simply not possible. The role of women is therefore discussed in most detail in relation to the project's Environmental Health Education and Extension/Training activities (Chapter 2).

1.3 The RWSSP and the evaluation

Because its underlying purpose is to extract and analyse broader issues, and because its time is extremely limited, this Evaluation Mission cannot undertake a fully "balanced" review of the RWSSP. Instead, the Mission must concentrate selectively on those issues which it considers most important for its policy assessment and recommendations.¹ The Mission's approach is critical and sceptical, because its task is to draw lessons for the future; as a result, the tone of this Report may seem predominantly negative.

The Mission wants therefore to make it clear that we were highly impressed by the manner in which the people of the RWSSP, expatriate and Yemeni alike, are working together to implement a complex project in a difficult operating environment.

The RWSSP is a complex and costly project (the largest Dutch-sponsored development project in Yemen). Additionally, the RWSSP has shared in the great difficulties experienced by Yemen: the economic and political disruption caused by the Gulf Crisis in 1990/91; the economic and social upheaval resulting from the vast influx of returnees (Yemeni workers expelled from Gulf countries); and the political and social uncertainties caused by the unification of the country and its subsequent establishment of a democratic system. Keeping things moving in the face of such difficulties was quite an achievement, for which both the RWSSP and the Government of Yemen should be warmly congratulated.

Our purpose is not to assess "blame" or to criticise individuals. Our concern, instead, is with the broader issues of the RWSSP and of similar Yemeni/Dutch development projects: the design concepts, the approach as worked out in practice, implementation issues and decisions, the roles played by the different actors, the features and factors which have or will influence the outcomes, etc.

¹ This Evaluation Mission specifically recommends to DGIS that a fuller and more "balanced" evaluation, narrowly focused on the RWSSP itself, should be undertaken shortly after completion of the project, with sufficient time and manpower resources to do a complete analysis. (se §7.3.3)

In addition, it should be noted that many of our criticisms can be applied equally to the majority of other development projects, in Yemen and elsewhere. Finally, we want to emphasise that some of our most fundamental criticisms are essentially concerned with the process by which the RWSSP (and projects like it) has been formulated, designed, developed, implemented, supervised, and controlled. The Government of the Netherlands (Ministry of Foreign Affairs - DGIS, and Royal Netherlands Embassy, Sana'a) developed the original project idea and have approved all major decisions about the project ever since; ultimately, therefore, "responsibility" for the RWSSP lies with the Government of the Netherlands.

1.4 The evaluation report

The Draft Evaluation Report was written in a very short time, during the last few days of the Mission's time in Yemen. Accordingly, it was not "polished" in composition or presentation. On the other hand, the Report was immediately available to all interested parties in Yemen. The Mission apologizes for any mistakes, over-sights or lack of clarity which may result from the Report having been written at such great speed. But we feel that the gains from immediate availability out-weigh any textual or presentational short-comings.²

The Mission has been repeatedly assured, by Dutch Government officials, by Yemeni Government officials, and by the staff of the RWSSP, that we should be completely frank, even blunt, in our judgments and statements. We have followed that advice, and the Evaluation Report is open and clear in its criticisms and comments - perhaps uncomfortably so. We consider this important, however, in order to focus attention on crucial issues and questions that should be dealt with; evading difficult issues and avoiding hard judgments in the end defeats the very purpose of an evaluation. On the contrary, only by honestly facing up to the real situation of today can we hope to create a better tomorrow. We trust that all those involved in reacting to and following up this evaluation will understand this approach and use this Report in a constructive way, for the ultimate benefit of the people of Yemen.

Finally, the Mission feels that this Report indeed raises many important and far-reaching issues which should be addressed, as a matter of urgency, by the Government of Yemen and by the Government of The Netherlands, especially in relation to new development projects.

² Some ambiguities in presentation, and some misunderstandings of interpretation, have been clarified in the revisions which have been incorporated in the Final Report (November 1993).

2 Assessment of the project and project components

2.1 The project over-all

2.1.1 General

The Rada Water Supply and Sanitation Project (RWSSP) effectively started in 1986 when the Netherlands Government decided to withdraw its support from a project they were going to carry out in Ibb and Dahmar together with the Germans and to redirect these funds (Dfl 26 million) to Rada. There had been a strong Dutch presence in the area since 1978 through the Rada Integrated Rural Development Project, which covered nearly the whole of Al Baida province. Being a rural development project, however, none of its activities took place in Rada town, so naturally there was pressure to "do something" for the Rada urban area. This pressure had also been stimulated by the Dutch-sponsored Rada Urban Development Study (1981/82), which produced a study and recommendations (including an outline plan for infrastructure investments) but no action or investment.

Rada is a small but rapidly growing town with a limited stock of infrastructure, of variable quality. The demands of its rapid growth could no longer be satisfactorily met by the individually organised water and waste water systems, but the institutional basis to develop modern and comprehensive systems is absent.

In July 1986 a project proposal was formulated, out of which the present RWSSP project has developed. (Those proposals were partly based upon the plans worked out through the 1981/82 Rada Urban Development Study and published in 1983). The consultants mobilized their staff in Rada at the beginning of 1988, and the present expectation is that the construction of project components will be successfully complete by the end of 1994.³

In 1993 we can observe that the basic concepts have been carried through consistently. The different components (drinking water, sewerage, solid waste collection, and rainwater drainage) are being constructed and implemented broadly in line with those original concepts from 1983 and 1986.

2.1.2 Project Expenditures

Unfortunately, the same observation on consistency can be made concerning the non-hardware components: institutional development, environmental health education, and training. There was no clear concept in 1983 and 1986 of how to handle these components, and in 1993 there is still none.

There is one important exception to this picture of consistency with the original concepts: the project costs! In 1986 the existing GON budget allocation was Dfl. 26 million, to be spent on the proposed infrastructure investments; the Formulation

³ There are many explanations for the stretching-out of the project timetable: some (such as the Gulf War) are exogenous and beyond the control of the project partners; but some are to be found within the RWSSP itself (its approach and the way in which it has been implemented) and within the Yemeni authorities (procedural and bureaucratic delays).

Mission therefore proposed a project which, by their rough estimates, would fit this budget (total cost of Dfl 33 million including Technical Assistance, with an expected Dfl 7.5 million of counterpart financing from GOY).

In subsequent development of the project, however, the budget steadily escalated, leaving the original Dfl 33.0 million figure far behind. By late 1992 the project's estimated expenditures had grown to a total of about Dfl. 78.1 million (including a GOY contribution of Dfl. 8.9 million). (See section 3.1.1 for further information.)

The Technical Assistance costs (originally suggested by the Formulation Mission as totalling roughly Dfl. 3.0 million) have grown even more rapidly than the capital investment costs, reaching a total of Dfl 16.1 million by the end of the second contract period (August 1993). The additional Dfl. 5.4 million which has been requested for the final 16 months (to the end of 1994) would bring the T.A. total to Dfl. 21.5 million.

The total project cost (all components, including Technical Assistance) will come to about Dfl. 78.1 million, more than double the figure estimated by the Formulation Mission in 1986 and more than 50% greater than the amount specified in the December 1989 Plan of Operations. For the 1995 design horizon this would mean an average total project expenditure of about Dfl. 1,560 per capita - roughly Dfl. 10,940 - 14,000 per household⁴ - impressively high figures for a country with an annual per-capita income probably in the range of Dfl. 1250 - 2500.

2.1.3 Project Approach

It is clear that the RWSSP has from the beginning been hardware oriented. Engineers have set out to do their utmost to leave a piece of solid Dutch engineering work in the barren lands of Yemen. In this narrow regard (ignoring for the moment the financial, economic, social, and institutional aspects), the Mission is quite positive in its judgement on the handling of technical affairs by the project team.

Nevertheless, this preoccupation with the project as a "one-off" engineering-construction task to which everything else has been subordinated reveals an approach to development planning and projects which has been largely abandoned by international development agencies and professionals. (see Chapter 5 for a fuller discussion of this points.)

To give one illustration, it is a long time since any of the Evaluation Mission members has encountered a project in which cars, computers, allowances and the like have been handed out so generously to the counterparts and to the consultants themselves. The justifications are familiar: all the other donors are doing the same; it is necessary in order to speed up the project and avoid delays; cooperation from the Yemeni side would not otherwise be forthcoming; etc. While there is some truth in these arguments, the disadvantages of such an approach are equally clear.

An obvious disadvantage of this attitude is that it increases costs and consumes money in ways which do not contribute directly to the project. More important, it clearly

⁴ On the basis of 9 persons per household, the figure suggested by Rada surveys, and a total of 50,000 population, we estimate 5550 households; if the average size is smaller (and there is considerable uncertainty over this) at say 7 persons per household, then the estimate is for 7140 households.

undermines sustainability when a project is pushed ahead in the short-run by creating a temporarily resource-rich environment during project implementation. In most cases (and this is true in Yemen) the local organisations which are going to operate and maintain the works cannot provide the same perks and extra resources once they take over; in such a situation it becomes difficult to find or keep capable and motivated staff or to find financial and technical resources at the same level as before. A "demonstration project", rich with financial and professional resources, may be pushed to a successful completion of construction, but such an expensively obtained "success" cannot likely be repeated elsewhere.⁵

This message, however uncomfortable for all parties concerned, is important; and given the commendable honesty and frankness of the Yemeni authorities, such issues should be discussed openly among all the partners in the RWSSP.

2.1.4 Institutional Development and Sustainability

This Evaluation Mission's main comment on the over-all progress of the RWSSP, however, concerns institutional development and sustainability - points which are repeated throughout this Report.

In our view, the considerable energy and creativeness which the project has directed towards its engineering tasks have certainly not been matched on the institutional development side. On the contrary, it seems clear that institutional development has been treated as a "sideline". For instance, although the consultants and the GOY are aware that setting up an operational organisation cannot be done overnight, the workshop and office accommodation for the local NWSA branch will be finished only shortly before commission the whole project. Equally, forwarding organogrammes with a covering note to the counterpart organisations is not going to solve and institutional problem, nor is simply blaming them that they do not respond.

The Evaluation Mission has raised these institutional development and sustainability questions in most of its meetings, including at various levels in the Government of Yemen. In most cases, government officials have given the impression that filling in the posts was not easy but definitely could be and would be done. (In contrast, Yemeni staff who are more closely involved with day-to-day implementation are generally less optimistic.) The Mission fears that the urgency and importance of these matters is still not fully appreciated.

It is widely acknowledged that the counterpart organisations have not in fact provided staff and budget according to the agreed plans. There are many reasons for this, of course, and the Mission is sympathetic to their difficulties. Nonetheless, a minimum GOY participation is necessary to ensure the sustainability (and thus the success) of the project, and in several ways even this minimum is not forthcoming. The Mission has pointed this out rather bluntly, observing also that this situation would be taken in consideration by the Netherlands Government in deciding upon requests.

⁵ This is the crucial criterion of *replicability*, so strongly promoted by the World Bank and others beginning in the late-1970s and early 1980s.

2.2 Water supply system

Rada currently gets its drinking water from small, mostly privately owned systems. The consumers are connected, through a disorderly network of small galvanised pipes running all over the streets, to the pumping main coming from one of the numerous private boreholes. Most systems provide water for only a few hours a day, and the line pressure is low. The consumers fill their ground reservoirs, from which the water is raised, in most houses, to a roof tank by means of a small electric pump. For the privilege of being connected to such a system the consumer pays a flat rate of about 100 Rial (no systematic data have been gathered) per month. The capital outlay for reservoirs, interconnecting pipework, and pumps, which can be a considerable sum, is paid by the individual consumers. The approximately 7% of households which are not connected to any system (according to a survey carried out by the project) are provided with water by neighbours and/or family or by means of water tankers, which charge between 50 and 150 Rials (again, no systematic data have been collected) per load.

This system of small diameter pipes and privately owned boreholes was assumed to be unsuitable for continued use, and therefore a wholly new, centralized system has been designed which will encompass all houses and totally replace the old systems.

The new Rada water supply system is designed to serve an estimated 1995 population of 50,000 people. In a second phase, which is not part of the present project, the system can be extended to serve the 75,000 population expected by the year 2010. It is the intention to provide all houses with an individual metered connection, with all water consumption being paid for by the users. The fundamental issues about the tariff structure, in relation to NWSA practice, national legislation, and the Rada population's ability and willingness to pay, have not yet been resolved. (See also Chapter 4.)

The main technical components of the water supply system are:

- well field with 6 deep wells, each equipped with a submersible pump of 10 l/s at about 110 mwc; additional well sites have been identified for future drilling;
- ductile iron pumping main with a total length of 60 m x 150 mm diameter, 720 m x 200 mm diameter and 3560 m x 300 mm diameter;
- before entering the reservoir the water will receive a safety chlorination via facilities in an office, workshop, and stores compound to be constructed along the pumping main; gaseous chlorine, to be imported from Saudi Arabia, will be used as oxidizing agent;
- power plant, 165 plus 2 x 85 kVA, situated at the main compound and connected with 11 kV overhead cable to the well field;
- concrete storage reservoir with a capacity of 750 m³ from which the water will flow by gravity into the distribution system;
- transmission main from reservoir to distribution network, consisting of 1200 m x 300 mm diameter ductile iron pipe;
- primary, secondary and tertiary distribution network, consisting of 4410 m of 200 mm diameter and 980 m of 300 mm diameter ductile iron pipe for the primary system and 44,405 m of 50 mm diameter and 27,265 m of 90 mm diameter HDPE pipe for the secondary and tertiary network;
- 5000 house connections, including meters.

The design of the system is basically simple and straight forward, trying to minimize current investment levels while at the same time keeping options open for future extension. The reticulation is developed as a branched system within which looped sections will be established where economically justified. The primary loop can be closed as and when developments warrant such action.

If the Yemeni authorities succeed in protecting the well field against further extractions by private well drillers, sufficient water will be available for the foreseeable future. However, the project hydrogeologists observed a ground water abstraction (primarily for agriculture) in the wider area which is not offset by a sufficient recharge of the aquifers. This indicates a serious long-term problem, as surface water cannot be a realistic alternative in Rada. This is a matter of vital importance which should be dealt with at the national level.

Against that background description, the Mission wishes to raise questions in respect to some of the design criteria adopted by the project.

2.2.1

The reticulation system seems to have been designed on a NWASA criteria of 60 l/c/d in 1990 gradually increasing to 100 l/c/d in 2010. Considering the fact that Rada is hoped to become one of the few Yemeni towns with an uninterrupted water supply, if not the only one, the applicability of such general criteria to the Rada situation seems questionable. It is therefore regrettable that the consultant has not tried to acquire more systematic information on actual and potential consumption in the specific local circumstances.

2.2.2

Equally, the decision to construct a reservoir of only 750 m³ capacity seems to have been based on conflicting criteria. It is true that in the more developed countries there is a tendency to minimize the size of reservoirs, in order to reduce the relatively high investment cost. This reduced safety margin, however, is normally backed up by an enormous spare capacity in the pumping, piping and power elements (as well as by quick-response repair capability); no such spare capacity will exist in Rada. The limited size of the Rada reservoir (equal to less than a half-day's consumption) would require that any breakdown in pumping main, power generation or distribution, or automatic system be repaired in a matter of hours if the supply is not to be interrupted.⁶

Relying on the tank capacity still available in private homes is not desirable, however, because another intention of the project is to reduce or eliminate the use of such individual reservoirs because of their high risk of contamination. (Purification and cleaning of these reservoirs would be very difficult.)

2.2.3

The choice of cast iron as the material for the larger diameter pressure pipes seems an expensive one. Without doubting the qualities of such pipes, the Mission still wonders why these pipes had to be of a prescribed brand (rather than simply of a prescribed performance standard), with alternative offers precluded. An economic analysis of

⁶ Spare capacity is built into some elements of the new Rada system, but it remains true that "a chain is no stronger than its weakest link"; the Evaluation Mission remains worried about system vulnerability.

different pipe materials would have been appropriate, to confirm that this decision was based not only on sound engineering, but also on sound economic principles.

2.2.4

Because the contractor started his construction work only recently, little can be said about the quality of his work; nonetheless, the Mission got the impression of a competent organisation, which unfortunately seems to have been slowed down by cumbersome and inflexible official Yemeni procedures. The Mission foresees that if these potential problems are not addressed properly, there could be further delay and, ultimately, a situation in which financial claims will be raised. The Mission recommends that the RNE, RWSSP, NWSA, and the Government of Yemen take up this issue as a matter of some urgency.

2.2.5

This Evaluation Mission shares the concerns expressed earlier by the Monitoring Mission that the success of the project will depend greatly on the preparedness of the Rada population to be connected to the new system and that the consultant has done very little to substantiate NWSA's general expectation that everyone will readily and rapidly connect. The Mission would certainly have expected the consultant to have conducted systematic and thorough studies on affordability and willingness to pay, including detailed examinations of present levels of consumption and payment (in Rada and in comparable towns elsewhere in Yemen), estimated direct and indirect costs for connecting and using the new system, potential availability and attractiveness of alternative systems, levels of income, etc. Such studies are normal steps in any development project involving paid services; despite the inherent difficulty in executing such investigations, numerous techniques have been evolved and applied successfully - and are reasonably well known and documented.⁷

2.2.6

The Mission has seen little concrete evidence of sufficient progress toward the institutionalization of the proposed Rada branch of NWSA. This is a subject of great concern, which is discussed at length in Chapter 4.

2.3 Sewerage system

Currently no adequate waste water disposal system exists in Rada. About half of the households dispose of their waste water via septic tanks and soakaway pits, many (perhaps most) of which are not emptied regularly and some of which are overflowing permanently. In parts of the city, the ground is not permeable and hence septic tanks or soakaway pits are not feasible; particularly (but not exclusively) in these areas, waste water can be often seen running freely onto the streets. Together with the solid waste which is still to be found in many areas, this creates a very unhygienic situation. The densification of housing together with an increase in the utilisation of modern flushed toilets causes a further deterioration of this situation.

⁷ This concern relates to a more general criticism about the paucity of systematic investigations and data collection in the project as a whole; see also §3.2.

2.3.1

It is asserted by the consultants that because of the adverse soil conditions and the density of the housing, septic tanks and the like could only provide incidental solutions, and therefore a central collecting and treatment system had to be chosen. The Mission, however, is not entirely convinced by this assertion, especially since the consultants apparently did not undertake a thorough analysis or feasibility study of alternative or mixed systems in different parts of the service area. Especially in view of the Yemeni tradition of even separating solid from liquid human waste, one would have thought that simpler solutions could have been identified and developed, at least applicable for some areas, instead of going directly for the very expensive solution of central collection and treatment.

Based upon the decision to go for a uniform piped system, the project has designed a first phase (1995 planning horizon) with the following elements:

- 4500 house connections consisting of a 110 mm diameter pvc pipe coming from the house into a small inspection chamber. (The positioning of this chamber proved to be a difficult part of the operation, because of the perpetual right of way disputes in which the Yemeni property owners seldom show much willingness to compromise);
- a system of tertiary, secondary and primary sewer lines of PVC pipes with diameters of 110, 160, and 250, 315 to 400 mm diameter respectively; total length of the system is nearly 100 km;
- for maintenance purposes the sewer lines are provided at every 50 to 80 m with manholes;
- a transmission line of 400 mm PVC will transfer the waste water by gravity to the treatment plant;
- 2 or 3 small pumping stations are required to lift the waste water of a few low lying districts into the sewer system;
- treatment consists of a series of oxidation ponds after which the treated effluent will be infiltrated into the ground.

2.3.2

The Mission is of the opinion that the design is based on sound and solid principles. At the same time it would appear that the tendency towards robustness sometimes is carried too far. The precast manholes, for example, are unnecessarily overdimensioned. The Mission reckons that by reducing the wall thickness, a cost saving of about 3.5 million Riyals in concrete and transport costs could have been achieved, without any significant loss of quality or sturdiness.⁸

On the other hand it is regretted that for the manhole cover a non-lockable option is chosen. Observations in other Yemeni towns (e.g. Dhamar) suggest that such covers are frequently lifted to deposit solid waste into the sewer system and that such occurrences are the most common cause of blockage.

⁸ A calculation was made during the mission, based on the actual tender prices of Archirodon, for the price difference between manholes of 150 mm and 250 mm wall thickness. The structural engineering aspects are complicated, but simply stated, additional wall thickness does not effectively provide resistance to the horizontal forces which are in practice the most dangerous for manholes. Other engineering solutions are also possible.

2.3.3

Also in the positioning of the connection/inspection chamber, conflicting ideas are discernible. If the maintenance of the inspection chamber is going to be the responsibility of the house owner (as indicated in the design report), then positioning on his private ground seems the most obvious solution. This would reduce the risks of traffic damage and unauthorized interference allowing again for a considerably thinner and therefore less costly, cover slab.

It is appreciated that right of way disputes have reduced the attractiveness of this option; the problems which arose during the first implementation efforts were certainly enough to discourage the project management from that option. Nonetheless, the decision to locate in the public right of way (away from the house) may prove to be a case speeding up project implementation in the short term while and complicating operation and maintenance in the long term. Resolving land disputes was outside the power of the RWSSP itself, but it should have been possible to find, perhaps with close involvement by local clan and neighborhood authorities, solutions to right of way disputes that would not significantly delay the progress of the project; however, that would require strong and sustained intervention by the Government of Yemen.

2.3.4

The Mission was surprised to observe during its visit that the whole sewerage system was being redesigned by RWSSP staff; the Mission naturally wonders why this is being done, what influence this is having on the overall project progress, and moreover to what extent is the client now having to pay twice for the same service.

2.3.5

The Mission supports the choice of a pond system for sewerage treatment, for which there are few feasible alternatives. The over-riding advantages of the chosen system are its simplicity and its robustness, especially its ability to continue functioning (at least to some degree) despite inadequate maintenance. These advantages outweigh, in the reality of Yemeni operating conditions, the theoretically superior performance of more complicated and maintenance-intensive systems.

2.3.6

The Mission wishes to express its concern, however, about the process that led to this decision. The pond option was for various reasons the preference of the Monitoring Mission, although the consultants preferred another system. At the insistence of the Monitoring Mission, a study was undertaken to compare the two systems; but when the study was completed, its results (in favour of the consultants' system) were challenged and then rejected. The final decision was still in favour of the pond system. This is a rather expensive and time-wasting way of reaching a decision, the essence of which was operational and economic, rather than purely technical.

2.3.7

The Mission wishes as well to bring up the disappointing fact that in Yemen even the oxidation ponds are not performing as well as should be expected. Part of the problem is that the principle of low maintenance seems sometimes to be translated into no maintenance at all (e.g. Al Baida⁹). This is a problem which NWSA and the local

⁹ When the treatment site was visited, it was totally without staff; the small sheds there were used only by the goats.

authorities should take up immediately. It also illustrates both the general need for "after project care" and the wide-spread weakness of maintenance activities in practice.

In addition, we suggest that the Yemeni authorities (not the RWSSP) undertake a systematic analytical study to establish whether Yemeni climatic conditions and waste water composition play a role in the observed difficulties of oxidation ponds. Considering the many important decisions to be taken about sewerage treatment investments, such a study would be most welcome. (see §7.3.6)

In the light of these observations on pond performances and on the reality of operating conditions, the Mission questions the wisdom of incorporating into the design such expensive elements as bottom sealers or even postchlorination units.¹⁰

2.4 Solid waste collection and disposal

The Yemeni people do not have an established tradition in solid waste collection nor do they seem to be inclined to make this a matter of high priority. Waste is often simply thrown out of the house onto the street. The increasingly unhygienic condition of its cities has prompted the Yemeni Government to seek assistance in their struggle with this problem.

The Netherlands Government has been supporting the Government of Yemen for some years already with solid waste programs in a number of towns. The Rada project being an integrated project directed towards environmental health improvement, it was logical also to have a solid waste component within the RWSSP.

This background may explain - but certainly does not justify - the action of deciding *in advance of the project* upon a technological and operational solution to be imposed upon Rada. Apparently, the hardware components (DAF/Geesink compactor trucks and containers) were already on order even before the RWSSP was officially started. It is not clear how or by whom the decision was made to thus pre-empt the choice of solid waste system, but it is an unprofessional and inappropriate way to start off a project.

This Mission considers it highly regrettable that the project was thereby given no opportunity to analyse alternatives and no opportunity to perhaps decide upon a different approach to the collection of solid waste. It is particularly regrettable because at the time of project formulation there were already signs that the solution (DAF/Geesink compactors and 1 or 1.6 m³ containers) was not as successful as many people had originally thought.

A key objection against such a high-tech hardware-oriented approach is that while the system is struggling to prove its worth under Yemeni conditions, it is blocking the way for possible intermediate solutions. (It is very difficult to persuade a society to move back from a heavily mechanised to, say, a donkey cart system.)

This is not to say that the compactor truck system is totally or permanently unsuited to Yemeni conditions; however, operational experience so far is not encouraging. The low rate of operational availability, the long times which trucks spend out of action,

¹⁰ The postchlorination units at the Dhamar treatment facility were fully equipped but wholly unused.

and the low productivity of associated labour, all mean that the expected advantages of the highly-mechanised system - such as high productivity - are not being realised in practice.¹¹

The Mission believes that Yemen needs a differentiated and flexible approach to its waste collection. Small, unpaved, steep paths require different solutions for solid waste collection than do wide, flat streets; Yemeni towns have many areas of both types, plus a variety of other sections of varying degrees of accessibility to large equipment. We regret that no thorough studies have been done of the possibilities of mixed systems, with different hardware and operational solutions applied to different parts of the over-all solid waste collection and disposal sector.

The containers as provided in the various projects, apart from frequently suffering from damage to their wheels (especially when placed on unpaved and uneven street surfaces), are not being utilized according to expectations, to judge from the amount of solid waste that litters the ground around them.

The Mission believes that many problems arise simply because this particular hardware solution was basically imposed from the outside onto the Yemeni situation. Consider the following: when it is observed that a lot of the waste ends up around the container, it is not concluded that these Dutch containers are too high; instead, it is said that the people involved (in Yemen mainly the children) are too small, so the solution is to adapt the people to the containers, for example by providing them with stepping stones.¹² Increasingly, those involved with running solid waste systems, including high officials in the MUPH, are beginning to look for more Yemeni-oriented solutions.

At another level, and without questioning the right of the Yemeni Government to pursue such mechanized western solutions if they so wish, the Mission wishes to stress the critical nature of operations and maintenance: unless and until the Government of Yemen is prepared and can provide the institutional and financial back up for these systems, continuing support of the solid waste sector in its presently mechanised form is difficult to justify. (This critical problem is discussed further in Chapter 4 on "Sustainability".)

For example, It is frequently said in Rada that the problem of trucks remaining in the workshops is because there is no foreign exchange to buy (imported) spare parts. Other people observe, in contrast, that sometimes the trucks are out of action because of a shortage of (local) funds to buy fuel or tires. The causes of trucks being non-operational is in any case an empirical question which could (and should!) be investigated, so that the discussion is informed by systematic rather than by anecdotal evidence.

¹¹ For example, in Rada there are three compactor trucks; however, the RWSSP staff study calculated that a city the size of Rada should need only one truck (if properly maintained and properly utilized) and certainly no more than two. Yet if three are needed in reality (because of inefficient labour practices, low productivity, high "down-time") then the heavy capital investment begins to outweigh the advantages of the mechanised system.

¹² This type of solution seldom works reliably in practice; the stepping stones are knocked over, or the container may be replaced too far away from the stone.

Nonetheless, if it is true that foreign exchange (spare parts) is the key bottleneck, then the hardware system seems particularly ill-chosen: it is technologically a system which "locks in" a permanent maintenance problem!

The Rada solid waste project started off with 2 compactor trucks, 425 containers plus some other heavy equipment and an enthusiastic staff to get the system going. There was an active public information campaign run by the project, and popular attention had been captured by a successful clean-up campaign in late 1988.

It appears that the Rada project was the first in its kind in Yemen that really tried to introduce some method in its container spacing and collecting schedules. A rough monitoring system was set up to record the degree of filling of containers and the running time of the compactor trucks. However, this monitoring effort was not very systematically pursued, it was not supported by anyone skilled in the design and execution of such things, and the results were not in fact analysed or used in operational decision-making.

In January 1993, the project issued a detailed and well-done technical analysis of the waste collection system, including some comparisons among Yemeni towns ("Transfer Report: Rada Solid Waste and Disposal"). Unfortunately, the present situation, based upon compactors and containers, had to be taken as the starting point of the analysis, since that decision had been taken years earlier. Some of the conclusions of that study were:

- need for a clear national policy on solid waste;
- lack of qualified staff at managerial as well as at technical level;
- need for a proper financial basis either by direct revenue generation or by a more substantial and reliable governmental budget support;
- need for clear procedures and operational planning.

The solid waste activities in Rada have been suffering particularly from a lack of effective support from the Government of Yemen authorities. In recent times, much of the equipment has been grounded due to lack of finances to buy fuel and spares, apparently due to budget problems at the national level as well as to delays in actually receiving even the approved sums. The staff have been on strike because their salaries had not been paid for several months, a situation that arose partly because these moneys are routed via the Governate in Al Bayda, where they only come out with considerable delay and occasionally even find a different destination.¹³ The sweeper force has never been brought up to the required numbers. Low salaries make it difficult to attract or retain good staff.¹⁴ Despite repeated promises from the MUPH, additional staff who are to be posted to Rada seem seldom to arrive.

All of this has resulted in low staff morale and in an inconsistent collection result. Despite all these adverse factors, however, solid waste is still being removed with some regularity and the situation is nowhere near as bad as it was before the project started. This is not only a tribute to those staff who still struggle to keep things working, but it also suggests that a viable system could be operated if the proper

¹³ In mid-1993 it was finally agreed at national level to route the O&M funds through the RWSSP budget, to ensure that money is available for the solid waste activities; unfortunately, this agreement does not yet extend to money for salaries.

¹⁴ It was reported, for example, that a valued supervisor was earning significantly less than the sweepers whose work he was supervising.

equipment and proper support (operational, managerial, and financial) were made available.

The apparently carefully selected dumpsite is still not accessible, as local villagers have raised objections which have prevented work on the site.¹⁵ So far, the Government of Yemen authorities have not been able to resolve the matter. As a result, the whole program is greatly delayed, and an unsatisfactory (and unhygienic) temporary dump site is continuing in use.

Although according to firm agreements the solid waste section is supposed to be handed over to the municipality in July 1993, the section seems still to lean heavily on the project.¹⁶ Although there have been strong commitments on the part of the MUPH to nominate certain key staff, little has actually been done so far. Some of the agreed budget provisions have finally been made available, but considering the time and pressure required to achieve this, there is little hope that such issues can be satisfactorily resolved when the waste collection becomes an independent entity based in the Rada Baladia.

The issue of the ability of MUPH to actually deliver the needed support to the solid waste activities of Rada is considered by the Mission to be of great importance. It is an issue which has been strongly put during discussions with the Ministry, and it should continue to be pursued vigorously by the Government of the Netherlands; indeed, if there is no improvement in the MUPH's actual delivery of funds, personnel, and other support then it should be questioned whether GON support for solid waste activities should be continued.

In various discussions the issue of privatisation of solid waste collection or of parts thereof was raised. Although the Mission does not see privatization as a panacea for all the problems encountered, it certainly recognizes that, in view of the persistent weakness of the responsible authorities, new and innovative approaches to creating a sustainable solid waste operation have to be found. A study (for the MUPH) into the various aspects of privatization of solid waste collection has been agreed upon. When the results of this study are available, the Government of the Netherlands should participate actively with the MUPH in exploring possibilities for implementing suitable new ideas. This is particularly attractive because there is a powerful tradition in Yemen of paying for privately-purchased goods and services while at the same time there is an equal tradition of expecting "government" services to be provided free of charge.

2.5 Drainage

Although it seldom rains in Rada, when these storms do occur they often are concentrated enough to cause flooding in the low-lying areas of the town. Combined with the solid and liquid waste already found in such areas, this obviously creates a

¹⁵ The reasons for the villagers' action are not wholly clear. According to some reports, the villagers are trying to force the RWSSP to give them water; according to other reports, it is a land dispute aiming at substantial compensation.

¹⁶ The January 1993 "Transfer Report" included an identification of bottlenecks and concrete recommendations for improvements at various levels which could help better prepare for the hand-over.

health risk. The absence of any effective drainage system, plus the gradual build up of hard surfaced area, compounds these problems.

It seemed logical, therefore, that remedial measures for drainage should be incorporated into the RWSSP. The drainage system chosen for the project was based on grading and surfacing a network of roads which would carry rainwater out of the city. An unrelated but important secondary purpose of hard-surfacing some of the streets was to protect the expensive pipe-work (water and sewer lines) being installed under them.

Once these designs emerged, it became clear that the people of Rada were keenly interested in the development of a paved street system, for reasons other than just concern for periodic rainwater drainage. The Netherlands Government, on the other hand, was on principle not prepared to support a "roads" project. So a compromise was reached on a network of drainage surfaces which closely resembled, but were not intended to actually be, a road system.

In line with the constraints of the donor (GON), the proposals as presented in the design report (1989) entailed the following:

- surfacing of 13.6 km of tertiary drains with concrete tiles or rammed concrete (approx. 34000 m²);
- Surfacing of 13.8 km of primary drains in a concave form and covering them with asphalt (approx. 84.160 m²);
- outlet structures.

The estimate for these works was 21.3 mln YR or 4.9 mln Dfl. (excluding heavy equipment).

This cost figure was achieved by various design restrictions, for example keeping the width of the paved part of the roads to 6 m, intended to conform to the budget that DGIS would provide. During the succeeding years, however, several experts were brought in to advise on the design and shape of the road/drainage system, and as a result of these technical discussions the cost estimate has gone up to 6.3 mln Dfl, even while the detailed designs have yet to be prepared.

The total budget figure for the RWSSP, as originally committed by the GON, will in fact be sufficient only to pay for the already-signed contracts for water and sanitation works, leaving nothing for the drainage works (which come last in the sequence of implementation). In other words, cost increases in the earlier components of the project have consumed the available funds. That fact, together with the increased cost estimate for the drainage component, means that the GON will have to be asked for a new allocation of at least 6.3 mln Dfl.

Given the long-standing general commitment of the Netherlands Government to the inclusion of surface drainage in the Rada project, it is still the desire of the GON to provide the funds necessary for completing the drainage component. But this "desire" will not necessarily be translated into a firm financial allocation. There are current economic and financial difficulties in the Netherlands as well as in Yemen, and extra budget is not so readily available today as it once was.

More important, the final decision will be taken by the central authorities of the Ministry of Foreign Affairs in The Hague, and their approval procedures will subject

this budget request to close questioning and analysis. For example, as suggested below, the GON may need to be convinced that the Government of Yemen (MUPH) will in fact fulfil its promises and provide the counterpart funds and staff which are necessary for implementing and, especially, maintaining the drainage component.

As only the general concept seems to have been agreed upon (the detailed design still has to be made), not much can be said on the technical aspects of the drainage system. There are, however, a few general remarks which the Mission wishes to make in this respect.

2.5.1

As can be seen in other towns, the condition of the roads plays an important role in determining the effectiveness of the solid waste removal system, primarily by making it much easier to sweep and collect loose rubbish. Smoothly graded and/or paved roads also make it easier to pick up and reposition the containers. These could be important side-benefits for Rada, where the mostly unpaved roads are extremely difficult to keep clean.

2.5.2

On the other hand, the curb stones proposed for Rada may cause extra problems for the containers. Extra cost increasing measures will be required, while the container positions probably will have to be fixed for other reasons than consumer ease.

2.5.3

There is some concern that the system, although designed as drains will perform that function only a few days per year. Not being designed as full roads, they might be damaged the other 360 days of the year when they are in fact being used as roads. The proposed thickness of the tar layer, which came as the result of the economizing discussions referred to above, does not leave much hope for permanence, especially as there is not yet any information on the intended compaction specification.

2.5.4

The discussion about the convex versus the concave profile has been exhaustive enough; nevertheless, the Mission retains some reservations about the reliability in practice of the connection between paved and non-paved sections.

2.5.5

The major concern of the Mission is again on the issue of "sustainability"; the MUHP has still to convince us that they will be able to organize the Rada municipality to the level required for organizing and executing road maintenance, including proper utilization of heavy equipment.¹⁷ (The Mission was informed that around Dfl. 1,000,000 of such equipment has been purchased through the project and has for some time been sitting idle.)

The Project Steering Committee recently proposed to let the secondary roads be graded by the civil works contractor, because the MUPH will not be able to perform

¹⁷ If not very carefully supervised, this heavy equipment poses a great danger to the expensively-installed water and sewerage system; these powerful bulldozers and road-scrappers are real threats to the massive manholes being installed.

this job at the required time (even though grading of the secondary roads was an agreed MUPH contribution to the project). The estimated costs of Dfl. 320,000 were asked to be paid out of the contingencies element of the main contracts; it was also agreed to ask DGIS to "replenish" these contingencies, which means that the cost of grading would in reality be met by "new" money from the GON.

This recent development is discouraging; if the MUPH cannot be relied upon to properly maintain these drainage roads and keep them in profile, then there is not much sense in spending more than Dfl. 6,000,000 to construct them.

2.6 Environmental health education/ extension and training (EHE/ET)

2.6.1 Objectives of the programme

During the inception phase of the RWSSP a proposal for an Environmental Health (EHE) Programme was formulated, at the insistence of the DGIS. The reasoning was that the health effects of an infrastructure project would be far greater if an educational programme about proper and effective use of the water, sanitation and waste disposal facilities would be implemented simultaneously with the infrastructure works. A Plan of Action for EHE, however, was included by the consultant as an equal project component in the Plan of Operations only at the specific insistence of the Monitoring Mission.

The Plan of Operations (Chapter 8) states the objectives and general approach of the EHE programme to be as follows:

- to support the technical sections with the design, introduction and optimal use of the physical facilities to be provided;
- to focus on the entire Rada Urban Area population, which would have to adjust its present practices concerning sanitation and waste disposal;
- to stress community cooperation and community responsibility;
- to mediate between the Rada Urban population and the technical sections of the project.

Two years later (by the end of 1990), a significant shift in the priorities of the EHE Section was made, i.e. to concentrate on water and sanitation and to reduce the focus on solid waste. This was decided upon by the Project Management and the Yemeni authorities, and supported by the Monitoring Mission. The name of the Section was changed into Extension and Training (ET) Section. The ET Section's redefined tasks would be:

- support the implementation of the water and sewerage infrastructure by disseminating information about the construction activities of the RWSSP;
- focus on environmental health education related to water and waste water services (and in consequence, stop with health education related to solid waste);
- organise and implement training for the personnel of the future NWSA branch office and MUPH/Baladia office.

The Section's plan of action from then on followed the sequence of technical works as they were implemented District-by-District, planned in accord with the three project phases:

1. prior to delivery of services: problem awareness, announcements on project progress and type of services, and establishing intermediate contacts;
2. during delivery of services: technical information on in-house facilities, connection procedures, solid waste collection schedules, and routings;
3. after delivery: proper use of services, environmental health related improvements, and environmental issues.

2.6.2 Strategy and activities of the programme

During the first two years the strategy was, to build up a broad-based network of District Coordinators and volunteers to promote environmental health, in particular to mobilize the population to participate in solid waste collection; and also to organize together with them other activities such as school campaigns about environmental health, cleanliness competitions for restaurants and butchers, meetings with men, and meetings with women.

Unfortunately, the network of District Coordinators was allowed to lapse. The official reason given, "too time-consuming" is, on its own, not convincing. It is to be regretted that the network is no longer operational, as it might have become the nucleus of an independent grassroots movement for a cleaner environment, and could certainly have stimulated community responsibility and initiatives.¹⁸ At present District Coordinators are only contacted ad hoc to organize public meetings.

The backstopping mission of November 1992 articulated clearly the intended approach to the extension activities: a campaign to reach all households with Newsletters and leaflets, followed by a very small number of meetings with men to reinforce the information (if required), to be followed in turn by a large number of meetings with women to inform them about the implementation of project facilities, the necessity of improved house connections, and the use of the facilities.

Despite the good intentions, it has proved to be very difficult and time-consuming to organize meetings with women. They do take place, but the number of women attending is variable and unpredictable, and follow-up meetings are not feasible.

A separate activity is the EHE course at the Informal Women's Training Centre which is held twice a year and which is reportedly well appreciated by those who attend.

The emphasis in the EHE approach is on giving out information in a one-way process, differentiated according to the three project phases. It is a positive feature that the information campaign instructs the population during the pre-service and house-connection phases about project progress, the required technical adjustments to their existing systems, and about new municipal procedures and schedules.

¹⁸ Earlier activities of this network seem to have had an impact: residents have learned to expect public solid waste service, for example, and now point accusingly to the Baladia when garbage is lying in the streets.

This information provides an important link between the new piped, project-provided, systems on the one hand and the existing systems of the user-households on the other hand.

A negative aspect of the phasing of the information campaign is, that hygiene education about the proper use of water and sanitation facilities is delayed to a later project phase. The health risks resulting from the faulty and leaking existing systems are large. These risks should have been addressed as well through early hygiene education (e.g. hand washing, water storage, cleaning of facilities), if indeed the ultimate project aim was the improvement of the population's health. The Mission sees no inherent reason why environmental hygiene education should have to wait till the new piped facilities are constructed.

In accordance with the ET Section's work schedule of 1990, the years 1991 - 1993 were used for the preparation of water and sanitation related health education. These messages will be disseminated on a large scale in the first of the four groups of Districts from September 1993 onwards. At that time the first phase of the water and sanitation system is scheduled to become operational (as the commissioning is likely to be delayed, the start of the EHE messages may have to be postponed as well). Other Districts will have EHE campaigns even later.

In the meantime a minimum of environmental health education is continuing through the RWSSP Newsletter. Similarly, the EHE courses for women at the Informal Training Centre in Rada continue to take place regularly.

The main approach to EHE has been to increase the residents' knowledge. Group meetings were and are used to disseminate information only, rather than to utilize group processes for attitudinal or behavioural change. Exceptions have been the network of District Coordinators and the school committees, who shared responsibility for making people change their habits. A recent example of relying on socio-economic processes in the community is the ET Section's initiative to motivate farmers in the well field to dispose of their used engine oil in a safe way. The ET Section supports them to organize this activity themselves.

school

2.6.3 Educational and information materials

As information material the ET Section issues quarterly Newsletters and leaflets to inform the public about project progress. They are eagerly read by a wide public, mainly men.

Recently the ET Section started an interesting experiment to reach the Rada' women (92% of Yemeni women are illiterate¹⁹). Meetings with girls attending intermediate school are organized in small neighbourhoods. The girls undertake to visit households in their own street and read the leaflet to their mothers and relatives. This is not an uncommon practice, as girls are used to reading magazines to their mothers. Together the girls should be able to reach a large range of women. The enthusiasm of girls, (and of their mothers and fathers) to participate in this activity is great. Some women of the Women's Training Centre participate in this experiment as coordinators or supervisors.

¹⁹ Yemen Times, 20 June 1993.

A plan to monitor and evaluate this new approach to informing women on a large scale has not yet been prepared, although the ET Section has the intention to do so.


Other EHE materials used are large posters, smaller drawings, and booklets. The educational quality of these materials varies considerably and some will certainly not stimulate the lively dialogue expected of good materials. The Mission did not have the opportunity to view the video films which have been produced.

The Mission does, however, find the ET Section's heavy concentration on written material perhaps debatable in a largely verbal (and non-literate) society. Analysis of manpower time spent during the January-June 1993 period shows the following rough distribution:

- 60% preparation of Newsletter and information leaflets on the water and sewerage system;
- 25% meetings with girls who will read the leaflets;
- 15% meetings with farmers about waste oil.

While recognising that in previous years more time may have been spent on home visits and meetings, contacts with restaurants, and school campaigns, and that EHE courses at the Women's Centre will start again in October, it nonetheless seems that relatively little time is spent in direct contact with the community.

2.6.4 Preparation and monitoring of the programme

 The baseline survey of 1989/1990 was intended as the basis for the EHE programme. Despite shortcomings in questionnaire design and presentation of data, and its late timing (two years after the start of the programme), it is a worthwhile document as it interprets traditional and modern habits in relation to (environmental) health and it questions current assumptions about, *inter alia*, (Yemeni) women and development by quoting the collected data. Unfortunately, it does not give any population figures nor information about the existing facilities (e.g. types of water supply and sanitation, expenditure on water, arrangements for shared use, responsibilities for maintenance and repair, the amount of money spent on repairs, habits of cleaning the water and sanitation facilities).

The baseline study recommends that seminars are held among all RWSSP staff to create a consensus about the role and potential of EHE in the Rada' Urban society. Such seminars were never held, despite suggestions to the RWSSP management by the ET Section staff.

The need for monitoring and evaluation of the impact of the EHE programme has been stated by several documents outlining the work of the EHE/ET Section. A backstopping mission in November 1992 did make a schedule of extension activities and media production covering the year 1993 in which a beginning was made with the detailing of targets, target groups, facilitators and timing. The elaboration of indicators and methods for monitoring, however, was left to a later date.

In practice, monitoring has remained a weak element. Due to the absence of benchmarks, concrete targets, specific dates and indicators, it is not possible to measure the impact of EHE. Questions about the effectiveness of various methods to reach target groups, particularly women, can not be answered with any certainty.

An attempt to monitor garbage collection failed due to lack of understanding between the Project Management and the ET Section about the purpose and organization of monitoring and the allocation of required resources. (See also §3.2.2.) A general impression of the impact of the EHE and information campaigns can be seen from the solid waste collection rate: an estimated 60 to 80% of total household waste is collected from the street corner containers. This implies a change in habits of women and children, which must have been the aim of the EHE campaign.

2.6.5 Staffing of the section

The operation of the ET Section has been less than optimal due to continuous problems with staffing on all levels. The Mission considers that these problems have not been handled adequately by the project management or by the consultant firm involved.

The Section has had four Heads within five years, three of them expatriate women and one Yemeni man. During a prolonged period in 1992 there was a lack of clarity about authority in the Section, as the division of tasks between the Environmental Health Advisor and the Environmental Health Extensionist was not clear in practice. Both had understood from their own head office (they were from the same consultant firm) that they would be the Head of Section. Neither the RWSSP Management nor their head office stepped in firmly to handle this unfortunate situation. One of them withdrew from the activities of the ET Section and was for a while allocated assignments outside the RWSSP.

The professional qualifications of some of these senior staff to carry out environmental health education must be questioned. At least two of them have had no specialised training for this kind of work. Although it is acknowledged that staff qualified in hygiene education are difficult to find, the firm's head office should have given them substantive professional support, as well as short specialised training before sending them to Rada. This did not occur.

The short-term technical assistance missions were not designed to improve the effectiveness of the EHE/information work itself, but only to prepare proper work planning. Important as this assistance has been, such a task should have been within the competence of long-term staff, assisted by the project management.

The counterpart situation is also problematic. NWSA has not yet made any personnel available to the Section. The MUPH in 1988 allocated two men who are expected to continue EHE/information work in the Environmental Health Division of the Rada Baladia. One of these men has been unofficially designated (two years ago) as Head of the EHE Section in the Baladia, but until now the MUPH has delayed confirming him in that position. Demotivation is obvious.

In addition, the MUPH has not developed any vision or guidelines on what the EHE Section in the Baladia can or should do, given the shortage of resources in local offices.

The general level of education of the local personnel is low, with at most some years of intermediate schooling or a diploma. None has had EHE training or experience.

Four of the nine section staff have attended professional courses while being with the project. Nevertheless, this situation necessitates continuous on-the-job training and supervision.

→ On-the-job training is in itself a very valuable contribution of the RWSSP to manpower development. Yet, because this requires much time and energy from the Head of the Section, this task must be planned for. It is the Mission's impression that this is not the case, especially considering the tight planning of activities of the Section.

Project management claims that it is very difficult to attract experienced Yemeni personnel to the project. As similar problems are experienced all over Yemen, the accepted solution is to appoint foreigners, even on government contracts. At present four (two are women) out of the nine Section personnel are foreigners (Sudan, Ethiopia, Egypt). There has always been a similar proportion of foreigners in the Section. The employment of foreigners, however, creates problems for the future, as they have no chance of being carried on in government employment.

2.6.6 The position of the section in the RWSSP

The ET Section has an uncomfortable position in the project, as its social/cultural/educational concerns are not understood or shared by the hardware-oriented management and technical sections. In addition, in terms of finance - the relative scale of expenditures - EHE/ET is very small; the Plan of Operations specified an EHE/ET budget somewhat less than 1 % of the total project budget. Finally, integration of the EHE work in the mainstream of RWSSP has been further hampered because management did not create the opportunities for this to happen.

The Monitoring Mission and the ET staff complained frequently about lack of communication between the technical and non-technical sections.²⁰ For instance, when the ET staff required technical information for their EHE programme, the management took an excessively long time (in their view) to provide that information.

Improvement in communication started in 1992. The management saw the usefulness of the ET Section when it began to prepare information that told the people not to hamper construction activities. A senior engineer was appointed to supervise the technical information distributed by the Section.

2.6.7 The position of women in the section

Environmental health education aims at changes in knowledge, attitudes and behaviour of both men and women. It is therefore necessary that both men and women are employed in the ET Section. The RWSSP has had difficulties in employing Yemeni, particularly Rada, women.

The restrictions in Yemen on women's employment outside the house are well-known. Those who do work (usually out of economic necessity) must be given special

²⁰ The Evaluation Mission finds it unfortunate that the 5th Monitoring Mission Report criticised the inexperience of ET staff as a cause of difficulties in communication. Communication is always a two-way process which requires effort and sensitivity from both sides; and in any case, professional communication within a project is by definition the ultimate responsibility of the project management.

"protection" by their employer, who becomes responsible for their safety. He must therefore accept that special arrangements and extra resources must be made available for this purpose.

Transport between home and the office with a socially acceptable driver must be available as well as a women-only room in the office. Also, work time of senior women staff is required to accompany the women to special events outside of the office (e.g. a training course in Aden). In general the RWSSP has been able to fulfil these conditions, although there has been difficulty recently with transport.²¹

The selection criteria for employing women do not seem to be a barrier: a completed primary education, and willingness and permission to work in the community. Even so, the RWSSP has never been able to attract more than two young Rada women at a time with these qualifications.

To attract Rada women with an intermediate education, the RWSSP would have to pay higher salaries than at present. Only then would it be worthwhile for these women and their parents/husbands to risk social disapproval for their employment.

2.6.8 Training activities

The first preparations for a training programme were planned to start by September 1989 (Plan of Operations). For unknown reasons even the beginning of the preparations were postponed until late 1990. The first group of men went for (in-country) training in May - August 1991, that is, immediately after the Gulf War. They were RWSSP and MUPH/Baladia middle level staff.

Thus, only some three years after the start of the RWSSP - and after the end of the first (38-month) contract period - did the first external staff training take place. This is very late, considering the emphasis which project documents place on raising the professional level of project and counterpart staff. The Mission considers this late start to be highly regrettable. Despite the acknowledged difficulty of having suitable counterparts made available for training, much greater effort should have been made to get the training activities underway at an earlier stage in the project.

The Mission also notes with some dismay the low priority placed on training by the consultants, as evidenced in the pattern of project expenditure. In the first three years of the RWSSP nothing was spent on training. During the first five-and-a-half years (1988 to mid-1993) the total expenditure on training was only about 2% of the total Technical Assistance budget (excluding DIP).

²¹ It is notable that the topic of allocating transport for staff usually raises heated discussions, with management questioning the real necessity and/or the propriety of certain forms of transport for women.



| Expenditures on training activities | |
|---|-----------|
| Expenditures in Dfl. (1991 to June 1993) | |
| RWSSP Management (5) (outside region) | 145,000 |
| MUPH/RWSSP (4) (in region) | 46,000 |
| MUPH/NWSA (3) (in region) (senior national management) | 23,000 |
| MUPH/RWSSP (5) (Yemen) | 11,000 |
| RWSSP (1) (Yemen) | 2,000 |
| RWSSP (1) (Yemen) | not known |
| English language (56) (in-house) | 21,130 |

The Mission appreciates the emphasis which the training programme has given to training of middle level personnel of the RWSSP/counterpart staff (mostly in-country and in-region). Only a small number of the most senior officers of central level have been sent to attend international seminars (at over 50% of the total training expenditure).

The Mission regrets not having seen any documents that state the purposes of training or the targets to be achieved for the people involved in the 1991/1992 programme. Five of the 10 people who had gone for training during 1991 were asked about their experiences. Four of them expected to apply 50 to 75% of what they had learned in their current jobs. A frequent comment was that the course content was only partly applicable to the Yemen/Rada situation (this comment was made both about training in-country and abroad). For example, for an engineer who will deal with the sophisticated sewerage system to be built in Rada, a course in low-cost sanitation (in the Netherlands) was not very useful. There were also complaints about the courses offered by DAF and Geesink in the Netherlands.

In October 1992 a training needs assessment was made for MUPH and NWSA staff based in Rada, at least as far as possible, in view of the many vacancies in the offices. All this training was planned to take place after September 1993, that is, after the end of the original project period and after the planned transfer of the solid waste disposal operations to the Baladia (July 31st 1993). The Mission thinks this timing to be rather strange.

3 Project finance and implementation

3.1 Financial aspects

It is clear to the Mission that the budget of the RWSSP have never been under tight supervision: the absence of any "hard budget" has allowed the project to continuously increase its expenditures, especially on technical assistance.

The general picture is therefore one of a project which is "out of control" financially. The Mission considers this to be one of the most unsatisfactory features of the whole history of the RWSSP - a feature for which DGIS, the Royal Netherlands Embassy Sana'a, and the consultants must share responsibility.

By the phrase "out of control" we mean simply that costs seem to have steadily escalated, throughout the life of the project. At each step of the way, of course, proper approvals were sought and given; the formal procedures were observed. The decisions at each step presumably followed - in isolation - the logic of the particular situation as then presented. Nevertheless, the cumulative, over-all effect of these piece-meal decisions was to produce a steady increase in total expenditures, in the end raising the total project costs to a level which is far beyond that originally foreseen.²²

3.1.1 Budget escalation

As explained earlier (§2.1) the Rada project began with a sum of Dfl. 26 million, brought over from the Ibb-Dhamar project, to be spent on the proposed infrastructure investments. The Formulation Mission of July 1986 therefore designed a project that would fit this budget. Their original estimate was for a total project cost of approximately Dfl. 33 million (Dfl. 30 million for the investments, Dfl. 3 million for the technical assistance), of which Dfl. 26 million would be a GON contribution and the remaining Dfl. 7 million would be a GOY counterpart contribution.²³

Based on the project sketched out by the formulation Mission, consultants were selected by DGIS and work was begun in early 1988. In January 1989 (after the consultants had been at work in Rada for nearly a year) the First Monitoring Mission still estimated the investment costs at Dfl. 31 million (GON contribution of Dfl. 26.1 million), excluding technical assistance and the solid waste component.

The consultant's draft Plan of Operations (June 1989) raised the total cost up to Dfl. 50.3 million, which prompted the Second Monitoring Mission to comment:

"The present estimate is appreciably higher than the ones presented in earlier stages of project preparation, and it is felt necessary to review the design proposals to see if savings can be realised."

²² It is an hypothetical question, and therefore unanswerable, but we may still wonder if the Government of the Netherlands would have gone ahead with the Rada project in 1987 if they had then known the true scale of eventual expenditures.

²³ With the wisdom of hindsight, we can suggest that the Formulation Mission cost estimates were over-optimistic.

In the event, and despite a long period of period, the proposed savings were modest, for the Final Plan of Operations (December 1989) showed a total project cost of Dfl. 51.6 million, comprising Dfl. 43.3 million for investments and Dfl. 8.3 million for technical assistance. This meant a total GON contribution of Dfl. 43.3 million and a GOY contribution of Dfl. 7.3 million (excluding countervalue funds and land acquisition).²⁴

By the time of the 5th Monitoring Mission (Sept 1992), budgets had increased again. On the basis of then-known contract values (which exceeded the original engineer estimates) and actual expenditures, it was calculated that to carry the project to completion would involve a cost of Dfl 67.1 million. This comprised Dfl. 40.7 million of GON and Dfl. 8.9 million of GOY investments in works and equipment (for a total of Dfl. 49.6 million) plus Dfl. 16.5 million for technical assistance. The total GON commitment had risen to Dfl. 57.2 million.

However, it had been clear for some time that increased spending on the water and sewerage contracts would consume all of the committed and available budget, leaving nothing for the surface drainage works. It was estimated that at least another Dfl. 7.1 million will be required if all the originally planned project components (e.g. surface drainage) are to be executed. In addition, an additional Dfl. 4.9 million was also said to be needed for technical assistance support to the completion of the project (end-1994).

Thus, to finance all of the extra technical assistance, cost increases, and additional items, the Monitoring Mission suggested a total project cost of Dfl. 78.1 million, of which the GON contribution would be Dfl. 69.2 million. (The Evaluation Mission gives its own recommendations about these requested extra allocations in §7.2.)

²⁴ According to the consultants, it was already known at that time that the project would have to be extended to end-1992 with a consequent increase in technical assistance costs (estimated by them as an extra Dfl. 3.3 million).

Although the figures are necessarily approximate, the summary table below helps to show what happened to the budget over the period in question.

| Estimated approximate size of RWSSP budgets ²⁵ (Millions of Dutch Guilders) | | | | | |
|---|----------------------------------|---|---------------------------------------|----------------------------------|--------------------------------------|
| | Formulation Mission July 1986 | Addendum to Inception Rep. Jan. 1989 | Final Plan of Operations Dec. 1989 | Monitoring Mission Sept. 1992 | Percentage Increase Dec'89-Sep'92 |
| Total project | 33.0 | 39.2 | 51.6 | 78.1 | + 51.4% |
| Investment | 30.0 | 32.7 | 43.3 | 56.7 | + 30.9% |
| Technical assistance | 3.0 | 6.5 | 8.3 | 21.4 | + 157.8% |
| GON contribution | 26.0 | 33.2 | 44.3 | 69.2 | + 56.2% |
| GOY contribution | 7.0 | 6.0 | 7.3 | 8.9 | + 212.9% |

Thus, a project which began life in 1986 because an allocated sum of Dfl. 26.0 million was looking for a place to be spent, is now expected to cost the Government of the Netherlands more than two-and-a-half times as much! There may be many plausible reasons for some, or even most, of this increase. Nonetheless, the basic fact remains clear: the final cost of the RWSSP is very much greater than it was originally expected to be.

3.1.2 Technical assistance costs

Technical Assistance costs (primarily for consultants fees and expenses) strike this Evaluation Mission as being particularly prone to escalation, the total rising by more than 2½ times between the Final Plan of Operations (December 1989) and the Monitoring Mission estimates of September 1992. The Formulation Mission's suggestion in 1986 of Dfl. 3.0 million was about 9% of total project costs, a relatively low but not implausible proportion for such a capital-intensive project. The Final Plan of Operations (December 1989) showed a technical assistance total of Dfl. 8.3 million, which was about 16% of the estimated total project cost (of Dfl 51.6 million). In contrast, by the time of the September 1992 Monitoring Mission, the T.A. budget had swollen to Dfl. 21.4 million and was equal to about 27½% of the total project cost (of Dfl. 78.1 million).

Looked at in a different way, between the December 1989 Final Plan of Operations and the September 1992 Monitoring Mission Report, the expected total project expenditures on investments increased by 30.9%, whereas the expected total expenditures on technical assistance increased by 157.8%.

²⁵ These are not precise figures, taken as they are from a variety of sources and relying on a combination of estimates and actual expenditures. Also, the category split between investments and technical assistance is not always clear. Finally, the GOY contribution is sometimes difficult to calculate unambiguously from the available figures.

3.1.3 Reasons for cost over increases

The Mission has not been able to obtain enough financial information, nor has it enough time, to support a more detailed analysis of the project's finances.²⁶ However, some points can be raised tentatively.

Actual tender prices exceeded engineering estimates, in some cases by substantial margins. This occurred for materials, much of which involved familiar specifications (or even particular brands). The supply of DI pipes was estimated at 4 million TR and tendered at 14-15 million YR (increased by a factor of 3.6). The sewer pipes and appendages went from 14.8 million YR to 25 million YR (increase factor of 1.7). The electro-mechanical tender was 24.3 million YR compared to 10.7 million YR in the estimates (increase factor of 2.3). Certainly, Yemeni domestic inflation is a principal explanation for such price rises, although it does not explain the very different rises in price among the different elements just noted (with increase factors ranging from 1.7 to 3.6).

Calculated in a somewhat different way, the cost of the water supply system tenders turned out (in total) to be not far above the estimate of the Final Plan of Operations (December 1989), whereas the cost of the sewerage system tenders was twice as high. Even given the agreed changes in the lagoon system for the treatment plant, there seems no obvious reason why the sewerage system cost should have increased so much more than the water supply system cost.

The exact role of inflation in all this is difficult to assess. Domestic inflation in Yemen has certainly raised the prices of labour and of many construction materials; this has raised the price of the contract works and other locally-purchased goods and services. On the other hand, domestic inflation is associated with a fall in the exchange rate: in 1988 the budget was being calculated at YR = 0.23 Dfl., but in 1993 it was taken as YR = 0.16 Dfl. (official rate). Other things being equal, this exchange rate movement should have lowered the cost in Guilders of items purchased in Yemeni Rials.

Other factors are also likely to have played a role. For instance, the contractors claim that the bureaucratic and inflexible attitude of the Government of Yemen authorities causes both time-delays and increases in costs. It can be suggested, for instance, that the rigid contracting specifications have not left much room for creative thinking on the side of the contractor and have probably given contractors an incentive to build in higher contingencies and margins.

Time delays are almost certainly a primary cause of cost increases, especially in relation to manpower (technical assistance) costs. During the long delays in getting tenders approved and contracts let, the consultant manpower stayed at full strength; maintaining a large number of expatriate consultants over a period of seven years is bound to be expensive.

²⁶ In fact, the Mission was surprised at the scarcity of clear and straight-forward financial information, and especially at the confusing and inconsistent figures which were sometimes presented in different documents. There is an over-abundance of "raw" data but a shortage of readily-available data presented in a comprehensible and consistent form. This may result from having to comply with different accounting and reporting requirements, in which case DGIS should look into methods to simplify such requirements and make them more consistent and readily-comparable.

The 4th Monitoring Mission (July 1991), for example, reported that cost increases of Dfl. 3.98 million were blamed on inflation and strict contract conditions (Dfl. 3.02 million) and on additional items (Dfl. 0.96 million).

It would be most instructive to see a thorough analysis of the various cost increases of the RWSSP, and the Mission recommends that DGIS commission an independent study to answer questions such as:

- to what extent and in what ways have higher design standards increased costs (analysed separately for the different components)?
- what was the impact of procedural delays (such as approvals for tendering, importation of materials, land acquisition, etc)?
- what was the effect of exogenous factors (such as the Gulf War)?
- what items of expenditure (especially equipment) could have been omitted without significant direct effect on the project outputs?
- in what ways could the manpower budget (both long-term and short-term) have been reduced, especially during periods of lower work intensity?

3.2 Implementation and management

The Mission wishes to make a number of specific observations about the way in which the RWSSP has been organized, implemented, and managed - over-all, not in relation to particular project components.

3.2.1 Information and data gathering

Through the five-and-a-half years of the project, there has been surprisingly little interest in securing systematic information (especially statistical) about the physical, social, and economic situation and characteristics of Rada and its people. (In contrast, the project devoted - quite properly - considerable effort to technical surveys such as hydrological and soil investigations.) Moreover, this was already pointed out in January 1989 by the Monitoring Mission, which criticised the lack of surveys and information, especially on population, sanitation, and poverty, and also complained that the basic information which should underlie the Environmental Health Education programme was lacking. In the view of this Evaluation Mission, the situation has scarcely improved during the four-and-a-half years since that criticism.

The Rada Urban Development Study (1981/82) provided some initial information, but we would have expected the RWSSP, following normal practice, to have undertaken immediately an organized campaign to build up a systematic information and data base, using primary (survey) and secondary sources, an activity that should normally be continued with up-dating throughout the life of a project. In practice, however, it seems that very little of this was done. A small-sample survey was executed in Feb/Mar 1989 to investigate existing water facilities and use; but this seems to have covered relatively few aspects and in some respects its reliability may be questioned.²⁷ Moreover, there was no effort to explore in detail the nature of the existing water systems, which after all served 93% of the houses. Instead, the Plan of Operations

²⁷ For example, the survey claimed that 85% of homes had washing machines, a number which is higher than in many European countries and seems strange in a city which is short of water and critically short of electricity. At the very least, such an *a priori* suspicious figure should have been re-checked.

simply repeated - almost verbatim - the text of the Formulation Mission Report which stated that these systems are not mapped and that no operational data are on record.

After long discussions, a so-called "Baseline Survey" was finally conducted, in Oct/Nov 1989 (although the written report was not released until December 1990!). However, this survey was basically aimed at health and hygiene issues and did not provide information about other aspects. For example, there seems to have been no systematic sampling and laboratory testing of water, in the existing piping system or in existing house storage tanks, so that repeated references to "low quality" all seem to be based on a few samples analysed in 1982 (or on subjective general judgments by users).²⁸

→ (Particularly surprising is the failure of the consultants to execute the appropriate studies to test the acceptability of the proposed system to the population and to establish willingness to pay for particular services.²⁹ As discussed earlier (§2.2.5), this is a normal procedure for projects which intend to invest heavily in service provision. In the absence of such investigations, critical decisions about investment levels, technology choices, pricing, service levels, and other key aspects of the project must be taken on the basis of untested assumptions or judgments. It is risky and unsatisfactory to base fundamental decisions on such thin evidence, a point also emphasised in several Monitoring Mission reports. It is the impression of the Evaluation Mission, however, that in general in the RWSSP too many assertions and assumptions have been relied upon, generally untested and accepted at face value.³⁰

3.2.2 Monitoring

This Mission considers the project to have been consistently remiss in its failure to institute and maintain systematic monitoring. Monitoring its activities is a fundamental part of any project, for two main reasons: to provide feedback information to help revise and refine project activities as they proceed, and to help measure the actual achievements of the project in terms of its ultimate objectives. The RWSSP has failed to build in a systematic monitoring function of either type.

A clear example of missed opportunity is the project's failure to establish and maintain a properly-designed monitoring of the solid waste collection activities (as was plainly urged by the First Monitoring Mission). The questions of appropriate size, shape, accessibility, number and location of containers can best be answered empirically, by measuring the results of different configurations of container systems. This could help the programme to identify the most effective system in practice. As the solid waste system has been active for almost five years, considerable knowledge could have been gained. However, this would have required clear guidance from the project

²⁸ The difficulty of obtaining reliable laboratory results is acknowledged, but at least some rudimentary testing should be done.

²⁹ The complexity, or expense, of executing such fundamental investigations are not justifications for failing to undertake them.

³⁰ Of course, there is always a role for "informed professional judgment"; but such judgments should always be subjected to cross-checking and to revalidation with "objective" data. This is particularly true when the circumstances are subject to significant change, as for example during a period of economic stress like the last three years in Yemen.

management as well as commitment of the requisite resources (money and manpower), and this was not forthcoming.

In a similar way, alternative approaches for spreading information to the population could have been tested by monitoring their effectiveness; then judgments about appropriate means for most effectively reaching men and women could have been made on a basis of evidence.

For a different example, it should be remembered that the basic objective of the project was to improve health; provision of water, sewerage, solid waste collection, drainage, and environmental health education were to be the means of achieving improvements in health. To understand the extent to which the project has in fact contributed to health improvements, it will be necessary to have a stream of information (coming from monitoring) which measures health for different population groups, and for men and women, together with the relevant factors (both inside and outside the project) which will affect health.³¹ The project has made no systematic effort to secure this sort of information.

Monitoring (and data-gathering) should have been designed into the project from the beginning, and the appropriate time, money and manpower resources should have been made available. Monitoring should have been an integral part of the whole project, guided and supported by the project management and by specialist short-term inputs as necessary; it is not something to be left to individual staff to do, or not do, as their interests and time dictate. If the consultant failed to include such activities in the work programme, however, DGIS should have insisted on their inclusion; indeed, they should have been included in the original Terms of Reference.

3.2.3 Use of short-term inputs

The project's short-term inputs do not seem to have been well integrated into the on-going activities in Rada. There were complaints from expatriate and from Yemeni staff that short-termers generally worked in isolation, rather than being paired with a project staff member (expatriate and/or counterpart). It may not always be possible, but the general principle (in any project) should be to integrate the work of short-term specialists with the work of the resident staff, through close collaboration. When this is not done, not only is the learning potential lost, but also the likelihood of follow-up and continuity is much reduced. In the case of RWSSP, our impression is that short-term inputs were planned and decided by the management of the consultant firms in The Netherlands, with inadequate participation of the project staff, especially in regard to short-term inputs related to the EHE/ET activities.

Moreover, short-term inputs often resulted only in a report, written later in The Netherlands, which had no clear connection to on-going project work and which seems often to have had no follow-up.³² A full analysis is not possible, but the Mission still feels that the huge budget for short-term inputs has not been utilized as effectively as it should have been for the benefit of the project. This judgment leads

³¹ Many factors other than water and sanitation could be at work to improve health: gender, increased access to medical services, increased literacy and education, better diet, etc.

³² This reliance on written reports as outputs also suggests that they are largely geared to other expatriate professionals, for Yemeni organizations and staff seem to operate with much less use of written materials. (The relative absence of paper in government offices and on officials' desks immediately strikes the visitor as notable.)

directly to our recommendation that DGIS should institute a much more rigorous and effective control over the use of short-term manpower, both in project design and budgeting and, especially, in project implementation (see Chapter 8).

3.2.4 Work done in The Netherlands

The project has utilized substantial consultancy manpower budget for work done in The Netherlands (more than Dfl 850,000 in the first two contract periods). This seems a very large amount, and the Mission feels that some of the work done in The Netherlands could and should have been done in Yemen.

As an example, detailed work on cost-recovery was done in The Netherlands and sent back to Yemen (after much prodding) as a finished product. This is inappropriate on two counts: first, it wrongly assumes that calculation of tariffs and cost-recovery is somehow a purely "technical" exercise which is better done on big computers back home, whereas all of the important issues concern setting the assumptions and trade-offs, which can only realistically be done by informed local people; and second, it is a subject which it is urgent that the Yemeni counterpart organizations learn about - but they cannot benefit from the activity of thinking about and working out tariffs if the work is done in The Netherlands.

3.2.5 Personnel management

Personnel affairs is one of the most difficult issues facing any project, and the RWSSP is no exception. The Mission is of the opinion, however, that personnel issues and problems within the RWSSP have not always been handled with success. As in any project or organization, the staff of RWSSP are individuals who may face a variety of difficulties in relation to their work or in relation to other people. If misunderstandings, bad communication, and conflict proceed too far, they can create bad feelings and undermine morale and professional cooperation in a way which significantly affects the work of the project.

Unfortunately, this seems to have happened in the RWSSP, particularly in the EHE/ET section, both within that section and between that section and other parts of the project. Even more unfortunately, this seems to have persisted through the whole history of the project, to the extent of significantly reducing the effectiveness of EHE/ET activities. (See also §2.6.) As a direct result of these inadequately resolved problems, the project has heavily (and expensively) under-utilized some of its staff resources, which is demoralizing to staff and which represents a loss to the project.

In any organization, it is appropriate to devise means for maintaining morale, generating enthusiasm, and stimulating staff to further creativity and accomplishment. Means to achieve this are difficult to define, and will depend heavily on the personalities of the management and of the staff, but can include things such as: regular team meetings of a participatory nature, clear and open lines of communication, well-defined and agreed job descriptions, clear organizational structure, full access to information, opportunities for professional improvement²³, support for "outside-work" activities, sensitivity to "personal" problems, etc. In contrast, the rather "centralized" ("individualized") decision-making system of the RWSSP seems to have given individual staff little discretion over their own work

²³ For example, exchange visits to other projects, participation in national or regional seminars, encouragement for professional publication, etc.

activities or resources, and has not stimulated initiative or a creative attitude toward the work.

These aspects of personnel management will become even more important now that the staff members for the future NWSA Rada branch are coming in. They will have to be moulded into an organizational behaviour with proper procedures and clear understanding of individual responsibilities. There is no training institute where such subjects are taught; therefore, the RWSSP staff will have to use their own creativity to accomplish this. It is suggested, for example, that regular formal class-like sessions be held at which organizational and individual roles are described and discussed.³⁴

3.2.6 Integration of Yemeni staff

Full and effective integration of counterpart staff is a fundamental requirement for the long-term success of development projects, although it is always difficult and is seldom fully achieved in practice. The Mission feels that the RWSSP has only been partially successful in this regard. Although such things are difficult to substantiate objectively, we still perceive a distinction between expatriate staff and Yemeni staff, reinforced in some cases by a failure to allocate "real" work and responsibilities to some of the counterpart staff. Certainly, there are Yemeni staff who feel that they are not taken seriously and not given important jobs; or, if they do have specific jobs, these jobs are largely separate from the jobs being done by the expatriate staff.

To be fair, there are also examples of successful (and much appreciated) side-by-side working, especially activities "in the field"; equally, it must be said that collaboration must be a two-way affair, with willing and active cooperation from both sides. In this regard, it is most unfortunate that the Yemeni authorities have not allocated to the RWSSP the number, or quality, of counterpart staff required to full-scale partnership and collaboration. Nonetheless, our impression remains that the RWSSP could have more fully utilized the collaborative working potential of the situation.³⁵

³⁴ This might help prevent situations such as the following (observed by the Mission): a supervisor was attentively watching what the contractor was doing in the trench; but when asked "What are you looking for?" he answered, "I don't know!".

³⁵ Collaborative working experience is also one of the most effective means of training, which is why it is most unfortunate (and inexplicable) that when the expatriate head of the E&T section was sent to Quetta, Pakistan, for training/work-experience, no Yemeni counterpart was sent with her.

4 Sustainability of project activities

4.1 Sustainability issues for the project as a whole

4.1.1 Institutional sustainability

The basic "sustainability" question is: will the facilities and services provided (at substantial expense) through the RWSSP continue to operate effectively once the Dutch assistance is terminated? Sustainability therefore is fundamentally concerned with the ability and willingness of the relevant Yemeni authorities to take over responsibility for the infrastructure provided by the RWSSP, to effectively operate and maintain it, and to provide those supporting activities necessary for making effective use of it.

Sustainability involves political, economic, and institutional issues, both at the local and the national level, although more critically at the national level. Sustainability in this sense is primarily an issue of Institutional Development: the building up of organizations which have sufficient legal (and/or political) authority, good management capacity, efficient operating practices and procedures, reasonably qualified and effectively utilized personnel, and reliable and adequate levels of funding.

Institutional Development was expressed as a major concern by the Formulation Mission and also (repeatedly) by the Monitoring Mission, who clearly recognized the weaknesses of the organisations which were destined to take over the facilities and services provided by the RWSSP. The logical conclusion was equally clear: unless the relevant Yemeni institutions are greatly strengthened, they will not be able to successfully take over and run the facilities and services built up by the project.

From this perspective, and looking at the project as a whole, the Mission cannot be optimistic about long-run sustainability. While some progress has been made, the necessary degree of institutional strengthening of the Yemeni organizations has not been achieved.³⁶

The Mission does not foresee a total collapse of services; the relevant organizations will no doubt "muddle through" in some manner. What is likely to happen, however, is a gradual but steady decline in the quality of services, combined with an inadequate level of maintenance which will significantly reduce the useful life of the original investment. This will bring forward the date of necessary replacement, increasing the future investment burden of the country.

Some efforts have been made through the RWSSP to deal with the problem, but not in a structural or sustained manner (see also the discussion in Chapter 5.) The Mission is indeed critical of the rather low-key manner in which the RWSSP, and the DGIS and RNE, have handled this crucial issue. However, the Mission must be critical also of the seemingly low priority given to institutional development in Rada by many

³⁶ Other organizations with experience with development projects in Yemen, such as the World Bank, have also identified inadequate institutional development as a critical factor in limiting sustainability.

of the Yemeni authorities.³⁷ If this is a reflection of the importance attached to the subject by the central authorities there is little reason for optimism.

Prospects for the survival of an integrated approach to the operation and management of public services in Rada are not good. The Baladia of Rada will take over the operation of solid waste services and maintenance of surface drainage; the Rada NWSA branch (still to be established) will take over the operation of the water and sanitation systems. Cooperation between the two organisations at the local level is not likely to be close, as each is linked vertically to a different supervising agency. The Baladia is linked upward to the Governate and then to the Ministry of Urban Planning and Housing. A Rada branch of NWSA would be linked to NWSA headquarters, which answers to the Ministry of Electricity and Water. Mechanisms and procedures for horizontal cooperation have not been developed.

Environmental health education and public information in Rada will be taken over by the Baladia and will therefore likely concentrate on solid waste and environmental cleanliness only. NWSA has never shown effective interest in EHE and there will probably be no follow-up of extension activities on the water and sewerage side.

The Mission strongly feels that the sustainability requirements resulting from the chosen technology should have been built into the project's design process from the very beginning, so that the implementation and operational systems were suited as far as possible to the local reality. The greater and the more complex the operation and maintenance burden placed upon the Yemeni agencies (for instance, by building in a permanent need for imported spare parts), the more difficult it will be for them to cope, organizationally or financially.³⁸

4.1.2 Sustainability and robustness

Although institutional factors are by far the most critical in determining sustainability, there are also issues of "robustness": basically, these concern the durability and longevity of construction and the ability of physical works to survive and continue providing services despite harsh treatment and/or under-maintenance. Despite the superficial attractiveness of the idea, however, it cannot be said that robustness is simply a question of bigger and/or stronger construction; it has more to do with the appropriateness of the design³⁹, the nature of expected uses and mis-uses, and the maintenance and repair which is provided. Equally, it cannot be said that "more solid" construction is always better than "less solid" construction, because that ignores the essential question of cost.

It is not sensible, of course, to pursue solidity or robustness as an end in itself; the purpose of the construction is to provide services which the community desires at a price which the community can afford to pay. The quality of services provided does

³⁷ The difficulties facing the Government of Yemen in this respect are indeed formidable. Nevertheless, hard decisions must ultimately be made, for example on allocation of personnel and budget, in order to fulfil the minimum needed inputs to what is, after all, a joint Yemeni/Dutch project.

³⁸ The practice of adding 10% to equipment contracts to buy an initial stock of spare parts (as is commonly done, including in the RWSSP) is not a satisfactory solution. The result is (expensively) to fill store-rooms with unneeded spare parts, while the machinery is still grounded because of the lack of particular parts which are no longer in stock.

³⁹ To take an obvious example, it does not increase robustness to massively increase an element's structural resistance to vertical forces if the primary threat is likely to be horizontal forces.

not increase proportionately to the solidity or robustness of the construction; once a minimum system is designed, doubling the size and strength of piping will not double the value of water services provided. Similarly, robustness and cost are not related in a simple linear fashion; instead, the relationship is probably an S-curve, meaning that robustness rises rapidly with initial increases in cost but the curve then flattens out, bringing diminishing returns of robustness in relation to increasing cost. Finally, robustness in a system as a whole is determined by the critical elements (i.e. those with greatest vulnerability); because a chain is no stronger than its weakest link, it does not make sense to overdesign elements which are not critical in that sense.

To some degree there is a relationship also between initial investment and operation, maintenance and repair (OMR) costs; for some construction, greater expense in initial investment can reduce the burden of OMR, for example by using more expensive but more durable and maintenance-free materials. But the opposite can also be true, depending upon the technology chosen; the DAF/Geesink compactor trucks used for solid waste collection are very expensive in initial investment but are also very demanding in terms of maintenance. Nonetheless, with careful design, it is possible to reduce OMR costs, and to enhance longevity, at the cost of increased initial investment. Where appropriate and cost-effective, this should be done.

Investment cost, however, is always a key consideration. Money which is not spent on extra-heavy construction can be used on other things, which perhaps society values more than an extra ten years of life in the water and sewer system. Looked at another way, money which is not spent on initial investment could be used to develop institutional capacities which would then become able to handle the operation and maintenance demands of the less-solidly built system. A related point concerns overdesign in the sense of excess capacity in a system, which is sometimes argued to be desirable because it copes with the needs of future expansion. This argument fails on the same grounds: designing over-capacity into the system represents a "locking up" of society's scarce investment capital in a form which is unproductive until the future date at which the excess capacity is needed. (These points are also discussed in Chapter 5.)

4.2 Sustainability for project components

4.2.1 Solid waste collection and disposal

The key issues have been discussed sufficiently in Chapter 2 (§2.4) and need only be summarized here.

Although solid waste collection and disposal is still an RWSSP component, its recurrent budget is financed by the MUPH, and almost all staff are MUPH/Baladia of Rada employees. It is planned that full responsibility for the solid waste management will be transferred to the Baladia of Rada by the 31st of July 1993.

The draft Transfer Report outlined several institutional elements that needed to be addressed before transfer could take place with a reasonable chance of success. These elements concerned, inter alia, the final design of the organization, final job descriptions, elaboration of procedures, and - especially - recruitment and training of key personnel. As far as the Mission is informed, these elements have still not been adequately addressed.

Other factors which threaten the sustainability of the solid waste services at the present level are insufficient management capacity in the Baladya, inadequate salary levels for attracting or keeping key staff, and inadequate funding. The latter includes both the volume of the O&M budget, and the excessive delays in paying out salaries. (Delays in the O&M budget have been partially dealt with by an interim agreement to channel those funds through the RWSSP budget.)

The problem of equipment availability and utilization (including the spare part problem) were presented and discussed in §2.4. The result of the lack of spare parts is a seriously reduced useful life of the equipment, which in turn will cause a decline in the service level of waste collection and disposal. Ultimately this will affect the residents' discipline about using the containers and their willingness to pay for such a service (if this were to become possible).

4.2.2 Water and sanitation services

The Rada Branch of NWSA is not yet established. The original target of having a financial/administrative department established by September 1993 and the whole branch fully operational by mid-1994 seems unlikely to be reached, at present rates of progress. Counterpart staff are still missing (for example, the critical staff to learn about financial and accounting systems) and this has delayed the planned training of personnel. Unless staff (even if unqualified) are made available, they cannot be trained.

Moreover, the Mission feels that even if it could be attained, the target date of mid-1994 (six-and-a-half years after starting the project) is too late and does not allow sufficient time to establish routine operations and familiarize the new employees with the system. This in turn raises doubts about the ability of the NWSA branch to adequately operate and maintain the system after the RWSSP is finished.

The Mission believes that electro-mechanical systems like generator sets or switch gear are potentially as susceptible to breakdowns as the compactor trucks, although the consequences will be even more serious. It appears that the RWSSP has vested its hopes for remedying these problems in one or two men "with golden fingers". This may help alleviate the danger in the short-run, but the institutional weakness remains. The local man with the best mechanical abilities is employed by the project, with a wage level which will be difficult to maintain in the regular government service.

The Mission is equally concerned about the future of the sewerage system (see also §2.3). Observations elsewhere in the country confirm that the local institutions do not have great experience in maintaining these sort of systems, nor do they seem to feel a strong inclination towards getting more closely involved. Yet even the simplest designs require maintenance and proper operation is the service is to be sustained in the medium or long term.

4.2.3 Surface drainage

As discussed earlier (§2.5), there are serious worries about the ability of the Baladia to carry out the necessary maintenance activities, once a system of road surfaces are graded to form the drainage net. These grades and surfaces must be carefully maintained, if the rainwater is to continue to drain smoothly out of the city. If inadequate or improper grading is done, the road may still function well enough as a road, but it will no longer perform its drainage role. Unfortunately, this may not be

known until the rains come, at which time there could be not only flooding but also further damage to the drainage system itself.

As expressed before, the Mission has grave reservations about entrusting more heavy (and expensive) equipment into the hands of the Baladias in general, at least until it there is greater evidence of their ability to handle such equipment properly.

4.2.4 Environmental health and education activities

It is unlikely that the EHE activities will continue in the same manner after the end of the RWSSP; the institutional basis for sustained activity simply does not yet exist. The two counterpart staff (both men) will return to the Baladia (Environmental Health Division), but it is doubtful whether they have the professional capability, the equipment, the organizational support, and the funds to continue in a meaningful manner. In addition, without female staff it will be impossible to reach the women population.

Much of the future impact will depend on the attitude and involvement of the head of the Baladia towards these issues. There may also be a role for the central Environmental Awareness Department of the MUPH, if it can secure enough resources to provide support for the various Baladias.

It is hoped that when the RWSSP is terminated, the EHE activities may be continued independently through the activities of the PHC clinic and via the Training Centre for Women, both of which have important personal networks among women.

4.3 Financial and economic sustainability issues

Financial and economic issues have been discussed with respect to the individual project components (Chapter 2) and elsewhere (Chapter 3). It is nonetheless useful to briefly review them here in the specific context of post-project Sustainability. As emphasised above, an adequate and reliable source of funding is an essential requirement for institutional development and for the sustainability of services.

4.3.1 NWSA services

For water and sewerage, the latter on a percentage basis connected to the former, there is at least an established practice and procedure for charging for services received. In principle, this should provide a basis for financial sustainability. In addition, although NWSA is a public agency, it is established as an "Authority" and so it has somewhat greater financial and economic autonomy than the normal service departments of line ministries.⁴⁰

However, there are a number of problems which limit the ability of NWSA to generate sufficient revenue to guarantee financial sustainability.

At present, there is a national water tariff in operation. It is the intention of NWSA to move to a locally-set tariff structure, directly related to the investment and O&M costs of the specific town or area facilities, but the legal basis for such a move is

⁴⁰ Unfortunately, this partial autonomy seems to be eroding, and NWSA leaders complain about the difficulty of attracting and retaining good staff because their salaries, previously well above general government levels, are becoming relatively lower and less attractive.

unclear. If we assume that this legal authorization is secured, then still the consequences on the local tariff in Rada will have to be worked out.

NWSA declares that it is committed to cost-recovery, but that there are many different definitions, depending upon which costs are to be recovered, over what periods and at what discount rates. Although alternatives have been analysed by the consultants, the Mission is not convinced that NWSA itself has carefully thought out the political and other policy "trade-offs" involved in different levels of cost-recovery.⁴¹ Yet a decision on the Rada tariff is now an urgent issue as the RWSSP/Rada branch have to start their negotiations with the prospective customers. NWSA, however, seems still to be awaiting the consultants report on the cost-recovery analysis.⁴²

The revenue from NWSA branches is not retained, but goes direct to the headquarters. Later, and in a separate operation, the headquarters allocates an operating budget and an investments budget to the branch. These budgets are not necessarily related to the amount of revenue generated.⁴³ It seems that most NWSA branches are in fact running at a loss, when recurrent costs are compared with locally-generated revenues. Rough 1993 data for Dhamar showed a budgeted expenditures of YR 12.5 million and revenues of YR 9.3 million. The Dhamar water supply system - and the Dhamar branch office of NWSA - were established under the support of a large German-financed project, which appears to have had even higher technical standards and higher costs than RWSSP. (One expatriate is still working there, two years after project completion.)

This situation is further aggravated by the evergrowing accumulation of bad debts resulting from the high rate of non-payment. The total outstanding debts of the whole of NWSA were estimated at YR 200 million. The most common of these non-payers are large government institutions, along with powerful individuals and families, which makes recovery of debts politically difficult. In Sana'a more than 50 % of the private consumers were reported to be in default to some degree. In Dhamar, it was reported that some 20% to 30% of billed water is not paid for. Unless NWSA can find ways to act effectively against defaulters, there does not seem much hope that they ever will overcome their budget problems, locally or nationally.

In these circumstances, a conventional cost-recovery calculation is of limited utility. The figures worked out by the consultants seem to show the possibility of recovering the basic system costs (investment and operations) over 20 years.⁴⁴ As in all cost-recovery exercises, however, everything hinges upon the assumptions which are made. Because no systematic studies were ever made in Rada to determine potential willingness to pay, it is difficult to be confident about any assumed level of

⁴¹ This is one of the consequences of consultants sending the cost-recovery work to their head office; in that way there was no collaboration with the Yemeni counterparts. This problem is aggravated by the failure of NWSA to allocate a counter-part to work with the RWSSP's financial manager.

⁴² Their somewhat passive attitude in this respect illustrates the disadvantage to having this work done in the Netherlands rather than having it worked out in-country, collaboration with the people and institutions who have to act upon the information.

⁴³ The Mission was not able to obtain reliable information about the criteria or procedures on which the branch budgets are decided.

⁴⁴ The revised calculations were only available to the Mission just before its departure from Sana'a, after the Draft Report had been completed, and therefore no detailed analysis of those calculations has been made.

consumption and expenditure; prudence would therefore dictate the use of a conservative estimate. Given the poor collection record in most areas, it is also difficult to be optimistic about the levels of actually-recovered payment; the default rates assumed in the consultants' calculations are not as high as those found in Dhamar or Sana'a, for example. Lifetime operation and maintenance costs, moreover, seldom work out as planned in advance; especially in a context like Rada, it is possible (even likely) that inadequate and/or improper maintenance could soon increase the costs of repair and replacement of system elements.

More to the point, however, is the fuzzy relationship between cost-recovery and "sustainability". Even in the unlikely event of the Rada system having the ability to generate local revenues which cover its local costs, there is no reason to assume that it would ensure sustainability of the local system. Given the practice (noted above) by which branch office revenues are taken up by the central organization, which then returns some in the form of an authorized expenditure budget, the Rada system could still be under-financed in terms of recurrent expenditures (and of investment). In such a situation, the local Rada branch office and system could have sufficient cost-recovery but still not be sustainable.

For the RWSSP there is an agreement that the moneys paid in by the customers as connection fee, the actual costs of which have been paid for by the project, will be put into a special fund, which is supposed to be utilized for further extensions to the local system. From the Rada point of view, this seems a positive break-away from the national budget policy.⁴⁵ Until this fee for Rada is actually established, however, it remains impossible to estimate the potential of this fund for helping finance future system expansions.

4.3.2 Baladia services

The financial problems of the Baladia are much more severe, for two reasons. First, it is the bottom layer of a poorly developed and weak local government system, tied through cumbersome bureaucratic procedures to the Governate and ultimately to the MUPH. Second, there is no established tradition of charging for its services, at least in relation to solid waste, surface drainage, or environmental health education. On the contrary, these are normally seen by the people as "public services", not as services for which payment could be levied. (And until the new Municipal Law is passed, there is no legal basis for charging for such services.⁴⁶)

Moreover, there is no real local tax base; the Baladia therefore must depend upon budgets allocated from higher levels of government - and disbursed through higher levels of government (which provides ample opportunity for delay and diversion of funds). This puts the Baladia in an extremely dependent position, which makes planning of its activities (such as staffing, operations and maintenance, extension of its services, or even replacement investments) very difficult. Finally, the low levels of salaries which can be paid constitutes a serious constraint on staffing.

⁴⁵ It is also not clear whether this special fund arrangement could be utilized in any other area of NWSA operations, since as a principle it runs counter to the existing budgetary practices of the authority.

⁴⁶ There is an experiment in Sana'a by which a surcharge is added to the electricity bill, to raise funds for municipal services (including solid waste collection); this is being watched with great interest by MUPH, but it is only a pilot exercise, and it seems there is no legal basis as yet for its extension to other areas.

It is significant, for instance, that the RWSSP budget is being asked to finance the necessary office furniture and fittings to allow the solid waste activities to set up operations in the (otherwise empty) new Baladia building, because the MUPH cannot keep its commitment to provide these furnishings.

Ideas for methods of charging for solid waste have been discussed, such as charging at least for commercial customers (by attaching the charge to their annual license fee), and these lines of thinking should be encouraged and supported. Realistically, however, the Baladia will not be in a position to do very much until its basic legal and financial position is changed; passing the Municipal Law would be a welcome step in this direction - but it would be only a first step, with additional (often politically difficult) steps further to be taken.

The Mission remains pessimistic about the financial sustainability of project services taken over by the Baladia, at least in the short run; in the longer run, if the Municipal law is passed and if measures of financial and political decentralization are taken, the situation could become different.

5 Evaluation of the project concept and approach

5.1 The "integrated project" concept

The RWSSP has often been described as an "integrated" project, although the project's main documentation (e.g. Plan of Operations) does not use the phrase, nor did the original Formulation Mission. Implicitly, however, it seems clear what is meant: the RWSSP "integrates" within one project the different technical components (water supply, sewerage, solid waste, and drainage) which most directly affect public health, together with an environmental health education programme and the building up of local organization for operating the services.⁴⁷

Superficially, the need for this type of integration appears obvious. In the Rada situation, for example, household sewerage flowed into the streets, mixing with uncollected solid waste, this unhealthy situation sometimes being aggravated by poor drainage and flooding. At the same time, the chronic shortage of water made proper personal hygiene difficult to maintain. It therefore seemed futile to tackle one or two of these inter-related problems in isolation from the others.

The more important part of "integration", however, is the linking of the technical components to the social and institutional systems. Local involvement and health education are essential, to enable the local population to make good use of the new facilities and to develop the complementary knowledge and skills which will produce a lasting improvement in health. Equally crucial is the development of local institutional capacity for properly operating and maintaining the technical (and health education) components. If these social and institutional aspects are not adequately developed and integrated into the project, the expensive technical components will not by themselves achieve the project objective, and the project overall will show poor levels of cost-effectiveness and sustainability.

5.2 The "integrated" approach in practice

In the judgment of the Evaluation Mission, the RWSSP has been only partly successful in achieving the desired "integration". On the technical level, the RWSSP has been largely successful; on the social and institutional level the project has been notably less successful. Some of the reasons for this incomplete success lie with the RWSSP itself - the way it has been organized and implemented; other reasons, however, are to be found within the "integrated project" concept.

The water and sewerage components have been designed and are being built together in a carefully engineered system which, in terms of finance and manpower, is the "mainstream" of the whole project. The solid waste collection and disposal system, however, seems to be run in parallel to, rather than closely integrated with, the project. The surface drainage component is in some ways an "orphan", subject to redesign and uncertainty, probably because it is constructed at the very end of the project.

⁴⁷ Although integrated projects are reasonably well-known in other parts of the world, especially in the urban sector, the concept is seemingly relatively new in Yemen.

The most immediate explanation of this situation is the division of responsibility on the Yemeni side: water and sewerage are the concern of the National Water & Sanitation Authority (NWSA)⁴⁸, whereas solid waste and drainage are the concern of the Rada Municipality (Baladia) and the Ministry of Urban Planning and Housing (MUPH). This split of responsibility is a natural, but fundamental, constraint on "integration" which the RWSSP has not by itself been able to overcome.⁴⁹

In terms of integration of social components, the RWSSP has had limited success. The original project concept called for a major Environmental Health Education (EHE) programme, intended to integrate the use of project services (water, sewerage, solid waste) into a broad framework of long-term improvement of public and private hygiene and health. For a variety of internal and external reasons (see also Chapter 2) this part of the project has been inconsistent in performance. Indeed, the Monitoring Mission has been heavily and repeatedly critical of the project in this specific regard: its failure to effectively integrate the EHE with the technical components.

The situation has improved in the last year, with the Extension and Training (ET) section now pursuing a more narrow focus on public information concerning installation of water and sewerage facilities, a utilitarian approach which will help integrate service provision with service use. However, the Evaluation Mission still considers that the broader issues of integration, as raised by the Monitoring Mission, have not been adequately resolved.

In terms of integration of institutional components, the RWSSP has been particularly weak. The principal explanation of this, of course, is to be found not in the RWSSP but in the general weakness of public sector institutions in Yemen. The poorly developed governmental institutions (especially at local government level), the critical shortage of trained manpower, and the ever-increasing demands imposed by rapid national development, all conspire to make it extremely difficult to build up local institutional capabilities in step with the building of the service facilities. (see also §6.4) In addition, the time and effort required to achieve "a well manned and trained organizational structure to operate and maintain the proposed facilities" has been consistently under-estimated, beginning with the Formulation Mission and its suggestion of a 3 to 3½ year project time scale.

Nonetheless, the Evaluation Mission feels that the project could and should have made stronger and more effective efforts in this direction. The project has repeatedly asked NWSA and MUPH for more counterpart staff, who would then be trained in project activities. Acknowledging that the delays in allocation of counterpart staff have been a frustrating experience for all concerned, the Mission is still of the opinion that a more constructive and forceful approach could have been adopted, especially on the part of RNE Sana'a and the DGIS.

It is significant that Institutional Development (ID) has never been a structural component in the organization of the RWSSP: there is no ID section, and there is no member of the consultant staff in Rada for whom ID is an explicit long-term

⁴⁸ The supervising Ministry for NWSA is the Ministry of Electricity and Water.

⁴⁹ Another explanation is to be found in the technical nature of the components: water and sewerage (and to some degree, drainage) involve civil and hydraulic engineering, whereas solid waste is concerned mostly with operations and management.

responsibility. The consultants acknowledged that it was important to develop local capabilities, but apparently they were unwilling or unable to translate that awareness into a serious and sustained activity properly integrated into the project; equally, DGIS seemed unable or unwilling to insist on a proper formulation and inclusion of institutional development. The Mission considers this a major failure in project design and implementation.

This lack of ID capability within the RWSSP has not been made up through short-term inputs from the consultants. The first short-termer to work specifically on ID (rather than on training programmes) came only in mid-1992, four years after the project began. His visit was only 3 weeks and his report, while quite useful, was sent from the Netherlands some months later. This is another example of the approach to short-term inputs which was criticised in Chapter 3: "parachuting in" a specialist to do an individual piece of work which is not done in collaboration with a project staff member (and/or local counterpart) and which is not related to an on-going programme of activity. There also seems to have been confusion within the project about the subject, with some people perceiving ID to involve little more than drawing organogrammes and arranging training.⁵⁰

5.3 The "technology-led" approach

One of our clearest impressions is that the RWSSP is overwhelmingly "technology-led": it is a "hardware-driven" project in which the "real" objective is to successfully build the highest possible quality infrastructure system. In practice, other aspects (such as health education, extension, training, institutional development) although included are clearly subordinate.⁵¹

*Basically, the consultants have designed and implemented the RWSSP as an engineering/construction project rather than as a development project.*⁵²

While this narrow outlook has certain advantages, such as simplicity and concentration of focus, it is - in 1993 - not consistent with modern thinking about, and hard-won experience with, development planning and development projects.

The RWSSP (and similar engineering projects) begins with the "hardware", which is largely pre-determined and to which the local people and institutions simply have to be fitted. In the view of the Evaluation Mission, *this approach puts things in the wrong order.*

⁵⁰ It is significant that when the EHE section was re-oriented and re-named, it became the Extension and Training section: training was thus disconnected from the broader task of institutional development and made an appendage of the extension activities.

⁵¹ The RWSSP is not unique in this respect; most water supply and sanitation projects have had a similar orientation, in practice even if not in theory.

⁵² Projects which are, like the RWSSP, designed and run by engineers tend to have this orientation, which is a natural reflection of the professional outlook of the engineer. It is significant in the respect that there appear to have been no economists or development planners involved in the design or organization or implementation of the project. We must also note, however, that this engineering/construction approach was approved, even if only implicitly, by the DGIS.

In a situation like that of Yemen, and especially in smaller towns like Rada, the critical constraints are social, institutional and financial; a development project should begin, therefore, with these aspects - and then design an engineering solution to fit.⁵³

It is significant, for example, that concerns about the project's "sustainability", as expressed by this Mission and by many others, are related to the financial and institutional capabilities of the organizations responsible for operation and maintenance, not to the qualities of the "hardware". This situation was perhaps almost inevitable, given the constraints facing the Government of Yemen, but nonetheless the Mission feels that the project's "hardware-first" approach has made it more difficult to achieve a satisfactory degree of sustainability.

For another illustration, consider the reasons given by the project for its time over-runs. These focus on unforeseen delays in a variety of approval procedures, involving both the Government of Yemen (GoY) and the Government of The Netherlands (GoN). Delays resulting from bureaucratic procedures are common, of course, in almost every development project and are not unique to the RWSSP or to Yemen. However, if there had been a clearer understanding of the Yemeni institutional situation, both at national government level and at the level of project activity, a more realistic time-table could perhaps have been established at the outset; this could have reduced costs as well as frustration.

In the specific example of the preparation of tender documents, the consultant is correct to point out that it became a very long and time-consuming process, which had not been foreseen. However, the consultant is also correct to suggest that this should have been seen as a learning experience - a collaborative exercise which was intended not only to approve a particular set of documents but also to help develop institutional capabilities in the relevant organizations and staff. Accordingly, this reality should have been built into the design, organization, and time-table of the project.

5.4 The integrated approach reconsidered

Our conclusion is that the "integrated" approach is potentially useful, but that it must be formulated clearly and carefully, be explicitly incorporated into the project design, and be firmly built into its implementation. In particular, the most critical element of integration is between the Yemeni institutions (social, governmental, and financial) and/or services being provided. In other words, it is more important to "integrate" effectively between institutional and technical aspects than to simply integrate across technical aspects.

⁵³ A good example is the debate in the early stages of the RWSSP over the most appropriate solution for sewerage treatment. The consultants' preference was eventually over-ruled, largely by the strong opinions of the Monitoring Mission (a decision with which this Evaluation Missions agrees). Significantly, the key decision issue came down to operations and maintenance, with the final choice going to a system which minimizes O&M requirements and which is most robust in standing up to inadequate O&M. (See also Chapter 2 above.)

5.5 Economics and the project approach

There is another perspective which seems to have been lacking in the RWSSP all the way through its formulation and implementation: the perspective of *economics*. True to its "technology-led" approach, the RWSSP seems always to have made its basic decisions on purely technical (engineering) grounds. The crucial concept of "Cost-Effectiveness" appears not to have played any significant role, either in thinking about the project as a whole, or in thinking about individual implementation decisions.⁵⁴

The Mission considers this a fundamental failing of project concept, design and implementation, for which the client and supervising agent (DGIS) must share responsibility with the consultants.

In the past, both within DGIS and within the Dutch development assistance community as a whole, there was sometimes a reluctance to think about costs or to worry about whether projects were economically justifiable.⁵⁵ In recent years, however, this viewpoint has been displaced, as the harsh reality of limited resources was acknowledged and as the concepts of replicability and cost-effectiveness took hold.

In reality, both Dutch and Yemeni economic and financial resources are severely limited, and it is foolish to pretend otherwise. It is vital, therefore, to use these limited resources in the most cost-effective manner, to make the greatest over-all contribution to the national development of Yemen.⁵⁶ The logic is simple: if the costs of a decision (for example, to use thicker manhole walls) exceed the likely value of the benefits, then the decision is not justifiable. No one can escape this logic by retreating into the Victorian engineer's ideal of "top quality construction and damn the cost!"

Project decisions must be aware of what the economist calls "opportunity cost": for example, an extra Dfl 500,000 used to pay for thicker manhole walls means that Dfl 500,000 less is available for other worthy and desirable development investments in Yemen. Financial and economic resources used for the RWSSP are therefore not "free"; there are always competing claims for scarce resources.

It is not an acceptable argument for the consultants simply to say, "The Yemenis insist on the highest possible standards." Of course, no one likes to be told that they should make do with a basic Toyota rather than a Rolls-Royce; but realistically, few people in this world can afford a Rolls-Royce. It is in the vital interest of the Government of Yemen to ensure the most cost-effective use of their scarce resources; and "high standards" come with a high price tag.

⁵⁴ Out of the vast short-term consultancy budget, which totalled 2,747 man-days during the first two contract periods, only one short-term visit (of 11 days in 1989) was for an economist - and his task was merely to work out some costings. None of the long-term staff have any experience or qualifications in economics. It is obvious that neither the consultants nor the GON (DGIS/RNE) have ever seen any need to apply economic expertise to the RWSSP.

⁵⁵ This attitude was sometimes summed up in the phrase "do it well and don't look back".

⁵⁶ Being cost-effective is not the same thing as minimizing cost; it is possible that high costs can be justified for certain investments, if the gains (benefits) are proportionately high. (More strictly, if the marginal benefits exceed the marginal costs.)

Unfortunately, all of the partners in the RWSSP (GON, GOY, consultants) have tended to evade these economic and financial realities, which is one reason why the project has a dismal history of continuous cost escalation - and still has an insatiable appetite for more and more extra funds. The Mission believes strongly that this underlying attitude must be changed, and soon, for the good of the project and for the good of the people of Yemen.

It is significant in this respect that high-level officials in the Ministry of Planning and Development (the central ministry responsible for coordinating development projects, especially foreign-assisted projects) expressed a more realistic awareness of the constraints they were facing. They readily agreed that institutional "sustainability" is a key issue in the RWSSP (and in similar projects).⁵⁷ More important, they expressed strong commitment to the principle of replicability. They readily agreed that the RWSSP is indeed "a luxury model", with "high standards" which are in reality "too high" for Yemen in its present circumstances. They stated that from their present point of view, it would be better (politically and in terms of development strategy) to have two lower-standard projects, covering two towns, than one high-standard project covering only Rada.

The officials of the Ministry of Planning and Development also candidly admitted that these points of view are relatively new in Yemen; years earlier (at the time of the beginnings of the RWSSP), the GOY point of view was much more uncritical and much less concerned with financial and economic constraints. However, the economic decline suffered by Yemen since 1990 has forced a re-consideration, and people in government are now aware of the need for more critical and well-controlled approaches to development projects.⁵⁸

In contrast to the sentiments expressed in the Ministry of Planning and Development, the Evaluation Mission has the impression that the impact of three years of economic decline has not been seriously considered by the managers of the RWSSP. Over the country as a whole, it is clear that both households and government agencies have less income. This fact should have consequences for aspects of project design, both in respect to investment levels and technology choices, and in respect to assumptions about potential consumer willingness-to-pay. However, we saw no evidence of any systematic reconsideration of assumptions.

5.6 Consideration of alternatives

The Mission has a strong impression that the RWSSP began with a pre-determined engineering solution which has been maintained, basically unquestioned and unchallenged, throughout the life of the project. This may be explained to some degree by the way in which the project was identified and formulated (beginning with

⁵⁷ They acknowledged that "improving management" is their key concern, but they are also keenly aware of the difficulties of effective institutional reform, which requires a degree of strong political support which is not yet mobilized.

⁵⁸ The Mission has the impression that these "new" ways of thinking about development have not yet penetrated so far in the operational agencies, such as NWSA or MUPH.

its origins in the Rada Urban Development Study), but to a greater degree by the "technology-led" approach which has been consistently adopted - and by the fact that it was implemented in practice as an engineering/construction task rather than as a development project.

Especially given the very large amounts of expatriate professional manpower available, as well as the long time taken for preparation (the final Plan of Operations was presented only in December 1989), we would have expected to see explicit and detailed consideration of genuine alternatives for the systems being proposed. After all, one of the purposes of providing ample resources during the preparation phase is precisely to allow for a detailed examination of the development problem and of the possible solutions; during this time it is the consultant's job to look for innovative design solutions and alternatives which can be discussed with the client (GOY) and the supervising agency (RNE/DGIS). As far as the Mission could determine, there seems to have been little or no concern for the formulation and testing of alternatives; on the contrary, the impression given is one of dogged adherence to the original preferred solution.

Given that the public sector in Yemen is relatively weak and impoverished, it would have been logical to develop and examine an alternative which utilized the potential of the private sector.⁵⁹ Thus, one could suggest a mixed solution, combining a public sector investment project which provides bulk water supply (finding and protecting the well field, drilling and pumping, transport to reservoir storage and treatment, mains delivery to key points in the town) with reliance on private sector systems which take care of "retail" distribution (laying and maintaining local distribution networks, charging and collecting payments), regulated through performance requirements tied to access to bulk supplies, and with public stand-pipes as an alternative for those not wishing to buy in to the private systems.

Equally, there should have been consideration of alternative systems for solid waste collection and disposal, especially of lower-technology systems and of "mixed" systems combining various types and scales of technology. Especially given the prevailing social attitudes toward public services (unwillingness to pay), systems which involve private sector participation should have been formulated and tested. Unfortunately, in this particular case the consultants had no real opportunity to explore such alternatives because the decision to go for a single capital-intensive high-technology solution was imposed on the project from the outset (as was discussed in §2.4).

Technological alternatives for sewerage should also have been extensively explored, such as the possibilities for "mixed" systems which combine the use of piped sewerage in densely built-up areas and areas of rock and of septic tanks (individual or collective) in other areas.

⁵⁹ Although there are few professionally trained managers and businessmen, Yemen has a long and successful tradition as a trading nation; private business is in many ways highly developed, and the entrepreneurial talents of the people should not be underestimated.

Perhaps such alternatives would not, upon thorough examination, have proved suitable. But at least they should have been properly tested, so that the chosen solutions could be based on firm knowledge of the advantages and disadvantages of design alternatives and variations. Finally, even if such alternatives had been explored and rejected in 1988-89, the changed economic circumstances of 1991-93 (as discussed above, §5.5), as well as the growing awareness of the institutional weaknesses and the threats to sustainability, should have stimulated a reconsideration of possible alternatives.

6 Assessment of roles

In the life of any development project, a number of different "actors" play important roles in determining its shape and progress. The ways in which different institutions influence a project will depend upon their formal structures and procedures, upon the individuals who are involved, and upon the situation and context in which they are operating. Thus, a comprehensive assessment must consider all of these factors and aspects.

As an Evaluation Mission, however, we are concerned only with an assessment of roles *as they have worked out in practice*, in relation to the Rada Project. Our assessment is therefore based on information gained and observations made during our three-week evaluation of the RWSSP, combined of course with our broader experience in development projects elsewhere.

In particular, we are not attempting here to give a full or comprehensive assessment of the functioning of the various institutions. Instead, we are only raising those issues and making those observations which have arisen during the course of our evaluation work and which are relevant to the main topics of the evaluation. For that reason, the comments in this Chapter are presented briefly and without detailed analysis and argumentation.

6.1 Directorate general for development cooperation (DGIS), The Hague

6.1.1

The desk officer for Yemen (section DAF/NF) is the person directly in charge of the project within DGIS and is the focal point for information flows and action.⁶⁰ The sector ("spearhead") specialists in DGIS communicate directly with sector specialists in the Embassy, on substantive matters, but they are expected to coordinate their interventions through the country desk.⁶¹

In practice, however, this situation has potential for confusion and for crossed lines of communication. Sector specializations will naturally have differing views and interests, both among themselves and with respect to any specific project, and it is possible for projects in the field to thereby receive mixed, even conflicting, signals. We feel this has occurred to a degree in the RWSSP (see also 6.2.6 below).

6.1.2

During the period since the RWSSP was initiated, DGIS has progressively improved procedures for project and financial reporting and control, especially in relation to what must be done at the Embassy level. This whole issue is still under discussion and

⁶⁰ Significant decision-making responsibilities are delegated to the RNE, although the Yemen desk in DGIS is informed and/or consulted.

⁶¹ Coordination should also occur at the Embassy.

review, but it is possible make some broad comments based on our experience with the RWSSP evaluation.

In general, the Evaluation Mission welcomes the move toward more rigorous and regular project and financial reporting and review. However, it must be emphasised that any system will be effective in practice only if the staff in the Embassy have the knowledge and time to use it properly. Moreover, there is a danger that control systems will intervene too closely in the details of the project, demanding too much information and requiring documented approval for financial and operational decisions which should be left to the discretion of the project officer in the Embassy. Put simply, there is a balance which must be struck between too little control (which can result in projects getting into financial difficulty) and too much control (which becomes costly and which can reduce effectiveness and dampen creativity).

What is really needed, we feel, is an information and control system designed for *management* purposes; it is the project management function within DGIS which requires regular information (on both finance and on project activities and performance), in order to intervene strategically and to make appropriate decisions. Additional reporting and other paper-work requirements should be limited to those which are strictly necessary, because the time needed to fill in forms is time which is taken away from the more substantive purposes of the development projects.

6.1.3

The internal review and decision-making mechanism within DGIS has acquired a reputation for slowness and delay. The fear of delay encourages people (in Embassies and/or in projects) to avoid DGIS procedures whenever possible, in order to keep their projects going and accomplish their tasks without getting "hung up" in the official approvals system. This is a perfectly understandable reaction, but it can undercut the review and control procedures which are important for effective project supervision.

6.2 The Royal Netherlands Embassy, Sana'a

6.2.1

It is one of the main duties of the RNE to exercise clear and strong operational and financial supervision over development projects. In this function, the project officer in the RNE is the key player. The success of the RNE's supervision function depends heavily upon this officer's personal initiative, time and energy. If the project officer has too many projects to supervise, and/or too many other duties to perform, this supervision function can become relatively passive, which reduces significantly the Embassy's (and DGIS's) ability to intervene effectively. If this happens, it is very difficult for the RNE (or DGIS) to maintain effective control. The Mission believes that this has happened in the past with respect to the RWSSP.

6.2.2

Because of regular reassignment, project officers do not remain in charge of projects very long; there have been four or five different project officers in charge of the RWSSP at the Embassy during the life of the project, and in the late summer a new one will take up post in Sana'a. This high turn-over means that for much of the time the project officer is struggling to familiarize himself with his new portfolio. For this

reason, the Embassy project officer is almost always at a disadvantage in relation to the project staff, who probably have greater knowledge and experience of the country and the project. In the case of the RWSSP, the project leader has been with the project from the very beginning and has seen a variety of Embassy project officers come and go.

6.2.3

Because of the reasons described above, it can easily happen that the Embassy project officer adopts a "responsive" (rather than "active") attitude toward his/her projects. If there is an experienced and knowledgeable project leader, it is only natural that an Embassy project officer may allow that person a high degree of discretion. Unfortunately, this can go too far, reaching the point at which the project leader's influence has become predominant. This may help the project officer to cope with a heavy work load, but it undermines the possibility of effective supervision of the project. After all, DGIS through the Embassy is the client - and the consultant's interests and the client's interests do not always coincide. When the relationship becomes unbalanced, because of the professional prestige or personal authority of the project leader, the Embassy project officer is in danger of losing his ability to control the project objectively and independently. There are signs that this has happened with the RWSSP.

6.2.4

It is one of the main duties of the Embassy to exercise clear and strong financial control over the development projects. In the case of the RWSSP this control function has been weak. Cost over-runs, the use of contingency funds for project activities, or the use of a specified budget item for another project activity seem to have been frequently approved, sometimes with very brief justification or explanation. The Evaluation Mission understands the underlying causes of such practices (for instance, to avoid the long, cumbersome procedures of the Ministry in The Hague, and also simply the heavy pressure of work on the Embassy project officer). There is, however, a balance which must be maintained, between, on the one hand, a constructive and reasonable flexibility and, on the other hand, a too-easy deviation from project objectives and guidelines. In the case of the RWSSP, the Mission feels that weak financial control has allowed too much in the way of cost over-runs, use of contingencies, and the like.

6.2.5

There are sometimes occasions when a project may be asked to let some of its facilities, or staff, or even finances, to be used by the Embassy or by other projects. This is natural enough, because it can sometimes be of great benefit, especially by providing resources which would otherwise not be available (or not be available on time). But this sort of "arrangement" should always be used sparingly - it should not become something which is relied upon, nor should it involve substantial manpower or financial resources. When it gets out of hand, it ceases to be helpful flexibility and becomes a potentially serious diversion of project resources.⁶²

⁶² Another disadvantage of such "arrangements" is that they carry the risk of building up obligations, even if unconsciously. If a project leader is generous in allowing the Embassy (or other projects) to use his resources, this will naturally tend to increase his prestige and potential influence.

The Evaluation Mission feels that the RWSSP has been misused in this respect. For example, several years ago 100 solid waste containers from the RWSSP were "loaned" to a project in Aden; they are still there. As a result, the RWSSP consultants have now come forward with a technical assistance extension proposal which includes Dfl. 110,000 for purchasing replacement containers. The Mission finds this an unacceptable procedure and outcome. The RWSSP budget is being asked, in effect, to pay twice for the 100 containers. It is the responsibility of the Embassy, and of DGIS, to force the Aden project to pay for the containers out of its own budget. For this reason, the Evaluation Mission also recommends (see Chapter 7) that the request for Dfl 110,000 is not approved.

Very questionable also is the arrangement whereby one senior staff member of the project's ET Section was allowed to spend first 30% and later 100% of his time on Embassy assignments, for which the Embassy did not pay the RWSSP. It is understood that this arrangement suited the interests of the RWSSP, the Embassy, and the staff member concerned. However, that misses the point. From the perspective of the RWSSP, this arrangement must be seen as an expensive mis-allocation of scarce human resources: the RWSSP budget was paying for skilled manpower which it did not use. Although understanding the circumstances which led to this arrangement, the Mission still considers it an improper use of RWSSP resources.

A different, but related, point concerns the use of the RWSSP project leader on project identification and formulation missions elsewhere in Yemen. From an Embassy point of view, this was a convenient way to save time and money. From the point of view of firms which may compete with the RWSSP consultants, however, there may be concerns for "conflict of interest" or of "unfair advantage". It has been suggested that the RWSSP project leader's firm should disqualify itself from projects identified or formulated in this way. DGIS should clarify its policy in regard to this type of situation.

6.2.6

Just as in the case of DGIS (see §6.1.1), so too in the RNE there is a potential for confused and/or crossed (sometimes conflicting) lines of communication. The formal line of supervision and control for a project is through the project officer in the Embassy; but the sector (spearhead) specialists at the Embassy can also intervene directly with projects, to promote their own priorities and interests. It is the responsibility of the RNE to coordinate all such activities, and undoubtedly the sector specialists will try to collaborate with the project officer. If there is disagreement or lack of adequate coordination, however, the result may look confusing and contradictory to project personnel and may even increase tensions within the projects, thereby adversely affecting performance. The Mission is of the opinion that this has happened in relation to the RWSSP.

6.2.7

The Evaluation Mission also feels that the RNE in Sana'a is understaffed in relation to the heavy load of development projects which must be implemented and supervised. There appears to be an inadequate number of officers available to carry general project portfolios, as well as inadequate back-up and support staff and facilities. The addition of extra burdens, such as expanded responsibilities for project accounting and reporting, has made the situation even more difficult.

6.3 Monitoring mission

6.3.1

The "Monitoring Mission"⁶³ is an *ad hoc* group of three Dutch-based professionals who have been advising the DGIS (Yemen desk) about the RWSSP all through the project's life, primarily through visits to Yemen (five so far) but also by some work in The Netherlands.⁶⁴ Their role is not clearly defined in the available documentation, but it seems in practice to function both as a review and monitoring group and also as a supporting and facilitating group.

One weakness in the Monitoring Mission arrangement is the lack of mechanism for follow-up. The Monitoring Group has a degree of formal continuity of linkage with the DGIS between assignments, but nonetheless it seems to us that its advice has sometimes had surprisingly little effect. This observation can be illustrated by summarizing some of the questions which this Evaluation Mission has raised.

6.3.2

Acting as Formulation Mission, two members of the Monitoring Mission in 1986 drafted the original design for the Rada project; later, joined by the third member, they advised DGIS during the inception phase of the consultant's work on the RWSSP, especially during the critical phase of developing the Plan of Operations.

It is clear from their later comments that the project proposal submitted by the consultant differed significantly from the project formulation prepared by the Mission and accepted by the DGIS. Why then did the DGIS accept from the consultants a project proposal which differed markedly from the design originally formulated? Why was a project proposal accepted which concentrated on the provision of high quality infrastructure instead of one which made the provision of infrastructure dependent on thorough investigations of the existing situation in Rada as had been recommended by the Monitoring Mission?

The Monitoring Mission visited the RWSSP three times in 1989 and were closely involved during the preparation of the Plan of Operation. Reacting to the draft Plan of Operations, they expressed strong criticism concerning the operationalisation of most project components. Some of these comments (e.g. about the sewage treatment plant) ultimately led (after much debate) to the revision of an earlier decision. Many other criticisms, however, seem to have had little or no effect.

The Monitoring Mission criticised repeatedly the inadequacy of surveys and reports, especially those regarding the population, the incidence and implications of poverty for the take up of house connections, and the status of existing water and sanitation facilities. The Mission stressed repeatedly that participation of the local authorities and general population in the preparation phase was a necessity, as they had to pay for the facilities and adaptations in the existing system. The Mission demanded that more

⁶³ Different names have been used, at least in English language documents, including "Monitoring Group" and "Advisory Group".

⁶⁴ Structurally, the Monitoring Mission is a subcommittee of the *Adviesgroep Land en Water*, but the nature of its work and its relationships to the DGIS have not been formalized.

attention be paid to the integration of institutional development, training, and EHE with the infrastructure programme, and insisted in November 1989 that an overall training programme be set up as soon as possible. The Evaluation Mission is of the opinion that none of these cogent and important criticisms were ever taken up satisfactorily. On the contrary, the project eventually proceeded (with approval by the DGIS) on largely the same general lines originally proposed by the consultants.

At the close of each Monitoring Mission visit, the wrap-up meetings attended by NWSA, MUPH, the Netherlands Embassy, and the RWSSP management endorsed the Monitoring Mission's conclusions and recommendations. Nonetheless, it appears that in practice many recommendations which did not fit the consultant's own approach were not taken up or implemented.

Similar questions arise from the fourth and fifth Monitoring Missions of June 1991 and September 1992 respectively. These were rather more mild in tone and (especially the 1992 Mission) acted more as facilitators between the consultant and the DGIS than as critical advisors. Nevertheless, serious doubts were expressed about various features, such as the lack of internal communication between the technical and ET sections and about the execution of EHE and community information activities. Again, we found no evidence of active response to this criticism.

6.3.3

To properly utilize the Monitoring Mission, its field missions should not have operated under such extreme time limits (on average about one week in-country), which made it difficult for them to carry out their monitoring and advisory functions adequately.

Perhaps due to the lack of structural allocation of post-mission work time, there was also a time-lag between the field missions and the production of the full reports; this time-lag was usually at least one month, and on one occasion three months. (Summary reports were produced during the mission and discussed at the Wrap-up meetings.) The Evaluation Mission also heard complaints from involved persons (including RWSSP staff) who had not received copies of the relevant reports; wide circulation, of course, is important to maximize the impact and usefulness of the Monitoring Mission reports and should be ensured by appropriate action from the DGIS and the RNE.

6.3.4

The Evaluation Mission concludes that the Monitoring Mission has filled an important function. However, we also conclude that the potential of that group was not fully realized, because of the lack of follow-up within the DGIS (and the RNE). Nonetheless, the Evaluation Mission feels that the Monitoring Mission idea is a good one, which would be valuable in other projects as well, if the mission is given sufficient resources (time) and if the DGIS works out effective formal procedures to ensure proper follow-up to the advice and findings of the Monitoring Mission.

6.4 The Government of Yemen

6.4.1 Background

The Government of Yemen is poorly equipped to deal with the stresses of rapid national development and, especially, to cope with the demands of complex foreign-assisted development projects. Upon the emergence of (North) Yemen as a modern state in the 1960s, an entire governmental structure and apparatus had to be newly created. The recent unification of the country further complicated the situation by requiring the merger of two separate administrative systems. The scarcity of trained and/or experienced administrative, technical, and professional manpower remains a chronic constraint, while the severe economic problems following the Gulf Crisis has put great pressure on the whole system. It is a tribute to the Yemeni people that they have continued developing their new democratic society in the face of such handicaps.

Nevertheless, as was emphasised in Chapter 4 ("Sustainability of Project Activities"), the weakness of the Government of Yemen in relation to the RWSSP raises serious questions about the future utilization of the facilities being constructed at substantial cost under the RWSSP. These weaknesses must be faced openly, so that all parties can work together to try and overcome them. Equally, the many constraints on Government of Yemen participation should be realistically incorporated in the design of any future development projects.

6.4.2 Provision of staff, finance, and other inputs and support

For a variety of reasons, the various agencies of the Government of Yemen have not been able to fulfill many of their commitments to the implementation of the RWSSP. In particular, *counterpart staff* have not been provided in anything like the numbers or qualifications needed for successful "hand over" of the project. Although high-level government officials sometimes express confidence that staff will (eventually) be provided, this optimism is not generally shared by field-level staff; and in practice, many aspects of the project have been severely hampered by the lack of counter-part staff. For instance, NWSA has failed to provide a counterpart staff member to work in Rada to develop the financial, accounting and related aspects of the new branch office, even though the consultant has had a well-qualified expatriate professional available and able to provide training and support and supervision; this may well have crippling effects on the ability of the new branch to execute the duties required of it. The delays in appointing and/or confirming staff for the Environmental Health section of the Baladia have seriously hindered efforts to build up a framework for continuing EHE/E&T work (thus further endangering sustainability of project services).

In the absence of local staff, the consultants have been forced to take up more of the work themselves and to proceed alone, and thus opportunities for effective on-the-job learning ("transfer of technology") have been significantly reduced. More seriously, this also further reduces the sustainability of the project, because it prolongs the weaknesses of the local institutions which are intended to take over the project-built facilities.

Also in many cases, government agencies have been unable to provide the *financial inputs* which were agreed, sometimes not at all and many times only after considerable delay. The chronically delayed payment of local solid waste collection staff is one

obvious example.⁶⁵ Another is the inability of MUPH to provide the necessary (and agreed) grading of secondary roads, which has led to a request for extra project budget so that a contractor can be hired and the work can proceed on schedule. A further example is the inability of MUPH to provide the furnishing required for the newly-built Baladia offices, another failure which has prompted a supplementary budget request to provide the essential furniture required for the office to begin operations.

In other ways, Government of Yemen support has not been as firm or consistent as was expected. The questions of water tariffs is a complex matter, to be sure, but some *resolution of key issues* at national level is vital, so that charging procedures and financial systems at Rada can be put in place. Other important issues, admittedly difficult ones, also remain unresolved; for example, many questions were postponed by saying that it must await the new Municipal law; unfortunately, the passage of that law was continuously delayed and in mid-1993 it was still not passed. The project, however, cannot wait - decisions must be made and activities undertaken, even if the new law is not yet in place.

In addition, there are complaints from the consultants and from the contractors concerning delays and problems which occur from *complex bureaucratic procedures* (e.g., for importation of equipment and its clearance and shipment from the docks). Of course, bureaucratic delays are not unusual in any country (they certainly occur in the Netherlands as well); however, it is the responsibility of the government agencies involved in the project to take active measures to overcome the predictable bureaucratic hurdles, acting on behalf of the RWSSP. This does not seem to have been done effectively.

The project has faced numerous problems because of *difficult problems of land rights and rights-of-way*. Delays have occurred in several different phases of the project because of the inability to clear up the questions of land ownership and land rights, and this has led to extra costs and/or to changes in implementation plans. One obvious example is the inability to locate sewer connection boxes on private property (see §2.3.3) and the sub-optimal solution then forced on the project. Another example is the continuing failure of the authorities to resolve the conflict over the new solid waste disposal site, which remains unavailable for use.

It is certainly true that land issues are very complex in Yemen, and it is equally true that there is little in the way of recognized basic law to govern land rights and use; conflict, and reliance upon traditional conflict-resolution measures (not excluding violence), seem to be intrinsic in the system. By the same token, overcoming such problems is clearly beyond the capability and authority of the RWSSP. The land-related difficulties encountered by the project can only be dealt with by the Government of Yemen.

So far, government agencies have not been able to deal expeditiously with land problems. However, it is probably unrealistic to expect that the Government of

⁶⁵ The late payment (or non-payment) of wages not only has the predictable effect upon staff performance, it also has the effect of consuming a substantial share of the time and energy of the higher-level local counterpart staff, who have to deal with disgruntled staff and who have to work hard to sort out the mess and chase things up in Al Baida and/or Sana'a.

Yemen could intervene more quickly or more effectively, given the fierce adherence of Yemeni people to their traditional views on land and given the lack of any political mandate for radical change. Nonetheless, the design of the RWSSP should have taken this reality into account; the consultants and the Government of Netherlands should have been advised more realistically and strongly by the Government of Yemen about the constraints which have to be accepted - and built into the system design. For example, the consultants should not have been required to learn about the difficulties of locating sewer connection boxes on private land only when confronted with serious conflict while laying their initial test system.

6.4.3 General Comments

As elaborated in Chapter 4, the Evaluation Mission is not optimistic about the long-term sustainability of the facilities and services provided by the project, primarily because of reservations about the ability of Government of Yemen organizations to fulfill the demanding responsibilities which are laid on them by such a project. The Mission understands and is sympathetic to the problems facing the Government of Yemen. Nevertheless, it is our opinion that the Government of Yemen has not provided the strength or consistency of support which the RWSSP needed.

In the view of the Mission, the Government of Yemen has not taken Institutional Development seriously enough nor given it a high enough priority. (Of course, as we have argued elsewhere, the Mission also believes that neither the consultants nor the Government of Netherlands gave sufficient emphasis to institutional development within the RWSSP.) We understand the pressures which make it difficult, but still it is crucial that the Government of Yemen make a much more serious and sustained effort to build up the institutions and agencies which will be required to maintain and operate the facilities provided by the project. There are no "easy answers" here - there is no "short cut" to building up institutional capabilities; but it must nonetheless be undertaken, sooner or later.

This also points, in our view, to another conclusion: here is a task for the donor community as a whole (including Government of Netherlands), to step out of the traditional role of "one-off" project support and develop (jointly, if possible) broader and longer-lived programmes to help develop the institutional capacities of the Government of Yemen. (see also Chapter 8)

7 Project-related recommendations

7.1 Recommendations on additional and/or revised project activities

7.1.1 Baseline survey and monitoring of consumer usage of the new water supply system

It is vital - and urgent - that a thorough and systematic study be made of the consumption patterns and payment performance of households being connected to the new water supply system in Rada. Unfortunately, time is quickly running out: useful information on *changes* in consumer behaviour can only be obtained by starting very soon, while it is still possible to survey households both before and after connection. Equally, systematic information about use of the new system should begin when the taps are turned on in the first districts being connected - and this is scheduled to happen soon.

The consultants should be instructed - as a matter of urgency - to design and execute an appropriate baseline survey and to design and implement a suitable monitoring system. The baseline survey should include, as a minimum, properly-constituted sample surveys of representative households in each of the various districts of the town; the surveys can be carried out sequentially, starting with the districts which are about to be connected, to ensure that data is obtained before the start of the new service. These surveys should provide basic "objective" information about the nature of the household's existing water supply (e.g., sources, quantities obtained from different sources, unit prices paid for different sources, total expenditures, consumption in total and broken down by purpose, etc).

If possible, it would be highly desirable to supplement the basic "objective" data with additional information perhaps drawn from smaller sub-samples. "Subjective" information could be obtained by questionnaire covering subjects like perceived quality of water, articulated difficulties in present water use, expectations about improvements under the new piped system, etc. It would also be helpful to make scientific quality analysis of samples of currently-used water.

In combination with the baseline survey, the consultants should design, test, and put into place a reliable monitoring system which will record consumption patterns and payment performance after the households are connected to the new piped system. This should be readily achievable, given that water delivery is to be metered and that charges are to be regularly billed. However, it will be necessary to provide the specialised professional manpower which can assist the NWSA staff and ensure that the data obtained are reliable and consistent. The monitoring system cannot depend entirely upon the NWSA network, however, because some aspects of payment are handled elsewhere (for instance, collection of unpaid bills, or "exemptions" for the poor). Most important, this monitoring system should be systematically extended district by district, along with the connections to the water system, throughout the remaining life of the project. This basic monitoring system should be supplemented with questionnaire interviews of sample households, covering the same sorts of topics dealt with in the baseline survey questionnaires. Ideally, the monitoring system should

also be designed so that the local NWSA branch can maintain it even after the consultants have departed.

Properly qualified staff, experienced in economic analysis and in survey design and implementation, should be brought in, to make the design and to supervise the implementation of the baseline survey and the monitoring system. New budget should not be required, however, because there is ample manpower (in total) in existing technical assistance budgets; manpower expenditures should simply be switched from categories which are over-supplied and/or less essential.

7.1.2 Enhancing women and environmental health activities

Liaison with the Informal Training Centre for Women should be strengthened, with the aim of making it a local centre for the improvement of environment health in Rada by relying on and reinforcing women's capacities. The course at the Centre should be intensified and should include the teaching of basic technical skills which can be applied in the house, such as repairing taps and pipes and unblocking sewer connections.

Small groups of EH "motivators" should be formed from among interested teachers, clinic staff, and course participants; these motivators will apply EH knowledge in their own neighbourhoods and motivate relatives and neighbours to do the same. These groups of EH motivators must be trained in participatory communication techniques, supported, and supervised. A Yemeni EHE/community development expert should be employed to set up such groups of motivators, organize training, and support and supervise them on an intermittent but regular basis.⁶⁶ The ET Section will supply information, prepare visual materials, and provide other relevant back-up.

7.1.3 Cooperation with the Dhamar project

The Dhamar Health Improvement and Waste Disposal Project is experiencing similar problems in reaching women with environmental health education, the the 1992 Dhamar Evaluation Mission recommended the assignment of a female Yemeni anthropologist to do action research on how better to reach women with EHE. It is therefore recommended that the RWSSP liaise closely with the Dhamar project about this assignment and agree ways of sharing the results of the investigations.

7.1.4 Expanding in-house on-the-job training

It is recommended that during the remainder of the project the RWSSP staff should be much more extensively and systematically involved in giving in-house hands-on training to local employees of the (new/forthcoming) NWSA branch office and Baladia office, to assist in familiarization with basic work procedures and job responsibilities. A training plan could be prepared by a professional trainer, but the training itself should be performed by RWSSP staff, whose local knowledge will help overcome lack of previous training experience.

⁶⁶ The costs of hiring such a person should be met from within existing budget allocations, for example by reducing the amount of expensive expatriate inputs.

7.1.5 Improving the quality of environmental health education

A short-term consultant should review the methods and materials used by the E&T Section and work intensively with the staff to assess its approach and develop ways to make it more effective. An evaluation of the strategy of using school girls to read leaflets to mothers and families should be included in this assignment.

7.2 Recommendations on requests for additional budget

7.2.1 Drainage

Due to cost overruns on the water and sewerage contracts, which consumed almost the entire available budget, an additional allocation of Dfl. 5,400,000 or Dfl. 6,100,000 (depending upon the availability or not of Dfl 700,000 of contingencies from the existing contracts) has been requested in order to execute the planned surface drainage works. (See the discussion in §2.5.) The Evaluation Mission finds it regrettable that this situation, which has been known to most parties for quite some time, has been allowed to proceed so far before finally facing up to the budgetary decision which must be made.

However, because of the unsatisfactory way in which this whole matter has been handled - being dragged on without clear decision - we feel that the Netherlands now has a "moral commitment" to provide sufficient funding to construct the drainage system. The Evaluation Mission therefore recommends that DGIS honour this commitment and allocate the sum of Dfl. 5,400,000 (or Dfl. 6,100,000 if contingencies are not available), but with the firm condition that under no circumstances will further price increases be accepted. In addition, there should also be a clear commitment by the Government of Yemen to provide the maintenance budgets and personnel required.

7.2.2 Heavy equipment

Requests have also been made (see the Report of the 5th Monitoring Mission) for additional heavy equipment for operation and maintenance of the planned drainage/road system (Dfl. 600,000). Having seen the underutilization of heavy equipment bought earlier through the project, the Mission sees no reason to believe that conditions for effective utilization of such equipment suddenly have become more favourable. The Evaluation Mission advises against allocating extra money for this proposed equipment purchase; additionally, the Mission recommends that the municipality considers putting out the occasional road maintenance on contract to the private sector.

7.2.3 Containers

The consultants have included in their technical assistance extension proposal a sum of Dfl. 110,000 for 100 solid waste containers, to replace those which were given on loan to Aden "on request from embassy and DGIS" but which have never returned to their rightful owners. Quite naturally, the project wishes to have replacements for the "borrowed" containers so that the solid waste collection system can be properly equipped. Nonetheless, the Evaluation Mission advises against this request, on a point of principle: payment for these containers should not come out of RWSSP budget. It is not appropriate, in our view, for the RWSSP budget to pay twice for

these containers. The proper solution would be for the DGIS to provide sufficient budget for the Aden project to allow them to "pay" for the containers. If the Aden budget is exhausted, the officers who invented this "loan" scheme should invent another equally creative solution for the unsatisfactory situation they have brought about.

7.2.4 Office furniture

The request is for Dfl. 100,000 for the furnishing of the Rada Municipal offices, to enable the Baladia to take over responsibility for the solid waste, drainage, and health education activities of the RWSSP. This item was never foreseen in the original estimates, because it was assumed that the GOY would provide offices and fittings. Because this represents another case of promised counter-part contribution not materializing, the Evaluation Mission is somewhat reluctant to support this request. It is undesirable, in principle, to continuously use extra Dutch finance to substitute for promised Government of Yemen contributions which do not appear.

However, recognizing the crucial role of the Baladia in keeping things going after the RWSSP, and concerned not to waste the investments and assistance having already been given through the project, the Mission recommends that the request be granted. But the amount appears excessively high, and approval of the request should not be given until the consultant has provided detailed lists of basic (not luxurious) items required, making every effort to economise and carefully justifying the various expenditures requested.

7.2.5 Workshop building

The request is for Dfl. 360,000 for the extension of the workshop. As no plans or estimates have been provided, nor any clear justification, we can give no informed opinion. The Evaluation Mission feels, however, that requests in this vague form should not be accepted, as a general principle. The Mission has also the impression that the counterpart organisations have come to assume too readily that the project will pay for everything that comes to mind and that the consultant too easily (and with insufficiently checking) passes these requests on to DGIS.

7.2.6 Vehicles for NWASA staff

Dfl. 160,000 is requested for 4 vehicles to be used by the staff of the Rada branch for supervision and related work. This Mission has strong reservations about the liberal approach of the RWSSP to the provision of vehicles. However, realizing that this is not the time to abruptly change course, the following scheme is proposed. Considering that cars are normally to be written off in 5 years, cars only should be provided when the receiving organization can afford to continue to provide its personnel with vehicles in the future; accordingly, a contribution of 20 % should be asked for. Therefore, we propose that Dfl. 128,000 is to be made available for the purchase of 4 vehicles subject to a NWASA contribution of Dfl. 32,000.

7.2.7 Staff training

Dfl. 150,000 was request for training NWASA staff in Jordan. Although training in general is viewed very positively by the Mission, in this particular case we hesitate because of the absence of supporting material accompanying this request. Therefore, although the Mission is favourably inclined, we feel that an explanatory proposal should be provided before approval is granted, so that the relevance of the trainees

and their work to the Rada project can be assessed (it being our opinion that RWSSP budget should not be used for general NWSA training but only for training directly related to the works in Rada).

7.2.8 Technical assistance

Because of delays in project implementations (due to bureaucratic procedures, Gulf War, etc.) the project has experienced a considerable time overrun. It will therefore be unavoidable to renew the contract with the consortium to continue its supervision work. However, the Mission does not think that the very large budget given by the consultants in their Technical Extension Proposal is necessary.

The Evaluation Mission is deeply concerned with the vast size - and seemingly endless escalation - of the total T.A. budget for the RWSSP, which we described (in Chapter 3) as being "out of proportion" and subject to seemingly uncontrollable escalation. The consultant's proposal for the 1993-94 extension confirms this view. The amount charged for consultants' fees (DGIS codes 2114, 2115, 2116) in the first contract (1988-1991) averaged Dfl. 108,000 per month; during the second contract (1991-1993) that average rose to Dfl. 126,900; during the final period (1993-94) the consultants propose an average of Dfl. 141,000 per month.⁶⁷ We find this escalation quite difficult to understand. In most development projects, it is expected that expatriate technical assistance should be "tailing off" in the latter part of the project period. Here, in contrast, we find a continuing escalation for which we see no convincing justification.

For example, considering that there is very little essential engineering work in the last 16 months other than contract supervision, we are not convinced of the need for three full-time engineers. Equally, we are not convinced of the need for much of the very heavy (and expensive) schedule of short-term inputs; for instance we question the need for someone to supervise electro-mechanical works for five full months. More such questions could be raised by going through in detail the schedule of proposed inputs.

Therefore, although we acknowledge that a technical assistance extension is necessary, the Evaluation Mission strongly recommends that DGIS review very closely the proposed budget, preferably by utilizing independent advisors, with a view to reducing the budget significantly.

7.2.9 System expansion

Many requests for extensions of the planned water and sewerage system are coming in from the people of Rada, even before the works have started properly, a situation which is not unusual in such projects. An important difference with other projects, however, might be the long time which has passed between inception and implementation. What probably seemed logical borderlines six years ago are no longer so clear today. Rapid development has made Rada a different town from what it was in those days.

Although it is easy to understand the desperation of those who are threatened to be left out, there are limitations to what the GON can and should do. On the other hand

⁶⁷ Since inflation is definitely not an explanation of the cost rises. Consultants fees are only affected by domestic inflation in the Netherlands, which has remained quite low throughout this period.

expectations are high and people are looking up to The Hague. As a variation order on the present contracts the extensions could be executed relatively easy and economical, which lends some force to the argument for expanding sooner rather than later.

However, there is a different way in which at least some of the problems might be resolved. An agreement between the GON and GOY has given the project the right to retain the fees for new connections in Rada and to use these funds for extensions. Although the level of the fees have not been determined, this would bring in a substantial revenue. The Mission therefore suggests that NWSA (with the project's help) try to work out a financial plan, utilizing those revenues, through which the expansion could be financed wholly or largely through their own resources (which was after all the intention of the special agreement). If funds were inadequate, or if the cash-flow time profile was wrong, proposals could be made for loan finance from the Netherlands Government.

On principle, however, the Mission believes that DGIS should avoid giving any general commitment at this stage. In the history of the RWSSP, loose or vague commitments have a way of becoming firm but open-ended claims on the Dutch budget. Eventually, in any development project, the host community must cease to depend upon foreign expertise and money.

7.3 Recommendations for follow-up activities

7.3.1 "After-project" management support and institutional development: Rada Baladia

An institutional development and management support project for the Baladia of Rada should be initiated as soon as possible. The ultimate aim of the project would be to assist the local authority to be able effectively to operate and maintain the local services initiated under the RWSSP (solid waste collection and disposal, surface drainage, and environmental health education and extension. The immediate aim of this project will be to develop procedures and formats needed for the smooth flow of information through the office, to train the administrative/financial and to some degree the technical staff, to work out the different levels of responsibility and accountability, to strengthen the institutional links with the Governate in Al Baida as well as with the MUHP, and to provide other direct assistance as required to strengthen the ability of the Baladia to carry on the work begun under the RWSSP. The consultant should be placed in the Baladia and work directly together with the existing staff. This should be a wholly new project, independently tendered and without connection to the existing RWSSP.

7.3.2 "After-project" management support and institutional development: Rada branch NWSA

An institutional development and management support project for the new Rada office/branch of NWSA should be initiated. The ultimate aim of the project would be to assist the local NWSA authority to be able more effectively to operate and maintain the water supply and sewerage system constructed through the RWSSP. The immediate aim of this project will be to develop appropriate work procedures, to train the administrative/financial and to some degree the technical staff, to work out

appropriate systems for billing and charging and keeping accounts, to build the necessary operational links with the supervising branch office (Dhamar?) and with the central headquarters in Sana'a, and to provide other direct assistance as required to strengthen the ability of the Baladia to carry on the work begun under the RWSSP. The consultant should be placed in the NWSA office and work directly together with the existing staff. This should be a wholly new project, independently tendered and without connection to the existing RWSSP.

7.3.3 Full-scale evaluation of RWSSP

Within 12 months of the termination of the RWSSP, a full-scale project evaluation should be carried out. This should be an in-depth performance audit and project assessment encompassing technical, economic, social and institutional factors. The aims of the evaluation should be, *inter alia*, to assess the way the system is performing, work out real costs, assess impact of each project component, analyze appropriateness of technology choices, examine institutional adaptations and operations, document the effective use of the facilities by the population, etc. A gender analysis and an environmental analysis should be included. The evaluation should be given sufficient resources and time to execute a complete and fully-documented analytical exercise which would provide firmly substantiated information for DGIS.

7.3.4 Study on privatisation of municipal services (solid waste)

The DGIS is advised to follow closely the progress of the present study on the possibilities for privatisation of municipal services in Yemen, and to inform the Yemeni Ministry of Urban Planning and Housing of its interest to participate in the discussions on implementation which may ensue from this study, especially in the area of solid waste collection and disposal.

7.3.5 Assistance to the MUPH Department of Environmental Awareness

The DGIS is advised to inform the Yemeni Ministry of Urban Planning and Housing (MUPH) of its interest to strengthen the MUPH's Department of Environmental Awareness. The Netherlands Government should make an EHE expert available to assist the Department with identifying priority environmental issues in urban areas, and to help prepare effective environmental education materials, which can be used by a wide range of organisations.

7.3.6 Study of experience with oxidation ponds

In view of the difficulties experienced in many places, the DGIS should recommend to the Government of Yemen that a systematic analytical study of the performance in practice of oxidation ponds (for waste water treatment) should be undertaken, with support from the Government of the Netherlands. The study should analyse the experience in Yemen, with an emphasis on the interaction of operation and maintenance with the chosen design and technology, leading to specific recommendations about operational policies and/or design modifications which may be appropriate.

8 Summary of main points, observations and conclusions

8.1

The basic project components (drinking water, sewerage, solid waste collection, and rainwater drainage) are being constructed and implemented broadly in line the original concepts identified in the 1986 Formulation Mission. (§2.1.1)

8.2

Concerning the institutional development, environmental health education, and training aspects of the project, there was no clear concept in 1983 and 1986 of how to handle them and in 1993 there is still none. (§2.1.2)

8.3

Total project expenditures work out to an average of roughly Dfl. 1560 per person (for the 1995 service population), rather high figures for a country with an average per capita income which is probably in the range of Dfl. 1250 - 2500 per year.

8.4

The RWSSP has from the beginning been overwhelmingly hardware oriented; in this narrow regard (ignoring financial, economic, social and institutional aspects) the project's technical work has been soundly handled. (§2.1.3)

8.5

The considerable energy and creativeness which the project has directed towards its engineering tasks have definitely not been matched on the institutional development side, which has clearly been a "sideline" throughout the life of the project. (§2.1.4)

8.6

The existing system of water supply in Rada was assumed to be unsuitable for continued use, and it was assumed that all households will be connected to the new, centralized public system; these assumptions do not appear to be based on firm evidence or information. (§2.2)

8.7

The sewer system design is based on sound and solid principles, but perhaps this tendency towards robustness has been carried too far, resulting in high cost. (§2.3)

8.8

The failure of the Government of Yemen authorities to deal with land rights and right-of-way disputes has led to a sub-optimal placement of sewerage connection boxes. (§2.3.3)

8.9

The Mission supports the choice of a pond system for sewerage treatment, because of its simplicity and its robustness in the face of inadequate maintenance. (§2.3.5)

8.10

Even oxidation ponds, however, are not performing well in other towns, seemingly because of inadequate maintenance. (§2.3.7)

8.11

The decision to base the solid waste collection system on DAF/Geesink trucks and containers was apparently taken before the RWSSP began and thus precluded the consideration of what might have been more appropriate alternative systems. (§2.4)

8.12

There are chronic problems with the mechanised solid waste system (in Rada and elsewhere) due to lack of spare parts and/or lack of basic equipment (fuel, tires), leading to a low rate of vehicle utilization and difficulties in the whole system. (§2.4)

8.13

Solid waste activities in Rada suffer from a lack of effective support from the Government of Yemen authorities: lack of spare parts, lack of money to pay salaries, lack of staff, etc. (§2.4)

8.14

The hand-over of the solid waste section is fraught with difficulties and the Rada Baladia is ill-prepared for this responsibility, leading the Evaluation Mission to be pessimistic about its ability to effectively run the service independently from the RWSSP. (§2.4)

8.15

Alternatives incorporating an element of private sector participation in solid waste collection and disposal should have been investigated. (§2.4)

8.16

Because of cost increases in the water supply and sewerage components, funds are not available in the existing budget to pay for the rainwater drainage component (which is the last to be constructed); this raises the issue of allocating additional funds (around Dfl. 7.0 million) to finance the construction of the drainage works. (§2.5)

8.17

There are serious doubts about the ability of the Rada Baladia to organize and execute the required maintenance of the road surfaces which are to be graded to provide the drainage network. (§2.5.5) (§4.2.3)

8.18

The MUPH has been unable to perform the agreed job of grading the secondary roads (as part of the drainage system) and this has led to a request for additional RWSSP budget so that the job can be completed. (§2.5.5)

8.19

Monitoring has remained a weak element in the Environmental Health Education / Extension & Training work. (§2.5.4)

8.20

The operation of the EHE/ET section has been less than optimal due to continuous problems with staffing on all levels. (§2.6.5)

8.21

Counterpart staffing in the EHE/ET section has also been particularly inadequate. (§2.6.5)

8.22

The EHE/ET section has had an uncomfortable position in the project, its social/cultural/educational concerns not being understood or shared by the hardware-oriented management and technical sections; communication between them has been very poor. (§2.6.6)

8.23

The project has placed very low priority on training; in the first three years of the project, nothing was spent on training; during the first 5½ years training was less than 2% of the total technical assistance budget. (§2.6.8)

8.24

The expenditures of the RWSSP has been subject to constant escalation; individual, piece-meal decisions have cumulatively produced a significant rise in costs to a level which is far beyond that which was originally foreseen. (§3.1) Total project costs have risen from Dfl. 33.0 million (July 1986 Formulation Mission) to Dfl. 39.2 million (Addendum to Inception Report, January 1989) to Dfl. 51.6 million (Final Plan of Operations, December 1989) and to Dfl. 78.1 million (Monitoring Mission Report, September 1992). (§3.1.1) Thus, the RWSSP, which began life in 1986 as an allocated sum of Dfl. 26 million was looking for someplace to be spent, is now expected to cost the Government of the Netherlands more than 2½ times as much. (§3.1.1)

8.25

Technical assistance costs have been particular prone to escalation, rising by more than 2½ times between the Final Plan of Operations (December 1989) and the Monitoring Mission Report (September 1992). By the latter date, the technical assistance component had risen to 27½% of total project costs. (§3.1.2)

8.26

Although a full analysis of reasons for cost increases was not possible, some reasons can be suggested: actual tender prices exceeded engineering estimates, in some cases by substantial margins; inflation played a major role for domestically acquired goods and services and for things paid in Yemeni Rials; bureaucratic rigidities and delays also increased costs. (§3.1.3)

8.27

The RWSSP has shown surprisingly little interest in securing systematic information about the physical, economic, and social situation and characteristics of Rada and its people. Particularly surprising was the failure to execute studies concerning the acceptability of the proposed system and the willingness to pay of the population. (§3.2.1)

8.28

The project has been consistently reluctant to institute and maintain systematic monitoring of its activities; this should have been designed in, as an integral part of the project from the beginning. (§3.2.2)

8.29

The project's short-term inputs have not always been well integrated into the on-going activities in Rada, tending too much to work in isolation rather than in collaboration. (§3.2.3)

8.30

The project has consumed substantial short-term consultancy manpower budget for work done in the Netherlands; the Mission feels that more of this work should have been done in Yemen. (§3.2.4)

8.31

Personnel problems (misunderstanding, bad communications, interpersonal conflict, etc) have had a serious negative effect on the work of the EHE/ET section of the project. (§3.2.5)

8.32

The failure of Government of Yemen to allocate the number, or quality, of counterpart staff has been a serious deterrent to collaborative working and to the development of local institutional capabilities to the point of being able to "take over" the facilities built through the project. (§3.2.6) (§6.4.2)

8.33

The Mission is not optimistic about long-run sustainability of the project facilities; while some progress has been made, the necessary degree of institutional strengthening of the Yemeni organizations has not been achieved. (§4.1.1) (§6.4.3)

8.34

The Mission is critical of the low-key manner in which the RWSSP, and the DGIS and RNE, and the Government of Yemen, have handled the critical issue of institutional development. (§4.1.1) (§6.4.3)

8.35

Prospects for an integrated approach to operation and management of public services in Rada are not good, because of the lack of institutional coordination between NWSA and the Rada Baladia (MUPH). (§4.1.1)

8.36

The Mission strongly feels that the sustainability requirements reflecting social and institutional reality should have been built into the project from the beginning, so that implementation and operational systems could have been design to be suited as far as possible to the local reality. (§4.1.1)

8.37

The concept of "robustness" involves much more than simply "solidity of construction", being closely related to cost, maintenance, and other factors. (§4.1.2)

8.38

The many institutional problems and aspects which needed to be addressed before the transfer of solid waste responsibilities seem not to have been adequately taken up by MUPH. (§4.2.1)

8.39

The Rada office of NWSA is still to be established, and critical manpower have not been trained or allocated, even though the first districts of the city are scheduled to be connected to the new system before the end of the year. (§4.2.2)

8.40

The Mission is concerned about the future of the sewerage system, based on poor experiences with similar systems elsewhere resulting from inadequate maintenance. (§4.2.2)

8.41

It is unlikely that the EHE/ET activities will be carried on successfully after the end of the RWSSP; the institutional basis for continuity simply does not yet exist. (§4.2.4)

8.42

Because no systematic studies were undertaken to investigate willingness to pay for the new water and sewer services, it is difficult to be confident about any assumed level of consumption and expenditure - and hence, about any estimated level of cost-recovery. (§4.3.1)

8.43

Default rates are high in most NWSA systems; given this poor collection record elsewhere, it is difficult to be optimistic about future levels of collection in Rada, and this also raises questions about cost-recovery performance. (§4.3.1)

8.44

Because individual NWSA branches or offices do not have financial autonomy, there is no direct relationship between revenues collected and expenditure budget authorized; this raises questions about the significance of cost-recovery estimates for Rada. (§4.3.1)

8.45

The financial problems of the Rada Baladia are severe: it is the bottom layer of a poorly developed and weak local government system, in which there is no established tradition of charging for its services; the Mission remains pessimistic about the financial sustainability of project services taken over by the Baladia, at least in the short run. (§4.3.2)

8.46

The RWSSP has only been partly successful in achieving the desired "integration": on the technical level it has been largely successful, but on the social and institutional level the project has been notably less successful. (§5.2)

8.47

In terms of integration of institutional components, the RWSSP has been particularly weak, primarily because of the general weakness of public sector institutions in Yemen, but also because of the failure of the project itself to pursue this integration seriously. (§5.2)

8.48

The time and effort required to achieve a well manned and trained organizational structure able to operate and maintain the proposed facilities has been consistently under-estimated, beginning with the Formulation Mission. (§5.2)

8.49

It is significant that Institutional Development (ID) has never been a structural component in the organization of the RWSSP, nor is there anyone of the staff for whom ID is an explicit long-term responsibility; this lack of ID capability within the RWSSP staff has not been effectively made up through short-term inputs. (§5.2)

8.50

The RWSSP is overwhelmingly "technology-led": it is a "hardware-driven" project in which the "real" objective is to successfully build the highest possible quality infrastructure system; other aspects (health education, extension, training, institutional development, etc) are clearly subordinate. (§5.3)

8.51

The RWSSP has been designed and implemented as an engineering/construction project rather than as a development project. (§5.3)

8.52

The "hardware-led" approach, in which the engineering solution is predetermined and to which the local people and institutions must be fitted, puts things in the wrong order; because the critical constraints are social, institutional and financial, a development project should begin with consideration of these constraints and then design an engineering solution accordingly. (§5.3)

8.53

The "integrated" approach is potentially useful, but it is more important to "integrate" effectively between institutional/financial/social aspects and technical aspects than to simply integrate across different technical aspects. (§5.4)

8.54

The economic perspective has been lacking in the RWSSP, all through its formulation, design, and implementation (for example, the concepts of "opportunity cost" or of "cost effectiveness" do not play any significant role in the project). (§5.5)

8.55

It is not an acceptable justification simply to say "the Yemenis insist on the highest possible standards"; perhaps no one likes to be told that they should make do with a basic Toyota rather than a Rolls-Royce, but realistically, few people in this world can afford a Rolls-Royce. (§5.5)

8.56

Officials in the Ministry of Planning and Development (GOY) showed a realistic awareness of economic constraints and agreed that the Rada project is "a luxury model" and that it would be better to have two lower-standard projects covering two towns than one high-standard project covering only one. (§5.5)

8.57

The impact of the past three years of economic decline in Yemen seem not to have been considered by the RWSSP (or NWSA or MUPH), although the drop in household and in public agency incomes must have some effects on the financial feasibility and sustainability of the project. (§5.5)

8.58

There seems to have been very little explicit consideration of genuine alternatives for provision of services in Rada; the basic full-scale modern-technology solution has been maintained, seemingly without challenge, throughout the life of the project. However, the Mission would have expected to see much more explicit and detailed formulation and comparative testing of alternatives. (§5.6)

8.59

Given that the public sector in Yemen is relatively weak and impoverished, it would have been logical to have developed and examined alternatives which utilized the potential of the private sector; this was not done. (§5.6)

8.60

Within both the DGIS (The Hague) and the RNE (Sana'a), there is potential for confusion because of the independent lines of communication of the sector specialisms ("spearheads"); the Mission feels that difficulties have occurred in Rada because of mixed signals and contradictory information. (§6.1.1 and §6.2.6)

8.61

Although the moves of DGIS toward more rigorous and regular project and financial reporting and review are welcome in general, it must be warned that such systems must be tailored to the time and expertise available in the Embassy and that controls systems should not try to intervene too closely in the details of projects and demand too much information. (§6.1.2)

8.62

The internal review and decision-making process with DGIS has acquired such a reputation for slowness and delay that people (in Embassies and/or projects) are driven to avoid DGIS procedures whenever possible, a consequence which undercuts the ability to exercise proper project control. (§6.1.3)

8.63

If the RNE project office has too many projects to supervise, and/or too many other duties to perform, the supervision function can become relatively passive and less effective than desired; the Mission believes this to have happened with respect to the RWSSP. (§6.2.1)

8.64

High turnover of project officers in the RNE has put them at a strong disadvantage when dealing with consultants. (§6.2.2)

8.65

A balance must be kept between constructive and reasonable flexibility and a too-easy deviation from established budgets and guidelines; if this balance is not maintained, financial control and project management can be weakened. (§6.2.4)

8.66

Arrangements by which manpower or resources of a project are "borrowed" by the RNE for other work should always be used sparingly; when it gets out of hand, it ceases to be helpful flexibility and becomes a potentially serious diversion of project resources; this has happened at the RWSSP. (§6.2.5)

8.67

The RNE in Sana'a is understaffed in relation to the heavy load of development projects; there is an inadequate number of officers available to carry general project portfolios, as well as inadequate back-up and support staff and facilities. (§6.2.7)

8.68

The main weakness in the Monitoring Mission arrangements appears to be the lack of mechanism to ensure effective follow-up to their missions and reports. (§6.3.1)

8.69

The Monitoring Mission should have been given greater time in-country on its field missions, as well as more post-mission work time. (§6.3.3)

8.70

The Monitoring Mission system is a good idea, and would be valuable in other projects as well, but should be given more time and more effective continuity and follow-up. (§6.3.4)

8.71

In far too many cases, government agencies have not been able to provide the financial inputs which were agreed as part of the Government of Yemen contribution to the project. (§6.4.2)

8.72

The Government of Yemen has not been as firm or consistent as required in dealing with other issues important for the success of the project: resolution of water tariffs, overcoming bureaucratic delays, dealing with land rights conflicts, etc. (§6.4.2)

9 "Lessons to be learned" and general policy conclusions

9.1 Design concepts and approaches for projects in Yemen⁶⁸

9.1.1

Projects must be formulated and designed within a clear *development framework*. Careful instruction and control of consultants should be maintained by DGIS/RNE, to ensure that Dutch-aided activities are prepared as *development projects*, not simply as engineering/construction works. This may require stronger and/or more explicit project-preparation and project-design guidelines. (The UNDP, for example, has a standard process and documentation framework for project preparation, the purpose of which is to place proposed activities firmly in a development context.⁶⁹) The project requirements of DGIS for activities within the Netherlands development cooperation programme should be different from the requirements in the commercial engineering/construction sector.

9.1.2

When projects are formulated, and terms of reference prepared for the design phase of a project, the consultants should be required explicitly to work through a programme of *creative formulation and objective comparative testing of genuine alternatives*. DGIS/RNE involvement in this early stage is critical, to ensure that the work has encompassed the likely full range of technological, organizational, and economic-financial alternatives; it is desirable at this stage to use "independent" external advisors as well, to help ensure fair consideration of real alternatives. This approach may lengthen the project formulation and/or design phase; but the advantages are considerable: it gives some confidence that the "chosen" design approach is the optimum one in the circumstances, and the process of comparative testing of alternatives helps to identify a variety of advantages and disadvantages which can be incorporated later into design modifications. Such a process is very important to ensure that pre-determined or "pet" solutions are not imposed upon a project.⁷⁰

9.1.3

In Yemen, as in many other countries, there is general problem of "*absorption capacity*": the difficulty of the national institutions (political, administrative, financial) to adequately cope with a large number of diverse and complex foreign-assisted

⁶⁸ The conclusions and recommendations given here relate to projects in Yemen, and are largely based upon the evaluation of the RWSSP; most of them, however, can equally well be applied to development projects in other countries.

⁶⁹ The UNDP system is not necessarily to be recommended in its present form, which has some rigidities and complexities (in its Project Formulation Framework and its Project Document) which DGIS would not require. It is the idea of a formal framework which is being suggested.

⁷⁰ Sometimes there is pressure from the client to adopt a particular solution, which is often favored for reasons which have little to do with development effectiveness; this pressure should also be resisted, and the process of considering alternatives can be used as an educational dialogue between DGIS/RNE and the client.

development projects. These problems can only be effectively addressed at a national level, through system-wide and long-term institutional development and strengthening measures; this could perhaps be a useful focus for joint activity among the major international donors, as it would assist them all in making their individual development projects more effective.

9.1.4

Project design should be guided by explicit concern for *sustainability*, and DGIS/RNE should make this very explicit in the terms of reference for project formulation and project design. It should be made quite clear that *sustainability is primarily in terms of institutional, organizational, social, and financial characteristics*; it concerns utilization, operation, and maintenance of facilities. Accordingly, development projects should include competent analysis of these sustainability characteristics, in the particular project context, as a basis for the project design finally chosen; equally, project elements concerned with enhancing sustainability should be clearly developed and firmly integrated.

9.1.5

Project design should be guided by explicit consideration of *replicability*, which DGIS/RNE should make quite explicit in terms of reference for project formulation and project design. It should be made clear that projects should, in general, be capable of replication elsewhere in the country, preferably without the necessity of additional foreign assistance. This means that projects must be formulated in very close consideration of what goods or services does the target community wish to have and what price are they willing to pay for them (for services which can be priced and sold)? For services which cannot be charged directly, willingness to pay will refer to the ability (and willingness) of the supply agencies to provide the services at the cost determined. A corollary of replicability is *cost-recovery*: the general principle that all (or most, or a specified component) of costs should be recovered from the community enjoying the services, either in direct payments or indirectly through taxes and other charges.

9.1.6

DGIS should insist, in future projects, on much more careful and thorough economic analysis, both in project design and preparation, but also particularly throughout project implementation. The concept of *cost-effectiveness* should be explicitly built in, to avoid projects being "kidnapped" by technology and to protect projects against the imposition of pre-determined solutions. This should also be connected the requirement for genuine consideration of alternatives, which will encompass (among other things) an economic analysis (see §9.1.2). DGIS/RNE should intervene actively, including with careful specifications in terms of reference, to specify the types of cost-effectiveness analyses to be undertaken.

9.1.7

Design of municipal services projects should be led by a thorough analysis of the social, gender, economic, environmental, and institutional characteristics of the local setting. These characteristics should determine what type of project is designed, and the design process should ensure that the system and technologies chosen are appropriate for the setting.

It is important that DGIS/RNE take a lead here, to make sure that project designs are fitted to the local social and institutional reality - and to avoid the "hardware-led" approach which requires the local setting to fit itself to the externally-initiated project.

9.1.8

Projects design should include an explicit consideration of the requirements of *continuity* - the conditions which are necessary to effectively utilize, operate, and maintain the project facilities after completion. Typically, this should include measures to be taken during the life of the project, designed to build institutional capacities and prepare the client organizations for the responsibilities of running the facilities; but it should also include the design of "after project" activities, intended to provide institutional development and management support in the longer term. These "after project" activities (which may be embodied in a separate project), however, should be quite distinct from the activities of the project which builds or provides the facilities initially.

9.1.9

In almost all projects in Yemen, it will be necessary to incorporate an *institutional development* element. This must be properly integrated into the project, not relegated to the sidelines, and it will require explicit instruction by DGIS to ensure that this is done properly. The institutional development activities (which will also include what is conventionally put under the heading of training) should be thoroughly and well developed in the initial project design, and both the work programme and the proposed staffing should be checked closely to ensure proper support to this component of the project.

9.1.10

In general, formulation of projects should look more seriously at *private sector and other non-government involvement*. Particularly in a country like Yemen, with its relatively weak and impoverished public sector, it makes sense to consider projects, or project components, which make greater use of the potential contributions and roles of private sector and other non-government actors and processes.

9.1.11

The DGIS should consider a change in its policy, to make some of their development assistance in the form of loans rather than grants. Some degree of Yemeni financial liability may help to increase the likelihood that counterpart funds and manpower for operation and maintenance are forthcoming, and help to increase the local sense of ownership and involvement, thus increasing the chances for sustainability. (Apparently, the old English (and Dutch) proverb, "Don't look a gift horse in the mouth" is also known in Yemen and carries the same sense.) Loan finance is appropriate for the provision of services which generate reliable streams of revenue to support loan repayment (as water potentially could be).

9.1.12

DGIS should demand that a systematic monitoring and evaluation component be built in the design of large projects. Budget should be set aside and capable manpower be assigned to do the work. A proper baseline study which permits the determination of

the parameters within which the project has to be implemented and which provide the indicators of achievements is equally necessary in most projects and should be a specified requirement.

9.1.13

A project's baseline study and subsequent monitoring should include gender-relevant data, so that the final project evaluation can make a gender analysis of project effects and impact. The studies should *inter alia* include data on women's (as compared to men's) access to income, education and training, women's role in household and community, and health conditions.

9.2 The project supervision process

9.2.1

In view of the staff and resource scarcities at the Embassies, DGIS should make greater use of independent consultants to provide monitoring and evaluation and advisory services; even relatively short missions (2-3 weeks) can provide essential information and advice that may not be forthcoming through the normal procedures. For larger projects this could be a group, with an agreed schedule of activities over the project life, as was the case for the Monitoring Mission of the RWSSP. Using external advisors will require significant expenditures, but the benefits to DGIS (and to the project) will also be significant.

9.2.2

The Ministry of Foreign Affairs should reconsider staffing levels at Embassies (such as RNE Sana'a) with heavy development project loads, to ensure there are enough professional officers, with sufficient time and back-up support, to permit an active and effective supervision process. Greater use could perhaps be made of sector specialists to carry some of the burden of general project portfolios. DGIS might also consider the possibility of hiring (on a strictly short-term basis) consultants to assist in Embassies which have particularly difficult project loads.

9.2.3

For each project, an evaluation/review schedule should be built in, to ensure that there are formal review and assessment events at regular intervals.⁷ These reviews should utilize the information gathered through the regular monitoring systems (§9.1.12) and should be coordinated with the interventions by external advisors (§9.2.1). They should involve the client, the executing consultant(s), the RNE, the DGIS, and an independent external advisor.

9.2.4

The DGIS should develop a simplified finance-based tool for project management and supervision. This would consist of a set of clear summary financial statements, on a periodic and cumulative basis, using a consistent set of categories and definitions which give up-to-date information on what has actually been spent on specified

⁷ Projects, especially large and long-lasting ones such as RWSSP, should not be allowed to carry on for extended periods without formal review; for illustration, normal practice in UNDP projects requires a tri-partite review at least every 12 months. (The missions of external advisors such as the Monitoring Mission of RWSSP are not the same thing as a formal review.)

activities, in comparison with the original budget. The system should be designed with its emphasis on simplicity, brevity and transparency; the purpose is not to duplicate financial accounts, but rather to provide readily accessible (and readily-comprehensible) information relevant project supervision.⁷²

9.2.5

The DGIS and the Embassies should exercise strategic and effective control over the use of short-term consultancy inputs in development projects. Consultants and team leaders should be required to submit a regularly updated list of consultants who will be flown in, in comparison with the originally proposed short-term staff. Information about proposed changes in these inputs should include discipline and experience of the person, the tasks he/she should perform, duration of stay, and expected achievements. A summary end-of-mission report should be provided. Short-term visits of less than three weeks should be discouraged; specific evidence should be provided of the way in which the short-term staff will collaborate with the appropriate local, especially counter-part, staff. Short-term inputs should, as a general rule, be executed in-country, not in home-base.

9.2.6

DGIS should reconsider its current rules and practices, which allow substantial quantities of time (in the Netherlands and on short-term mission) to be directly billed for administrative and management tasks of the consultant firms. This amounts to permitting direct billing of activities which should be provided through the overhead in the multiplier, and it becomes particularly noticeable when dealing with a consortium and paying separately for such activities for each firm.

9.2.7

In many (perhaps even most) projects, there are numerous extensions, sometimes required for completing the original schedule of work, sometimes to extend that work into new areas or topics, sometimes to provide complementary and associated services. DGIS may wish to consider a system of requiring major project extensions to be competitively tendered, rather than going automatically to the firm(s) holding the original contract.⁷³

9.2.8

DGIS should re-examine the present situation in relation to sector ("spearhead") specialists and their work; in particular, the coordination of communications with projects and project staff needs to be improved, to avoid the potential for crossed lines and conflicting signals.

⁷² Despite the vast quantities of documents circulating in most projects, very few meet these criteria; unfortunately, the documentation in some projects (such as the RWSSP) is too massive and too diverse to be readily useable. Many of the documents produced (on consultants initiative or on requirements of DGIS) in some projects are like company accounts: they obscure more than they reveal.

⁷³ This is now being done by USAID, for instance, for its large-scale projects in Indonesia.

Annex 1 List of persons and institutions consulted

Meetings and discussions in Yemen (06 June - 27 June):

Royal Netherlands Embassy, Sana'a:

Mr. G.J.A.M. Bos, Ambassador to Yemen.
Mr. Giovanni R. van der Lugt, Counsellor; Head of Development Section
Mr. Alexander Bartelink, First Secretary (Rural Development)
Mrs. Marian Nolte, First Secretary (Women in Development)

Netherlands Ministry of Foreign Affairs, DGIS:

Mr. R. Treffers, Director General
Mr. Patrick Brandt, Yemen desk officer, DGIS/DAF/NF

National Water and Sanitation Authority (NWSA):

Mr. Mohamed Noman Ghalib, Deputy Chairman
Mr. Mohamed Saleh Al Aroosi, Director General for Sanitation.
Mr. Saeef Mokbil Mohamed, Project Director for the RWSSP
Mr. Adel Abas, Vice Head, Design Department
Mr. Najeeb Al Maktary, Co-Manager RWSSP

Ministry for Urban Planning and Housing (MUPH):

Mr. Mohamed Abdul Rahman Al Zabidi, Deputy Minister, for Municipalities and Environment
Mr. Abdurahman A. El Moassib, Director General of Environmental Health.
Mr. Mohamed A. Mussa, Director General of Environmental Awareness
Mr. Ahmed Alhothi, Director General of Planning and Statistics
Mr. Abbas Abdo Saleh, Director Sanitation
Mr. Abdul Aziz Al Humikany, Co-Manager RWSSP

Governate of Al Baida:

Mr. Ali Hassan Al Ahmady, Governor
Mr. Al Kawzy, General Manager for Municipalities
Mr. Ali Ahmed Al Harradh, Director of Information for Rada

Rada Municipal Office:

Mr. Ali Eizy Al Rigal, Deputy General Manager (for Housing and Planning)

Rada Water Supply & Sanitation Project (RWSSP):

Mr. R.F.M. de Gier, Project Manager
Mr. Hagos Gidey, Senior Project Engineer and Deputy Project Manager.
Mr. John F. Rudman, Financial Manager and Project Administrator.
Mr. C. van der Hoeven, Senior Civil Engineer and Supervisor.
Mrs. Maria Naus, Environmental Health & Community Development Expert
Mr. Marc Brussel, Civil Engineer.
Mr. Taher Ali Qassim, Senior Advisor in Environmental Health Education
Mr. Enrico Kraijo, student civil engineer.
Mrs. Leslie Rudman, Secretary.
Mr. Mohamed Ali Saleh Al Nasiri, public relations officer

Meetings and discussions in the Netherlands (28 May - 05 June):***Ministry of Foreign Affairs, DGIS:***

Mr. Patrick Brandt (NAF/DF), Desk Officer Yemen
Mr. Carl Jurrjens (NAF/DF), previously project officer at the Royal
Netherlands Embassy Sana'a
Mr. Joop Blom, DST/TA, advisor to the project

Members of the RWSSP Monitoring Mission:

Mr. C. van der Wildt (Head)
Mr. M. Blokland
Ms. M. Boot

Project Director, Euroconsult:

Mr. R. van Schagen

Nettenbouw International:

Mr. H. Sybesma, Project Director
Mr. H. Trouwborst, Project Manager

Mr. Hassabou, Chief, Technical Staff
Mr. Ali Hamadi, Chief Mechanic
Mr. Abdul Malik, Draftsman/Supervisor
Mr. Abdullah Alshaneef, Storekeeper, Quantity Surveyor
Mr. Abu Shebab, Extension & Training Section
Mr. Ahmed Nassir Al Khudari, Extension & Training Section
Mr. Jamal Al Sarari, Extension & Training Section
Mr. Yemisrach Firdu Haile, Extension & Training Section
Mr. Mahmoud Babiker Mohammed, Extension & Training Section
Ms. Amina Mohammed, Extension & Training Section
Ms. Baraka Ahmed Nassir, Extension & Training Section
Ms. Fatima Ahmed Nisan, Extension & Training Section
Ms. Himmat Omar Al Disooki, Extension & Training Section

Rada Integrated Rural Development Project:

Mr. Ahmed Abu Rigal, General Manager

Archirodon Construction (Overseas) Co. S.A.:

Mr. Nicholas Balouris, Site Manager
Mr. Nicholas Theodoris, Area Manager
Mr. Emmanouel Seimenis, Administration and Finance Manager

Dhamar Branch, National Water & Sanitation Authority:

Mr. Radman Ahmed Saleh, Dhamar Branch Manager.
Mr. Mohammed Abdul Karim, Finance Manager

Dhamar Health Improvement & Solid Waste Project:

Mrs. Sheena Crawford, Team Leader

Others:

Mr. Ahmed Attashi, Member of Parliament for Rada
Sheik Ali Nasiri, Principal Sheik for Rada
Ms. Chrisje van Schoot, formerly Head of EHE section, RWSSP
Mr. Hans Trouwborst, Project Manager, Nettenbouw International

Annex 2 Terms of reference

Background

The Rada Water Supply and Sanitation project (RWSSP) addresses sanitary conditions in the rapidly growing town of Rada, a trading centre of about 40,000 inhabitants in the Governate of Al Bayda. The technical components of the project include water supply, sanitation, drainage, and solid waste collection and disposal. The project also includes community information and participation, and environmental health education, directed at the general population, as well as institutional development activities aimed at the authorities which will operate the various systems: the future Rada Branch of the National Water and Sanitation Authority (NWSA) under the Ministry of Electricity and Water, and the Rada Municipal Offices under the Ministry of Urban Planning and Housing (MUPH).

At present, the conceptual, design and tendering phases of the water supply, sanitation, and (partly) drainage components have been completed, and construction activities have started. The solid waste, community information and participation, and institutional development components are being implemented.

The project is being implemented by the Government of Yemen, through the authorities noted above, assisted by a consortium of Dutch Consultants (Euroconsult, DHV Consultants, Agrovision) led by Euroconsult.

For evaluation of the project, the Netherlands Government (DGIS) will recruit a multi-disciplinary team of independent advisors: an economist, an engineer, and a sociologist, all of whom are not connected to the consultant firms and not previously involved in preparation or implementation of the project.

Basic purpose

The basic purpose of the Evaluation Mission is to provide an independent assessment of the Rada Water Supply & Sanitation Project (RWSSP) and to advise on follow-up activities in Rada and on other proposed projects of similar nature elsewhere in Yemen.

Principal objectives

1. To evaluate in general terms the progress and achievements of the RWSSP, overall and in relation to individual project components, from December 1989 (*Plan of Operations*) to date.
2. To evaluate in broad terms the success of the basic "integrated project" approach of the RWSSP, including consideration of aspects such as:
 - efficient service delivery to the population;
 - effective use of facilities;

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- management and finance of operations and maintenance;
 - levels and sources of investment (initial and recurrent), cost recovery;
 - local institutional capabilities and functions;
 - replicability in other locations in Yemen.
3. To evaluate in general terms the sustainability of the project, especially in relation to its implementation procedures and its organizational structure (within the project and in the local Yemeni institutions), including considerations such as:
 - take-over from the consultants of operational responsibilities and functions by local institutions;
 - development of capabilities in the non-technical aspects of the project, especially community and user education and participation;
 - ability and willingness of different organizations (government and non-government) to effectively maintain and finance project activities;
 - short-term (1-3 years) and medium-term (3-5 years) prospects for effective continuation of project activities.
 4. To evaluate in general terms the past and potential roles - in relation to the planning and implementation of projects such as RWSSP - of the Monitoring Missions, the Royal Netherlands Embassy in Sana'a, and the DGIS/DAF/NF.
 5. To formulate specific recommendations concerning:
 - extension of RWSSP-related activities in Rada;
 - approach and design of proposed similar project activities elsewhere in Yemen;
 - possible studies and/or pilot activities to support future projects.

Additional points

The following are suggestions which the Evaluation Mission may consider during the execution of their work.

A. Project concept

1. Assess the project's success in achieving the objectives originally envisaged in the project formulation as well as achieving the objectives set in the Plan of Operations.
2. Identify and analyse any major constraints which hamper the progress and/or reduce the effectiveness of the project.
3. Review the progress made by the Yemeni Government in fulfilling their commitments.
4. Review the approach taken by the contractors in the preparation and implementation of their work.

5. Assess the institutional development of the Rada branch of the National Water and Sanitation Authority, and of the relevant sectors of the Rada Municipal Offices.
6. Assess the formal and informal communication and decision-making processes which have been developed in the project.
7. Examine the inter-personal and inter-organizational relationships which developed in the course of the project and assess their significance for project implementation.
8. Review the nature and process of popular participation in project development and implementation.
9. Assess the recommendations made by the 5th Monitoring Mission.

B. Solid waste

10. Review the planning and implementation of the Solid Waste Programmes.
11. Assess the progress made in transfer of responsibilities to the local authority and identify any existing or potential problems which may affect their ability to effectively operate the system.

C. Water supply and sewerage

12. Assess and make recommendations on proposed extensions of the water supply and sewerage systems.
13. Evaluate the choice of technology in relation to longer-term sustainability and cost.
14. Review current project design criteria in relation to population projections, design life, and service levels.
15. Examine the demand for services in relation to charging levels, including implications of individual metered house connections.
16. Assess the existing financing systems for operation and maintenance and for upgrading and improvement, including such aspects as cost-recovery, levels and structure of tariffs, cost-containment, management of O&M, etc).
17. Assess the institutional arrangements, including staff allocations, procurement and supplies procedures, financial allocations and systems, inter-governmental collaboration, etc.

D. Surface drainage

18. Assess the sustainability of the systems, especially in relation to finance.
19. Assess the specific recommendations of the 5th Monitoring Mission.

E. Sanitation and hygiene

20. Review the scope, approach, methods, and organization of the current hygiene education programme, and recommend possible areas for revisions and changes.

F. Community participation & information

21. Review the current community information, participation, and hygiene education activities, and assess their effectiveness in relation to the overall project objectives.
22. Make recommendations about how recipient organizations could play a more effective role in the future.
23. Assess the position of women in the project activities, particularly in regard to hygiene education, community management, and participation, and make recommendations about steps to promote a more active and effective participation by women.

G. Institutional development

24. Review the present organizational set-up of the offices of the recipient organizations.
25. Assess the implementation/absorption capacities of the various involved parties.
26. Review the formal roles of the various involved parties, and also assess the actual (formal and informal) decision-making structures and processes.
27. Examine the inter-governmental relations (National, Provincial, District, Town) and especially the inter-organizational coordination mechanisms (formal and informal) which operate.
28. Assess the willingness and ability of participating agencies and other organizations to integrate community participation, information, and hygiene education activities into their existing structures.

H. Staffing

29. Assess the expatriate and local professional staff required by the consultant over the remainder of the project period.
30. Examine the current and near-future situation regarding actual availability of NWSA and MUPH staff.

Sources of information

The evaluation mission will rely upon three sources of information for its work:

- review of documents and reports;
- site visits and investigations; and
- interviews with relevant resource persons, such as:
 - national and local governments in Yemen
 - beneficiary population and their representatives
 - staff of the consultants
 - representatives of the contractors
 - staff of the Royal Netherlands Embassy, Sana'a
 - members of the Monitoring Mission
 - staff at DGIS/DAF/NF.

Time planning and reporting

The Mission's visit to Yemen will take place between 6th June and 27th June, 1993. The Mission will first have briefings and discussions in Sana'a, after which the Mission will proceed to Rada. The Mission should spend two weeks in Rada, during the latter part of which time they will concentrate upon writing the draft Report. The Mission will then return to Sana'a, where the draft Report will be presented to and discussed with both the Royal Netherlands Embassy and with the relevant Yemeni authorities.

Within a week of returning to the Netherlands, the Mission will have a de-briefing meeting at DGIS. At a later time, and based upon comments received from Yemen and elsewhere, the Mission may be asked for further elaboration of and/or discussion about the draft Report and their recommendations.

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