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HUMAN RESOURCES DEVELOPMENT IN THE SWAZILAND WATER SUPPLY SECTOR



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Prepared for
the Technical Sub-Group,
National Action Group,
Government of Swaziland

USAID Mission to Swaziland
WASH Activity No. 354

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Prepared for the Technical Sub-Group,
National Action Group,
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Under WASH Activity No. 354

by

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It is most gratifying in these kinds of studies--which the authors try hard to ensure are not soon shelved at the completion of the project--when one is able to engage the interest and working contributions of those actively involved in managing the sector. Chapter 6 of this report has been a real joint effort between the consultants and the Technical Steering Group of the National Action Group. While the consultants retain responsibility for the report, and in particular any errors it may contain, the contributions of all those who worked on the final draft of Chapter 6 are especially appreciated.

The authors hope as a consequence that this study is useful in the effective development of human resources in the water supply and sanitation sector in Swaziland in the future.

ACRONYMS

AEU	Agricultural Economic Unit
AID	Agency for International Development
CCU	Central Cooperative Unit
CDO	Community Development Officer
CEO	Chief Education Officer
CIDA	Canadian International Development Agency
COSC	Cambridge Overseas Certificate
DAP	Development Assistance Programs
DGSM	Department of Geological Survey and Mines
GDP	Gross Domestic Product
GOS	Government of Swaziland
EEC	European Economic Community
HA	Health Assistants
HB	Housing Branch
HEC	Health Education Center
HI	Health Inspector(ate)
HRD	Human Resources Development
IDM	Institute for Development Management
IDWSSD	International Drinking Water Supply and Sanitation Decade
ILO	International Labor Organization
JC	Junior Certificate
MITC	Manzini Industrial Training Center
MOH	Ministry of Health
MOLPS	Ministry of Labor and Public Service
MONRLUE	Ministry of Natural Resources, Land Use, and Energy
NAG	National Action Group
NGO	Non-Governmental Organization
ODA	(British) Overseas Development Administration
PHC	Primary Health Care
PS	Principal Secretary
RSA	Republic of South Africa
RTI	Research Triangle Institute

ACRONYMS

RWBDCP	Rural Water Borne Disease Control Project
RWSB	Rural Water Supply Board
SCOT	Swaziland College of Technology
SIHS	Swaziland Institute of Health Sciences
SIMPA	Swaziland Institute of Management and Public Administration
SJC	Swazi Junior Certificate
SPSC	Swazi Primary School Certificate
SWAMDP	Swaziland Manpower Development Program
TF	Task Force
TSG	Technical Sub-Group (of NAG)
UBLS	University of Botswana, Lesotho and Swaziland
UNDP	United Nations Development Program
UNISWA	University of Swaziland
USAID	U.S. Agency for International Development
VOCTIM	Vocational and Commercial Training Institute Matsapha
WASH	Water and Sanitation for Health Project
WHO	World Health Organization
WRB	Water Resources Branch
WSB	Water and Sewerage Board
WS&S	Water Supply and Sanitation

EXECUTIVE SUMMARY

Recognizing the threat to development posed by inadequate supplies of potable water and related sanitation infrastructures, the United Nations in 1977 established the International Drinking Water Supply and Sanitation Decade, 1981-1990, with access and coverage targets to be detailed in national decade plans for each participating country.

Authority and responsibility for planning and guiding development within the water supply and sanitation sector in Swaziland were vested in the National Action Group (NAG) under Cabinet Paper No. 91/1979 dated April 20, 1979. At the request of NAG, the Technical Sub-Group (TSG) in 1986 conducted an assessment of needs within the sector. It identified a general manpower problem as a major constraint to the smooth functioning of sectoral agencies and to meeting sectoral development goals. The needs in many instances were clear and often urgent. Positions were vacant. Implementation of programs was, at times, retarded resulting in sectoral development goals not being met. There was competition among sectoral agencies and sectors for certain categories of staff. In many cases there was no clear basis for establishing training needs, and, because the employment structure was not understood, predictions of needs were highly speculative. There was a need to look at the needs of the sector as a whole.

In 1987, human resources development (HRD) became a matter of sectoral development policy. The strategies for implementing the sectoral policy guidelines approved by the NAG called for training programs. As the first step towards carrying out these directives, the two-year action plan for development within the sector prepared under the supervision of the NAG called for an assessment of HRD needs.

Accordingly, this report presents the method, results, and recommendations of such an HRD assessment in the water supply and sanitation sector carried out at the request of the Swaziland Government and the USAID Mission in Swaziland. The assessment was carried out during August and September 1987 by a two-man team from the Water and Sanitation for Health (WASH) Project working in collaboration with the TSG.

The report is organized in two parts. The first (Chapters 1 to 5) contains an analysis of the sector. The second (Chapter 6) consists of a plan for (1) meeting urgent and immediate staffing needs and (2) providing the institutional framework and technical guidance for ongoing, routine assessment of HRD needs in the sector as they evolve in the future.

A four-phased approach was employed in the sectoral analysis in Chapters 1 through 5. The first phase concentrated on the structure and function of water supply and sanitation (WS&S) and other central government agencies affecting HRD policy and planning in order to establish the context within which HRD planning must take place. The second phase examined occupational employment policy and practices in the WS&S sector. Employment in individual occupations and in four general occupational categories (professional,

technical, artisan, and administrative/clerical) was projected to 1992, and anticipated job openings in selected priority occupations were identified. The third phase examined existing institutions providing both pre-service and in-service training in Swaziland, inventorying factors such as water and sanitation related curricula, staff complements, and capacity for supplying human resources of sufficient quantity and quality to meet sector needs. The final phase assessed the relationship between current and projected demand and supply and, on the basis of that assessment, drew the conclusions presented in Chapter 5.

An important factor in the approach is that it followed explicit steps, all of which are documented and which are designed to be carried out periodically by the WS&S sector agencies themselves as part of an overall HRD strategy.

Major conclusions from Chapters 1 through 5 therefore are as follows:

- in many occupations, especially subprofessional and technical specialities, quantitative supply is likely to exceed demand, and this will place a premium upon quality, implying that only the better qualified will obtain employment;
- the labor force in Swaziland is expanding rapidly, and the gap is likely to grow between job requirements and the qualifications of most of those seeking employment;
- employment in the WS&S sector agencies is distributed mainly across two ministries (National Resources and Health), but personnel policies are determined in other agencies, notably within the Ministry of Labor;
- there are major structural differences between the urban and rural water agencies characterized by the ratio of temporary to permanent employment; the Rural Water Supply Board (RWSB) provides predominantly temporary employment, whereas the Water and Sewerage Board (WSB) provides mainly permanent employment;
- annual growth in total employment is expected to be between four percent and five percent during the period 1989 to 1991 in the WSB, but employment is expected to remain almost constant over the same period in the RWSB;
- in comparison with other countries and World Health Organization guidelines, the Swazi water supply subsector has a high staff-to-population-served ratio;
- critical short-term employment and training needs in WSB and Water Resources Branch (WRB) in professional and technical specialties must be met without delay in order not to compromise the functioning of these agencies;
- external technical assistance is needed at the senior professional level, but procedures for transference of technical knowledge currently vary in effectiveness from agency to agency and need to be better specified;

- in selected priority occupations studied, job skills requirements were usually not clearly defined, and job descriptions were neither familiar to job incumbents nor routinely used in performance evaluations;
- whereas data relating to sectoral employment and training exist in a form upon which an HRD planning capability can be built within each agency, these data are disaggregated and incomplete in most cases, thus making accurate skills needs assessment difficult if not impossible;
- at present Swazi educational and training institutions are under-utilized in the development of skilled human resources for the sector; and
- there are several initiatives already started which need to be carried through to conclusion. For example, although the changing and expanding responsibilities of Health Assistants have been reflected in new job descriptions and they have been approved for more than twelve months, there is currently no plan to provide training to enable them to meet their increased responsibilities in an integrated health care system.

With this outlook in mind, Chapter 6 proposes a sector plan for HRD which builds upon existing agency and institutional capabilities, but offers also some new ideas for consideration by the NAG and the respective ministries involved in the sector.

It is emphasized that HRD planning is not the same as "manpower planning" in the traditional sense, which has relied in the past on periodic "one-shot" studies conducted usually by outside researchers. It is instead a kind of intra-organizational "radar" which systematically scans the work environment. Signals from the surrounding (sectoral) labor market are sensed by the system and interpreted by management as a prerequisite for making human resources decisions. The purpose of the "radar" analogy is to underscore the routine scanning, rather than widely spaced "snapshots" provided by traditional "manpower planning." Signals for the interpretation include many different measures of workplace activity, such as job vacancies by agency and occupation, labor turnover by age category, in-service training activities, and emerging skills gaps in particular occupations. Human resource development planning requires that adjustments be made, as a result of the routine "radar" scans, in the specification of job requirements (for example in written job descriptions) or in the quantity or quality of occupational supply through more responsive education and training. Careful, cooperative appraisals should be made with individuals as part of the performance assessments and training needs and opportunities specified. Close linkages are desirable between sector management and the local institutions providing skilled human resources to increase the likelihood that HRD needs are promptly met where possible within Swaziland. Where overseas institutions are used, education and training should be well monitored and returns on investment should be demonstrated.

Accordingly, the proposed plan suggests an operational policy, strategy, and institutional framework to meet both short- and long-term sectoral HRD planning needs and proposes nine additional projects designed to assure that the needs of the sector are met:

- assessing occupational information, and establishing a sectorwide HRD information system to ensure an adequate data base for effective HRD management and planning;
- linkage of job analysis to training needs through the development of procedures for periodic review and updating of job descriptions for priority occupations;
- meeting urgent HRD needs in the sector, in engineering and other specialities;
- development of guidelines for external technical assistance, through case study assessments of sector agency experience with expatriate advisors;
- development of pre-professional programs for candidate training in engineering, involving innovative academic and work-experience arrangements through the University of Swaziland (UNISWA);
- improvements in training of water technicians, involving assessment and updating of the planned training course at the Swaziland College of Technology; and
- improvements in training, respectively, of health inspectors, health assistants, and artisans, through systematic application of procedures for identifying job requirements, determining appropriate skills and knowledge for effective job performance, and developing the necessary training specifications.

Chapter 1

INTRODUCTION AND BACKGROUND

1.1 Introduction and Report Organization

In recognition of the threat to development posed by lack of safe potable water and sanitary excreta disposal facilities, the United Nations in 1977 established the 1981-1990 period as the International Drinking Water Supply and Sanitation Decade, with access and coverage targets to be specified in country Decade plans. The pace of plan preparation was slower in Africa than in other regions of the world. Swaziland however participated in the original 1977 UN Water Conference at Mar del Plata which initiated the Decade. Since then, Swaziland has undertaken both structural and strategic steps to coordinate, plan, and implement Decade activities, such as convening a National Action Group (NAG), conducting sectoral studies and reviews, and preparing a National Action Plan.

The Government of Swaziland (GOS) has therefore been engaged in a concerted effort to improve water supply and sanitation for its population in urban, periurban and rural areas. Several national and municipal government agencies are involved, as well as non-governmental and private sector organizations. A major limiting factor in fulfilling Decade goals however has been the shortage of qualified human resources in professional, technical, and craftsman occupational categories in agencies comprising the Water Sector. As a consequence, one of the studies identified in the National Two Year Action Plan was a human resources assessment of the entire Water Sector. This report is the result of that assessment which was completed by a team from the Water and Sanitation for Health (WASH) Project under USAID sponsorship during August/September 1987 at the request of the Government of Swaziland.

The purpose of the report is to present the methodology, results, and recommendations of the assessment. The report concludes with a plan for human resource development within the Water Sector as called for in the National Policies and Strategies statement (National Action Group, June 1986, p. 21). The authors appreciatively acknowledge earlier studies conducted for the sector (e.g., Hamilton and Dlamini, 1987; Vilakazi and Plumb, 1984; Roy 1981) as well as relevant reviews in other sectors (see next section). This study differs however in two ways from earlier approaches. First, national human resources development (HRD) is presently of considerable concern to the Government of Swaziland. Our study therefore explicitly recognizes factors which, while contextual to this assessment, nevertheless affect the overall planning environment. One such factor for example is the proposal in the recent ILO report (1986) to increase the GOS capacity for HRD planning at the inter-ministerial level.

Secondly, the methodological framework for conducting the study has been documented and step-by-step guidelines developed for future use within the sector on a continuing basis. Thus, rather than rely on results of sporadic studies, a capacity can be developed for more in-house and strategic scanning of relevant labor market and education/training information. This institutional capability not only has the potential for organizational

linkages to ongoing and future HRD planning elements in other Ministries, but also strengthens the capacity of the Water Sector organizations to detect and respond to their own needs.

The organization of the report is as follows. The remainder of this first chapter presents the national HRD context for the study and then focuses directly on the Water Sector context and HRD issues. Chapter 2 describes the methodology. Chapters 3 and 4 address respectively occupational demand and supply within the sector. Chapter 5 discusses the results and conclusions addressing occupational demand and supply and identified imbalances between them. Chapter 6 is the keystone of the report, containing a plan for dealing with immediate problems raised by the report and strengthening the capacity of the sector to detect and respond to HRD needs in the future.

Planning for effective preparation, management retention, and retraining of the human resources in the Water Sector however cannot be carried out in a vacuum. Population, health, and economic factors affect labor force size and participation patterns, which in turn partly determine availability of skills. Pre-service (primary, secondary, and post-secondary) education and training take place in the education sector. Employees everywhere have aspirations and expectations based on individual, cultural, and economic experience. Labor legislation and policy dictate personnel procedure, and affect promotional routings (career ladders) throughout the civil service by establishment of posts, grades, and salary ranges. In addition, private sector wage and salary practices directly affect those of government.

Thus it is important that the Water Sector study recognize and the recommendations be related to the general context of national HRD policies in Swaziland. While it is beyond the scope of the report to address these areas in detail at the national level across sectors, some acknowledgment is essential of key factors impinging on HRD planning in the country. Therefore the word "context" is used several times in the text to refer to these larger issues within the scope of which the findings and recommendations should be viewed.

A number of reports and data sources were used for this overview, all of which are included in the list of references in Appendix A. Background data came mostly from a U.S. Department of State Post Report, the recent World Bank Population and Health Sector Review, World Bank Social Indicators of Development, 1987, and provisional releases of 1986 Swaziland Census information. HRD issues were identified from meetings with various Government of Swaziland, Donor Agency, NGO and private sector representatives, and from the national studies cited. Accordingly, the following is a brief review of factors identified by recent national studies.

1.2 National Human Resources Context in Swaziland

The Kingdom of Swaziland is a small, landlocked nation with a 1987 population of approximately 700,000 people. In 1903 the country became a British protectorate, and on September 6, 1968, an independent nation within the British Commonwealth.

Swaziland is almost surrounded on the north, west, and south by the Transvaal and Natal Provinces of the Republic of South Africa (RSA) and shares a 112 kilometer border with Mozambique to the east. It has a total land area of 17,364 sq. km., and is divided into four well-defined agro-ecological regions of roughly equal breadth running from north to south: the western high-veld (average elevation 4000 feet); the middle-veld (average elevation 2500 feet); eastern low-veld (or bush-veld, between 500 and 1000 feet); and the Lubombo range or plateau (average elevation 1800 feet). Four geopolitical regions subdivide the public administration of Swaziland (Hhohho, Manzini, Shiselwini, and Lubombo), and there are also two municipal governments and 40 tinkhundla (aggregations of chiefdoms).

The population and health sector has recently been reviewed by the World Bank (1985), but only on the basis of empirical census data from 1976. Using provisional estimates from the 1986 census, Table 1.1 illustrates de facto national population distribution by district. Total population for 1986 has been provisionally counted at 676,089 persons, with an average annual growth rate from 1976-86 of 3.13 percent (Government of Swaziland; Provisional Results, No Date), although the World Bank 1987 Social Indicators Data show a "most recent estimate" of Swaziland population of 784,000 with an annual growth rate of 3.4 percent.

Regional population distributions in 1986 appear similar to those in 1976, more or less evenly divided across the four regions. Some shifts however have occurred during the intercensal years in regional populations. Table 1.2 presents a comparison between the net intercensal gains/losses by region in 1966-76 and percent distributions in 1976 and 1986. In Table 1.2 percent distributions are presented in the second row for both 1976, in parenthesis, and 1986. Coefficients for migrant gain/loss for 1986 were unavailable for estimation of net intercensal gain/loss for the period 1976-86). These data suggest that the shift is continuing into Lubombo (with its agricultural development schemes and relatively empty land) and out of Shiselwini, which has higher rural densities and less opportunities for paid employment (World Bank, 1985, p. 5).

The proportion of Swazis staying abroad, often to work in mines and farms in RSA, has been estimated by the World Bank at about five percent of the total, and about 20 percent of the male working age population. Provisional evidence from the 1986 census suggests a decrease in the proportion of absentees across all districts for an average of 4.45 percent for Swaziland as a whole (Provisional Results, p. 5). Furthermore, it has been suggested that South Africa may be contemplating phasing out migrant labor to accommodate its own rapidly growing labor force (World Bank, 1985, p. 13). Thus the trend suggested by 1986 census data may become more pronounced in the future.

Prior studies have addressed national human resources issues associated with Swaziland's continued development (e.g., Research Triangle Institute, 1976; International Labor Organization, 1986). Population, health, labor force, education and employment factors relevant to the demand/supply of human resources identified from these reports and other sources are as follows. Contraceptive prevalence rates vary, but are comparatively low (approximately four percent nationally). High fertility rates (Total Fertility Rate approximately seven children per woman for 1976) combined with infant

Table 1.1
De Facto* 1976 and 1986 National and Regional Population Estimates for Swaziland

YEAR	SWAZILAND	HHOHLO	PERCENT	MANZINI	PERCENT	SHISELWINI	PERCENT	LUBOMBO	PERCENT
1966	374571								
1976	494534	133493	26.99%	139538	28.22%	117172	23.69%	104330	21.10%
1986	676089	179193	26.50%	190613	28.19%	153875	22.76%	152408	22.54%

* De Facto refers to persons actually present in the country on the Census enumeration date.

Source: Provisional Results of 1986 Census, Government of Swaziland, and World Bank Population and Health Sector Review, May 31, 1985.

Table 1.2
Migration in Swaziland; 1966-1986

	HHOHLO	MANZINI	SHISELWINI	LUBOMBO
Net intercensal gain/loss 1966-76	+2265	+1617	-9254	+5372
% distribution 1976-86	(27)26.5*	(28.2)28.2	(23.7)22.7	(21.1)22.5

Source: Provisional Results of 1986 Census, Government of Swaziland, and World Bank Population and Health Sector Review, May 31, 1985.

* 1976 percentage in parenthesis, followed by 1986 percentage of total population.

mortality rates of 135/1,000 are associated with at least a doubling of the population in the next 30 years. The sex ratio of 90.2 (number of males per 100 females) continues at present to favor females. The population is in large part youthful, with almost half being less than 15 years of age (the age of entry into the labor force), implying that the labor force will grow at a faster rate than the population.

Approximately half of the population is literate. The formal education system in Swaziland is 7-3-2, i.e., seven years of primary school, three of secondary, and two of high school. While in 1983, 94 percent of primary school age children were reported to be in primary school (World Bank, 1985, p. 15), data from the 1986 National Manpower Survey suggest that only about 44 percent of six-year-old children are in Grade One (International Labor Organization, 1986, p. 89). Education and training costs and wastage are judged to be relatively high, whereas pass rates have been declining (p. 81). Currently it is estimated to take 12.6 years on the average to produce a primary school completer, and just less than six years for secondary completers. (For the purposes of this report, school leavers are defined as those leaving before satisfactory course completion, as contrasted with completers who satisfy passing criteria.)

The Research Triangle Institute (RTI) report pointed, over ten years ago, to the shortage of jobs, as well as a lack of higher level technical and administrative skills (RTI, 1976, p. 2). Expatriates were perceived as dominating higher level occupations. Weaknesses in math and science curricula were associated with a proliferation of untrained teachers. A decade later, similar problems are identified in the ILO report. The formal sector is small, less than 80,000 workers in 1986 (ILO, p. 7) predominantly in manufacturing, agriculture and forestry, and government. Government, which accounts for 17 percent of GDP, employs over 15,000 persons (excluding police and defense forces) or 21 percent of the formal sector. Government also employs about 43 percent of Swaziland's skilled labor. The National Manpower Survey data show that among the skilled workforce, almost one-third are considered to have qualifications below those required by their employers. There is a severe shortage of skilled persons, particularly in the "Other Professional Occupations" category, which includes lawyers, accountants, economists, general and production managers, and government administrators.

There are substantial earnings differentials between public and private sectors and between Swazi citizens and expatriates. Wage/salary amounts in private sector occupations may exceed those in similar public sector occupations by 20-50 percent (ILO, p. 28). While expatriates account only for about three percent of total government positions, they occupy about eight percent of the skilled positions, and they tend to dominate in certain occupations throughout the economy, such as accountants and engineers. The higher earnings of expatriates are reflected throughout the job spectrum (ILO, p. 27).

Perhaps most importantly, the organizational climate for human resources development in the government inhibits initiative on the part of individual managers. A 1987 report by the British Overseas Development Administration (ODA) refers to a 1986 World Bank study on public administration and management which concluded that training alone would probably not prove beneficial while the operational government milieu in which managers are

expected to perform remains unchanged. Major problems suggested by the World Bank study included reluctance of managers to delegate, shortages of qualified, skilled managers in supervisory positions, lack of clearly defined post descriptions and job responsibilities, and insufficient recorded data for management decisions.

In conclusion, human resources development problems in Swaziland are national in scope. In face of steady population growth and dramatic increases in the size of the labor force, there is paradoxically an impending unemployment crisis at the same time as critical shortages of skilled Swazi citizens to fill technical and administrative jobs. There are significant skills imbalances between job requirements and the competencies of those available to fill existing vacancies. This implies increased competition for employment opportunities. Corresponding pressure is expected to be exerted on education and training institutions to augment facilities, staff, and programs to meet the demand for pre-service as well as in-service training for employment. Lack of adequate, reliable information for management and a confusing organizational climate for managers exacerbate the difficulties facing agency planners.

The severity of the HRD problems facing Swaziland necessitate coordinated policy and planning in this area. The ILO recommendations included suggestions for strengthening centralized statistical agencies, particularly in the labor and employment statistics aspects of government operations. However, such central coordination is premised on the supposition that major ministries/subsectors are aware of their own HRD needs at the agency level. The ODA report recommends improved personnel data systems, performance appraisal mechanisms, and enhanced training programs. It is therefore within this general context of need for institutional development in HRD planning that this study of the Water Sector was conducted and the results and recommendations presented.

1.3 Water Supply and Sanitation Sector HRD Context

In light of the general background and specific HRD issues reviewed above, the current study addressed the human resource needs specifically of the Water Sector. The following sections of this chapter outline the organization of the Water Sector, and of the sectoral development activities in Swaziland, and some major issues in Water Sector planning for human resources development.

1.3.1 Organization of the Water Supply and Sanitation Sector

Public responsibility for planning drinking water supply and sanitation programs and projects and for guiding and assisting their execution lies in two ministries. The Ministry of Natural Resources, Land Use and Energy (MONRLUE) deals with the conservation and protection of water resources, the provision of drinking water to communities, and the removal and disposal of urban wastewater. The Ministry of Health promotes the use of clean water and the hygienic disposal of wastes in homes, restaurants, and other public places and assists rural communities in protecting springs and constructing latrines.

Five units in the MONRLUE are concerned with drinking water and sanitation. The Water and Sewerage Board (WSB) was established in 1974 to implement and maintain water supply services in seventeen designated urban areas and waterborne sewerage schemes in five. It now operates 20 water supply and six sewerage systems. During the Fourth Development Plan (1983/4-1987/8) the WSB's specific objectives are however a) to expand raw water intake and treatment facilities to respond to demand, b) to expand water and sewerage services in urban and adjoining peri-urban areas on a project-by-project basis, c) to provide appropriate in-service training for all supervisory, technical, and professional staff, and d) to maintain a tariff structure ensuring that "viable areas" remain self-supporting.

The Rural Water Supply Board (RWSB) was established in August 1979 to implement and maintain rural water supply schemes and to guide other public and private agencies engaged in similar work to ensure compliance with acceptable design, equipment, and water quality goals. The RWSB's specific objectives during the Fourth Plan period are a) to encourage community participation in planning, building, and operating their water supply systems and b) to strengthen its nationwide capability and develop training programs for all staff. It cooperates closely with MOH in rural activities.

The Housing Branch (HB) was established to develop policy and programs for housing and related infrastructures and to coordinate, plan, and implement squatter upgrading schemes, site-and-service arrangements, and self-help housing projects both in urban and rural areas; these projects involve the provision of storm drainage and water points.

The Water Resources Branch (WRB) was established to assess, apportion, conserve, and manage surface water resources and to initiate negotiations with neighboring countries to ensure equitable use of the waters of rivers of common interest. In addition to supervising studies for the development of water resources, the Branch maintains and develops hydrological and meteorological networks and monitors rivers for pollution detection and effluent control. It operates and maintains certain dams.

The Department of Geological Survey and Mines (DGSM) has the responsibility to carry out groundwater studies and establish a data bank and a groundwater allocation system. DGSM is concerned with investigating and recording the geology of the country and advising various government and private sector agencies on natural resources and their development.

Two units in the Ministry of Health (MOH) are concerned with drinking water and sanitation. The Health Inspectorate (HI) was established to promote clean water and sanitation, to assist rural communities in building latrines and small spring protection, and to provide health education to encourage correct use of drinking water and sanitation facilities. During the current Plan period, the HI's specific objectives are a) to emphasize the essential complementarity of personal hygiene, sanitation, and clean water in realizing health benefits, b) to provide sanitation for schools and health centers, and c) to strengthen its internal management structure and train additional health assistants and health inspectors for its program.

The Health Education Center (HEC) was created to promote behavioral changes in communities which reduce the incidence of major health problems including those related to water and sanitation. During the current Plan period, the HEC's specific objectives are a) to organize community health committees, b) to promote health education in school curricula, c) to train and assist MOH program staff in effective delivery of health education, and d) to train additional health educators.

In order to promote and coordinate activities during the Decade, a National Action Group (NAG) was established in 1979. This group consisted of the Principal Secretaries (PS) of the Ministries of Economic Planning, Home Affairs, Public Works, Health, Agriculture, and Education. The NAG was chaired by the PS of Public Works with the PS/MOH as Vice-Chairman and the Chief Engineer of the RWSB (then part of the Ministry of Works) acting as Secretary. A Technical Sub-Group (TSG) of the NAG was set up in 1985 as a working group to assist the NAG in implementing Decade activities. The composition of the NAG was informally changed over time to accommodate to changes in ministerial responsibilities (for example the creation of MONRLUE). The RWSB provides secretariat functions for both the NAG and the TSG.

The creation of an independent national water authority to provide a permanent inter-ministerial forum for considering the national and international aspects of long-term water resources planning as well as ongoing water resource management decisions has been considered for several years. Potential legal and operational requirements of such an agency are currently being examined.

1.3.2 Decade Activities in Swaziland

The aim of the International Drinking Water Supply and Sanitation Decade, to which the Government of Swaziland has actively subscribed, was to provide accessible and safe drinking water and adequate facilities for the disposal of human excreta to all populations in need. The approach recommended by the UN system was to promote the achievement of this aim through individual and community efforts, aided by government and external agencies, within the context and as an essential component of a national primary health care program. This approach, and particularly its implications for interagency cooperation in the field, is understood and effectively maintained in Swaziland.

The government now anticipates that public water supply will cover 100 percent of the urban and 25 percent of the peri-urban population by 1990. In addition, it is estimated that safe rural water supply will be accessible to 50 percent of the rural population by the end of 1991. GOS also plans to extend sewerage to cover 40 percent of the urban population by 1990 and to assist 25 percent of the peri-urban population in the construction of interim sanitation systems with on-site disposal. Similarly, GOS expects that 35 percent of the rural population will have access to hygienic excreta disposal facilities, mainly ventilated pit latrines, by the end of 1991.

As implied in the Decade strategy, the above improvements in WS&S "hardware" are being achieved by strengthening various elements of sector "software," including a) health education and technical guidance to increase effective community participation in planning, executing, maintaining, and bearing the

recurrent costs of WS&S improvements, b) facilitating the choice of "appropriate technologies," that is, technologies which facilitate and enhance the correct use and maintenance of installations, and c) increasing emphasis on developing the human resources of the sector. It is to the last of these "software" objectives that the current study is addressed. The next section outlines some of the HRD problems already identified in earlier Water Sector studies.

1.3.3 Major Issues in WS&S HRD Planning

While in many respects the Water Sector is seen as functioning well, a number of difficulties related to staffing, retention, productivity, supervision/management, and training have been recently documented. Attention to immediate staffing needs of the Water and Sewerage Board and the requirements for a general human resources assessment for the entire sector are noted for example in the 1986 National Two Year Plan. The proposed National Water Authority also calls generally for strengthening of technical capabilities throughout the sector.

More specifically, statutory authority is sometimes difficult to determine for Water Sector functions, for example, in peri-urban areas in maintenance operations. Systems may not be originally constructed to standards, and routine maintenance is unavailable, so breakdowns occur (National Action Group 1986, p. 5). Resulting dissatisfaction with quality of repairs raises questions of staffing patterns and technical expertise within responsible agencies to respond to maintenance needs.

The Health Inspectorate is understaffed in relation to its responsibilities for the promotion of water supply and sanitation in rural areas. No Health Assistants (HAs) have been trained in WS&S for more than ten years (Ntezinde, et al., 1986). Acceptable ratios of health assistants to populations in need were defined by WHO at 1:5,000 in rural areas with environmental sanitation services only (Ministry of Health, 1987, p. 22). Currently, the primary health system in Swaziland is short, just over a third of the HA complement required to meet the WHO standard (MOH, 1987, p. 23). In an earlier study, Vinayagam (1974) suggested that good supervision was essential to effective HA performance in communities. Roy (1981) reported four factors as critical in the relatively high turnover of HAs, two of which were lack of career opportunities and inadequate supervision.

Turnover among employees in the RWSB was cited in Roy's earlier study as 7 percent per year over a four-and-a-half-year period (1981, p. 34). A major reason for this was cited as the initial probationary employment period. Although the study report does not specify exactly how the turnover rate was calculated, we inferred that terminated probationary employees accounted for the high rate. Detailed data on turnover and reasons for leaving were unavailable at the time, suggesting that future studies address these issues further. In particular, the extent of turnover among qualified senior staff and the impact of the private sector on decisions to relocate should be determined.

Chapter 2

METHODOLOGY

The methodology used in this study is detailed in WASH Technical Report No. 20 (Lawrence and Tomaro, 1983). Only a summary of the overall approach is, therefore, given here, followed by a description of its application specifically to the Swaziland Water Sector.

2.1 Summary of WASH HRD Guidelines Approach

The method follows a general model of human resources development, with an emphasis on improving the flow of occupational information from occupational employment to education and training programs. Competencies provided to individuals through education and training need to be aligned with workplace requirements. While much of this alignment is often left to chance, this approach provides a systematic framework for relating education and training planning to occupational demand.

A four-phased strategy is proposed, with discrete steps outlined for each phase. Phase I concentrates on the backgrounding of agencies to be studied, identification of "stakeholders" (those with a stake in the development of human resources for the sector), and data sources and documentation helpful to the assessment. Phase II focuses on the nature of employment in WS&S agencies. Occupational employment data from previous and current years are sought and occupational matrices by agency constructed, with employment for each occupation across available years. Since not all occupations can be appraised in detail, criteria are developed for selection of specific occupations for closer attention. For these occupations, visits are made to workplace sites, incumbents interviewed, and job skill needs assessed. If appropriate, occupational projections are prepared for broad occupational categories (professional, technical, crafts, etc.), and for the priority occupations within these categories.

Phase III requires appraisal of the data sources and documentation on education and training institutions providing occupational supply to the sector. An inventory is prepared of the institutions and relevant program offerings. Estimates are then made of the supply of individuals to the sector, by examining rates of flow, direction, and skills acquisition of those successfully completing or leaving (unsuccessfully) the program. Where possible, visits are made to institutions and training sites to discuss curricula with staff, observe instruction, and interview students.

Phase IV consists of assessing the balance or imbalance between the occupational demand and program supply and the preparation of an HRD plan to address both improvements on the demand side (in-service training of incumbents; promotion opportunities) and on the supply side (education/training programs, facilities, staff training, equipment, etc.).

2.2 Approach Used in This Study

A two-man team spent four weeks in Swaziland from August 17 to September 12, 1987. The team consisted of a human resource development specialist and a public health engineer. Counterparts were provided from WS&S agencies and the Ministry of Labor, and the team was provided offices in the RWSB for the duration of their stay.

During the first week, Phase I of the approach was conducted. Meetings were held with the TSG and with representatives of the relevant ministries, donor agencies, and other stakeholders in the WS&S sector. Lists of meetings and persons/agencies met with are provided in Appendices B and C of this report.

The purpose of the first phase was to understand the context for HRD planning and to limit the current study to areas and subjects of most utility to future management and policy decisions. Data sources were identified, and worksheets (contained in the HRD Guidelines) were completed indicating agency roles and responsibilities in the sector and data types and availability in aggregated or disaggregated form.

The second and third weeks were spent concurrently on demand and supply analyses. Personnel lists and annual reports were obtained where possible from each of the WS&S agencies, and the decision was made to limit the study to the three major public employers in the water sector--WSB, WRB, and RWSB.

Occupational classifications were compiled separating detailed occupations into five categories: Professional, Technical (sub-professional), Artisan, Administrative Clerical, and Laborers. The detailed breakdowns of these occupational categories are contained in Appendix D.

Priority occupations were selected according to criteria specifically outlined in Chapter 3 below, which include how critical they are to sector employment and significant training implications. Job descriptions were obtained for priority occupations where available, and visits made to work sites for each occupation. Incumbents and supervisors were interviewed, and job tasks reviewed in relation to training received and skills needed.

Detailed occupational matrices were constructed with employment for current and previous years where available. Data varied from agency to agency, both by occupational category/description and by number of previous years of data readily accessible for study.

Occupational projections over the five-year projection period were prepared individually with a representative of each of the three agencies, occupation by occupation, and then reviewed by each agency. Since the cells of the matrices contain data specific to individual employment, detailed matrices are not published in this report. Five-year projections are not therefore based on independent linear extrapolations from previous time series data on occupational and sector employment. Although the linear method is often used, it suffers from two basic weaknesses well known in the labor economics field. The first is dependence on the accuracy of data series on which the projections are based, and the second is the use of fixed coefficients for the distribution of projected total employment over sector occupations.

In the present case, the agencies are small enough, and occupational employment in most cases individual enough, to permit preparation of estimates of future employment for each occupation, a technique usually too time-consuming to be attempted in occupational studies. The limitation of this technique is of course the tendency for optimistic futures to be proposed by sector managers. There are two ways to counter this. The first is to ensure that overall rates of growth, both within and across sector agencies, are held to acceptable limits as bounded by sectoral and GOS policies. The second is to publish results, evaluate them, and consider specific alternative futures by adjusting occupational employment totals accordingly.

Separation rates were not available for sector occupations, so a general turnover rate of 3.5 percent was used in calculation of total job openings. This rate is the same as used in earlier studies as referred to in Chapter 3.

Occupational supply was reviewed by making an inventory of educational and training institutions providing for the sector in Swaziland and, to the extent data were available, for institutions overseas. Organization and purpose, facilities and fee structures, program and curricula, staffing levels, qualifications and experience of staff, and extent of previous and planned training of Water Sector employees were assessed for seven local institutions.

All but one of the institutions were visited and administrators and staff interviewed. Feedback was also obtained from employers on their perceptions of the training, skills learned, and productivity of employees on the job. Employees themselves were asked for assessments of the utility of training and suggestions for improvements in curricular content or design.

Projected occupational demand was then compared in general with the capacity of education and training institutions to respond and, for priority occupations, anticipated numbers of available training slots estimated.

Finally, a comprehensive HRD plan was drawn up for the sector, with policy and operational recommendations and procedures outlined.

Chapter 3

OCCUPATIONAL DEMAND

This chapter describes the existing staffing patterns within the Government of Swaziland Water Sector, addresses some of the issues in current utilization of personnel with specific reference to selected occupations, and presents employment projections and staffing requirements for the sector.

3.1 Assessment of Existing WS&S Human Resources

Most of the employment in the public Water Sector in Swaziland is accounted for in two ministries, Natural Resources and Health. In the Ministry of Natural Resources, according to annual reports for the respective agencies, the Water and Sewerage Board had the largest employment share in the sector in 1986, with 717 persons employed. Rural Water employed 148, and the Water Resources Branch employed 62. Total employment across these three agencies in MONRLUE in 1986 was therefore 927. In the Ministry of Health in 1986, Health Inspectors and Health Assistants, who are charged generally with water and sanitation responsibilities in the communities, numbered 30 and 74, respectively.

Additional personnel in WS&S-related occupations are employed in Geological Survey and Mines (including hydrogeologists and geologists concerned with underground water resources), the Housing Branch, the Townships administration, Town Councils in Mbabane and Manzini, the Swaziland Electricity Board, and the Ministry of Agriculture and Cooperatives. As industrial demands for water grow, the Ministry of Commerce, Industry and Tourism will increasingly affect WS&S activities. These public sector agencies form an essential component of the sector and should be considered important stakeholders in water and environmental sanitation throughout Swaziland. However, in view of relative employment share, in that most of public WS&S sector employment is in three agencies, this report deals in detail only with the occupational structure of WRB, RWSB, WSB, and the MOH Health Inspectorate. MOH staffing structures are covered in detail elsewhere (MOH, op. cit.) and are not repeated here.

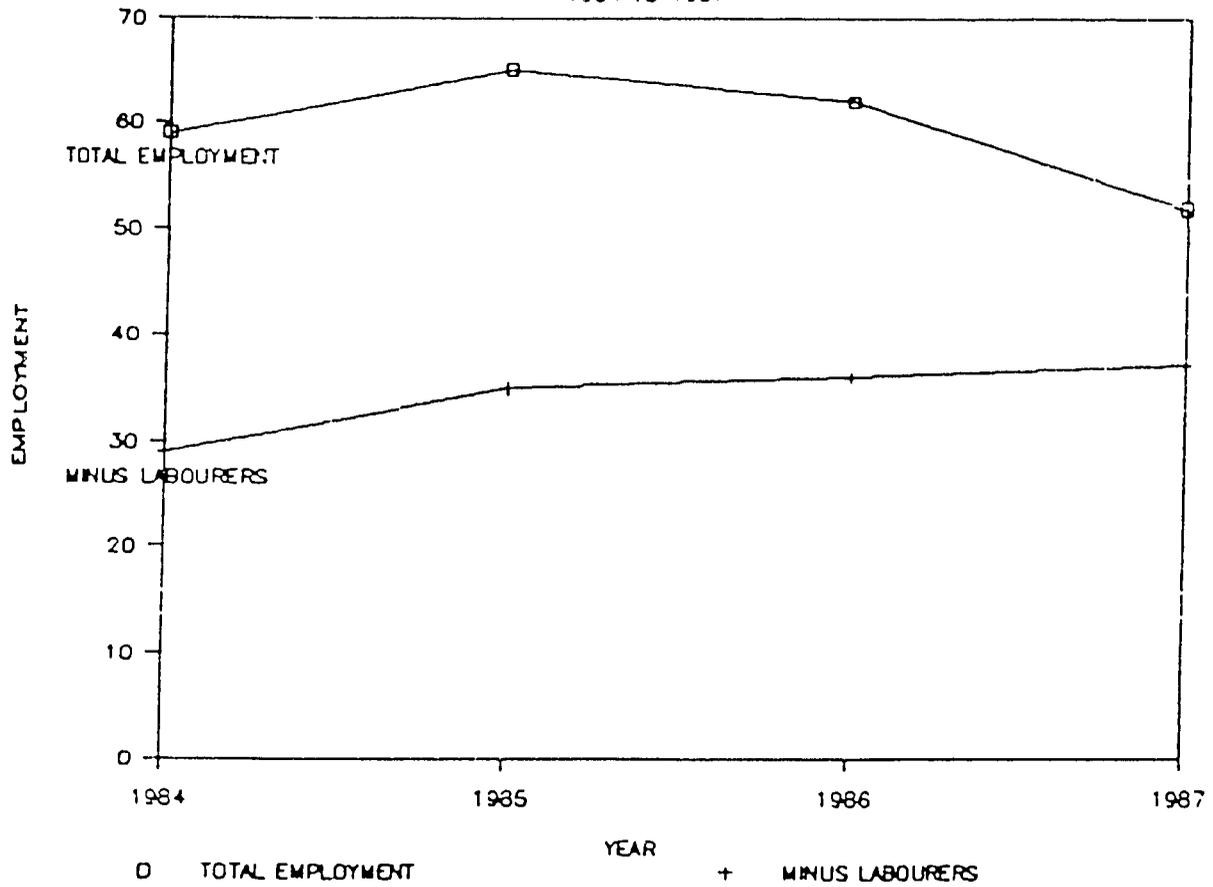
3.1.1 The Water Resources Branch

According to its 1985/86 Annual Report, WRB functions include international as well as national policy considerations in terms of water conservation and apportionment. Its role extends to research and analysis of surface water resources availability and use, hydrological activities, the establishment of a National Meteorological Service, pollution monitoring, and, increasingly, operation, maintenance, and assessment of safety of dams.

WRB employment for 1984-6 is presented in Figure 3.1 both for total employees and for total employees minus laborers. The complement of laborers at any given time is highly dependent on projects, and they do not usually require formal training. Employment peaked in 1985, when the effects of a cyclone

FIG 3.1 TOTAL WRB EMPLOYMENT

1984 TO 1987



were being assessed and repairs completed. While total employment (including laborers) has declined slightly since 1985, employment excluding laborers has gradually increased.

Employment and staffing patterns within WRB from 1984 to 1987 by major occupational group are contained in Table 3.1. Because of the distortions in total employment (TE) caused by the inclusion of numbers of laborers (TL), total employment (minus laborers) is also computed as $(E) = TE - TL$.

Staffing patterns (ratios of occupational totals (O) to total employment minus laborers $(E) = O/E$) are included in the table. These are indicative of the distribution of (E) for the agency over four major occupational groups, Professional, Technical, Administrative/Clerical, and Artisans. The detailed occupations composing each of these four categories are shown by category in Appendix D.

The staffing ratios show relative stability for major occupational groups at 17 percent to 22 percent for Professional, 58 to 65 percent for Technical, and 8 to 10 percent for Administrative/Clerical. There were 41 established posts in 1986. The annual growth rate of total employment minus laborers dropped from almost 21 percent in 1985 to around three percent in 1987. According to the Establishments Register 1987-88, there were 46 established posts in the WRB.

3.1.2 The Water and Sewerage Board

According to its most recent Annual Report 1985/6, the WSB employed over 700 people and is the largest employer in the public water sector. Established in 1974 by legal notice, WSB implements and maintains water and sewerage services in urban areas. The Annual Report (p. 7) indicates there were 416 established posts in 1986 in WSB.

Figure 3.2 shows employment growth of the Board from 1978 to 1987. Again, laborers are graphed separately. It is clear that employment growth as measured by (E) has remained relatively constant for the last seven years. Daily paid laborers however account for considerable growth in total employment since 1982. WSB personnel suggested that the data from which these graphs were drawn incorrectly enumerated the number of laborers actually working in WSB during 1980-83. In which case, the growth in the number of laborers 1980-83 would be more gradual than the considerable step-type growth shown on the graph.

Table 3.2 presents employment (E and TE) by year from 1978 to 1987, and again breaks out (E) by major occupational grouping. Staffing patterns (ratios) are included. Detailed occupations composing each major occupational category are contained in Appendix D.

Staffing patterns reflect the operations of the Board. Between seven and eight percent of the staff are professional including, for example, the engineers, financial controllers/accountants, chemist, and clerks of works. The technical staff have comprised a steadily increasing proportion of (E), from less than 12 percent in 1978 to more than 16 percent in 1987. Artisans

TABLE 3.1 OCCUPATIONAL EMPLOYMENT 1984 TO 1987 FOR WRB

OCCUPATIONAL GROUP	1984	PROPORTION	1985	PROPORTION	1986	PROPORTION	1987	PROPORTION
PROFESSIONAL	6	0.227	6	0.171	8	0.222	8	0.216
TECHNICAL	17	0.596	23	0.657	22	0.611	23	0.622
ARTISANS	3	0.103	3	0.086	3	0.083	3	0.081
ADM/CLERICAL	3	0.103	3	0.086	3	0.083	3	0.081
TOTAL MINUS LABOURERS	29		35		36		37	
LABOURERS	30		30		26		15	
TOTAL	59		65		62		52	

Source: Water Resources Branch, Ministry of Natural Resources

NOTE: Proportions are computed on total employment minus labourers

FIG 3.2 EMPLOYMENT GROWTH IN WSB

FROM 1978 - 1987

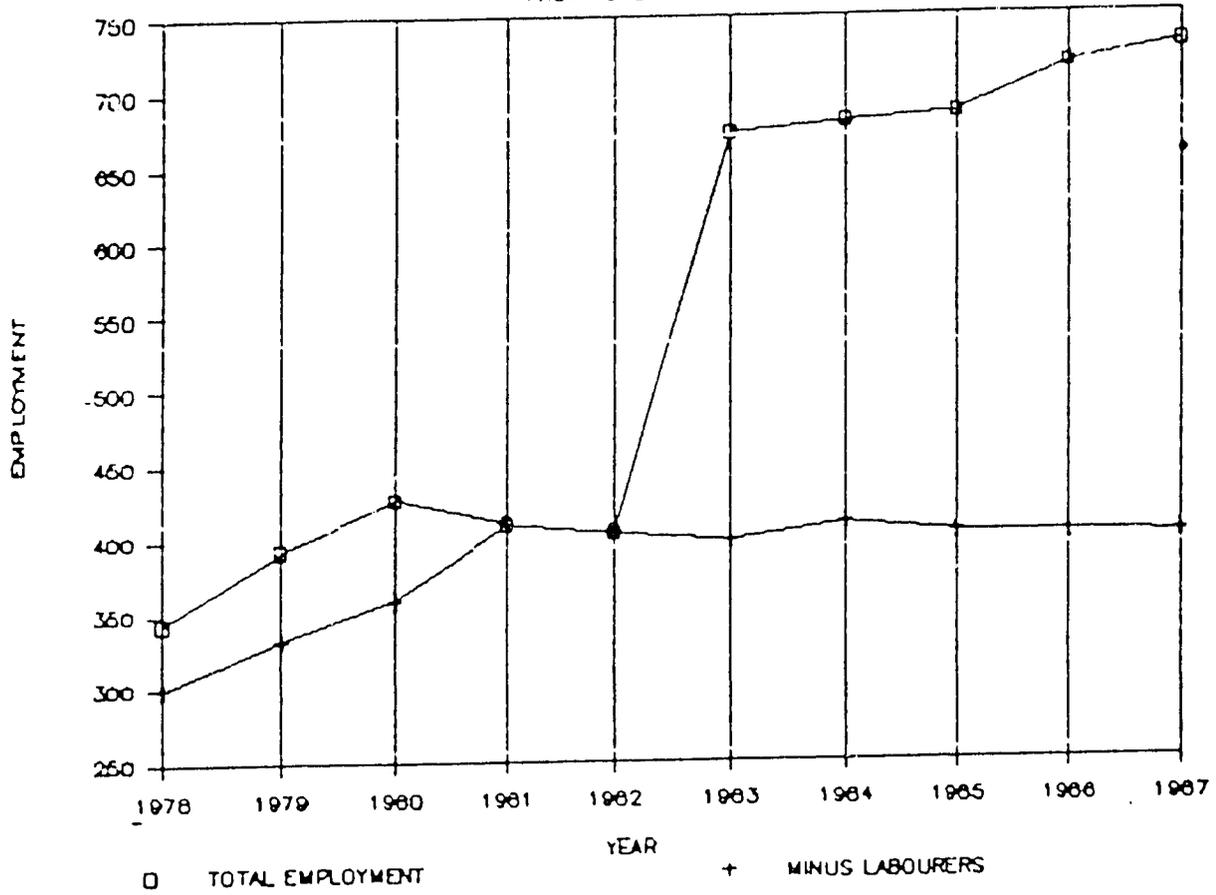


TABLE 3.2 EMPLOYMENT IN MSB FROM 1978 TO 1987 BY MAJOR OCCUPATIONAL GROUP

OCCUPATIONAL GROUP	1978	PROP	1979	PROP	1980	PROP	1981	PROP	1982	PROP	1983	PROP	1984	PROP	1985	PROP	1986	PROP	1987	PROP
PROFESSIONAL	25	0.085	26	0.080	26	0.074	30	0.075	28	0.071	29	0.073	29	0.071	28	0.069	29	0.072	29	0.072
TECHNICAL	35	0.119	37	0.114	43	0.122	53	0.132	60	0.152	59	0.148	68	0.166	64	0.159	65	0.161	65	0.162
ARTESAN	171	0.580	182	0.562	198	0.563	226	0.564	222	0.561	213	0.534	213	0.520	212	0.526	209	0.519	207	0.516
ADMIN/CLERICAL	64	0.217	79	0.244	85	0.241	92	0.229	86	0.217	98	0.246	100	0.244	99	0.246	100	0.248	100	0.249
TOTAL MINUS LABOURERS ETC	295	1.000	324	1.000	352	1.000	401	1.000	396	1.000	399	1.000	416	1.000	403	1.000	403	1.000	401	1.000
LABOURERS	44		60		61						274		270		282		314		329	
OTHER/UNGRADED OCCUPATIONS	4		8		7		9		8		0		0		0		0			
TOTAL	343		392		426		410		404		673		680		685		717		730	

Source: Water and Sewerage Board, Ministry of Natural Resources

NOTE: proportions (staffing patterns) are calculated on total employment minus labourers and other ungraded occupations

make up the majority of WSB's workforce but less so with time, dropping from 58 percent in 1978, to just over 50 percent in 1987. Administrative/Clerical (which in this case includes storekeepers, guards, and nightwatchmen) constitutes almost one-quarter of (E).

3.1.3 The Rural Water Supply Board

RWSB has responsibility for planning, construction, maintenance, and rehabilitation of rural water supplies, water quality surveillance, and collaboration with MOH in construction of latrines and sanitary inspection as well as ancillary operations in coordination, technical assistance, and training. While the populations currently served and potentially to be served by RWSB are respectively about 80 percent and 400 percent greater than those of WSB (see Chapter 1, Table 1.3), the total staff of RWSB is approximately 22 percent of the total staff of WSB. In addition, less than one-third of the RWSB staff are in permanent (established) posts. A small permanent staff exists in the headquarters and the four regional depots, but most of the workforce is temporary and paid from capital project funds. While administration, design, and planning activities are centralized, construction and maintenance are regionalized.

Figure 3.3 illustrates the relationship between permanent (established posts) and total employment in RWSB from 1982-1987. Total employment declined by about one-third from 208 to 158 over this period, while permanent staff almost doubled from 16 to 31.

Total RWSB employment by major occupational group is presented in Table 3.3. The distribution of detailed occupations within these occupational groups is provided in Appendix D. Proportions in this table are calculated with (TE) as the denominator. The proportion of professional staff has fluctuated between four percent and nine percent of total staff (partly due to movement of expatriate advisors), while other categories have remained relatively stable.

3.1.4 Detailed Occupations

Within the major occupational groupings (Professional, Technical, Administrative/Clerical, and Artisans) three occupational categories were addressed in more detail, engineers, water technicians, and, within the health sector, Health Inspectors and Health Assistants. These occupations were given priority in the study because they met one or more of the following criteria:

- they were particularly critical to sector functioning, or had been singled out as presenting staffing problems in recent reports or
- they had significant training implications for institutional planning in Swaziland.

FIG 3.3 RWSB EMPLOYMENT 1982/7 FOR
PERMANENT AND TOTAL STAFF

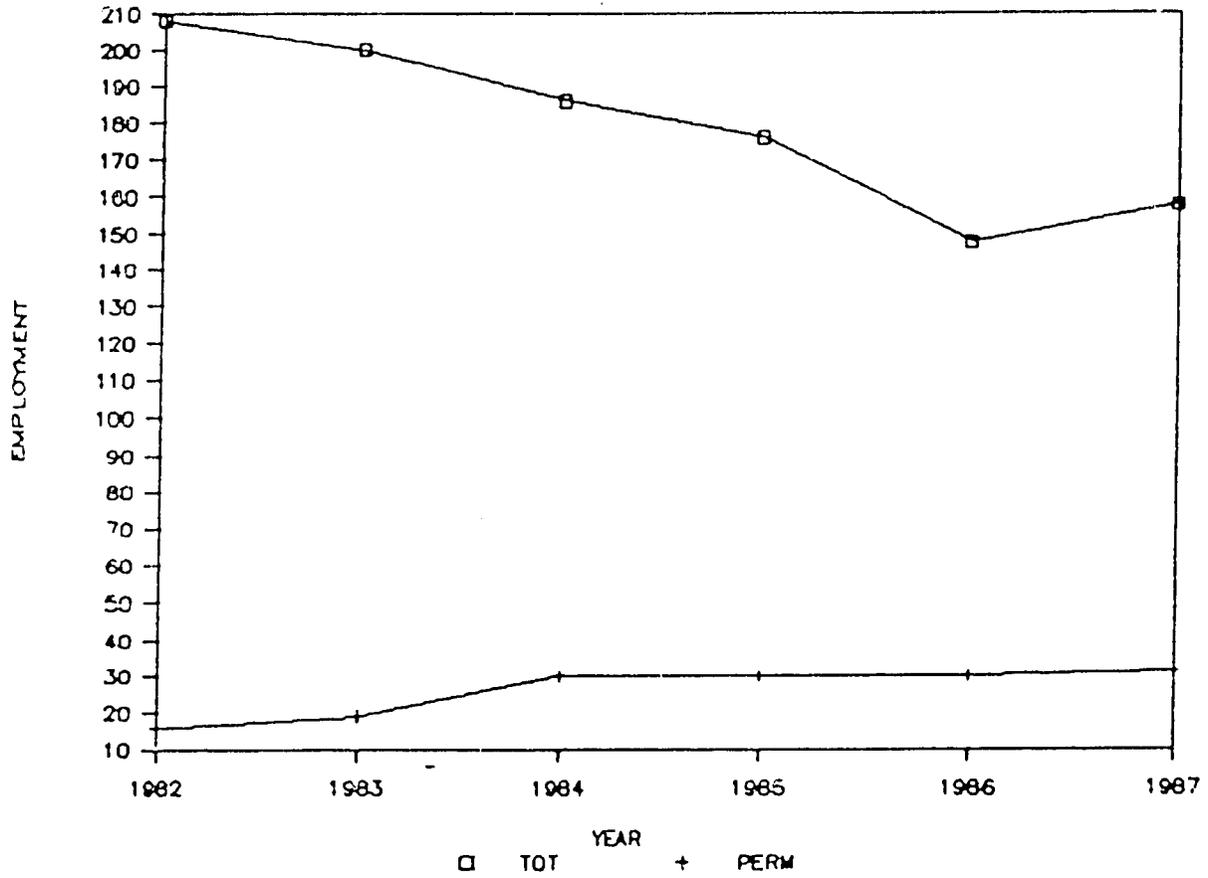


TABLE 3.3 OCCUPATIONAL EMPLOYMENT 1982 TO 1987 IN RURAL WATER SUPPLY BOARD

OCCUPATIONAL GROUP	E M P L O Y M E N T											
	1982	PROP	1983	PROP	1984	PROP	1985	PROP	1986	PROP	1987	
PROFESSIONAL	9	0.043	11	0.055	16	0.086	16	0.091	13	0.088	10	0.063
TECHNICAL	26	0.125	27	0.135	28	0.151	24	0.136	23	0.155	26	0.165
ARTESANS	86	0.413	97	0.495	80	0.430	77	0.438	64	0.432	63	0.399
ADMINISTRATIVE/CLERICAL	27	0.130	26	0.13	26	0.140	25	0.142	21	0.142	27	0.171
LABOURERS	60	0.288	39	0.195	36	0.194	34	0.193	27	0.182	32	0.203
TOTAL	208	1	200	1	186	1	176	1	148	1	158	1

Source: Rural Water Supply Board Personnel Lists 1982-87

3.1.5 Engineers

In WRB in 1987 there were posts for a Senior Water Engineer, two Water Resources Engineers and two Water Control Officers, with vacancies in positions for WR Engineers. No expatriate engineers currently work in the WRB. Seven engineering posts have been created in WSB, and three cadet engineers are currently employed. Three expatriate engineers are currently working with WSB, two from Sri Lanka and one from Uganda. The Planning Engineer, a Commonwealth consultant, was to relinquish the position in autumn 1987. There are four engineering positions in RWSB: a Senior Engineer as well as Planning, Design, and Public Health Engineer. One expatriate engineer from USAID serves as Advisor to the Public Health Engineer in RWSB.

3.1.6 Water Technicians

Water technicians are employed by that occupational title mostly in RWSB, where there were nine in temporary positions in August 1987. This is a little over half the total complement of water technicians in RWSB in 1982 when 15 were employed. Although none are employed under that occupational title in WSB, some former water technicians have occupied posts such as waterworks supervisor or laboratory or maintenance technician.

3.1.7 Health Inspectors/Assistants

According to the recent health manpower study conducted by the Ministry of Health (1987, Table 2, p. 68), 41 Health Inspectors were employed in Swaziland in October 1986, 30 in government and eleven in other agencies such as Town Councils in Mbabane and Manzini. At that time, 79 Health Assistants were on post, the majority (74) in the government sector and five others in Mission or Town Council locations. The regional distribution of Health Inspectors and Assistants employed in government is as follows:

TITLE	REGION					Total
	Hhohho	Manzini	Shiselwini	Lubombo	HQ	
Health Inspector	5	6	7	6	6	30
Health Assistant	14	9	11	21	19	74

Source: Ministry of Health; Government of Swaziland

Health Manpower Requirements

According to the Ministry of Health, Health Assistants are currently assigned to specific vertical programs such as malaria, bilharzia control, or tuberculosis case follow-up. MOH, however, is moving toward an integrated system where Health Assistants will be located in geographic areas according to numbers of people to be served (one per 800 homesteads or one per 5,480 population).

5.2 Current Utilization of Personnel

The foregoing section described quantitatively the occupational employment distribution of the selected WS&S sector agencies. This section discusses more qualitatively some of the concerns expressed to the authors of this report concerning staffing in general in the sector, particularly as they relate to the way human resources are developed at present and utilized for the benefit of both the individual and the national program. The section concludes by focusing on the priority occupations identified earlier.

A number of contextual factors are important in the assessment of HRD strategies in the Water Sector. Increasing educational levels, and hence aspirations, of men and women in the public sector workforce are counterpoised by sharpened competition for public funds and constraints on government hiring, post establishment, and promotion and salary increments policy. Structural and statutory changes in water resources management policy are likely as a result of the role of the anticipated new National Water Authority. These will have implications for personnel both in the proposed authority itself as well as in implementing agencies throughout the sector. As peri-urban areas continue to require operational coordination between several jurisdictions in water supply and sanitation, between for example Housing, WSB, RWSB, Townships, and Town Councils, consequent demarcation of responsibility will necessitate re-evaluation of agency capabilities and staffing patterns. As industrial development continues throughout Swaziland, effluent control and pollution detection techniques will probably take on national significance, with resulting strains on public resources. In order, therefore, for Water Sector agencies to meet the growing expectations of Swazi citizens, assessment of utilization of human resources should take such factors into consideration.

At present, sector agencies are characterized by some notable imbalances. The functions of WSB, RWSB, and WRB should essentially be coordinated, in that they are all central to the sector, yet they sometimes function not only autonomously, but even competitively. Although there is evidence of serious shortages of adequately trained personnel in some technical fields such as laboratory analysis, there is also underutilization of, for example, existing maintenance staff. While most WSB personnel are permanent, most RWSB are temporary, creating the potential for a flow of personnel from one agency to the other. Finally, the problem of the lack of in-country professional education and training has clearly been recognized. Several opportunities exist for education and training in neighboring African countries and overseas. Less thought seems, however, to have been given to the careers of individuals trained outside Swaziland upon their return, such as graduated experience and job incentive systems to encourage both confidence on the job and effective long-term contributions to the sector.

3.2.1 Engineers

Engineers provide technical and often administrative leadership and expertise to the sector. There is a consensus that the quality of these professionals is critical to effective WS&S services. Several factors obstruct the recruitment and retention of qualified people. Annual reports from WSB and WRB refer to these problems.

The lack of permanent posts for cadet engineers is seen as creating uncertainty on the part of managers as well as candidates for these posts. WSB feels that these positions should provide recently trained Swazi nationals with sufficient job experience and adequate supervision to eventually take full-time administrative and technical responsibility in permanent posts. In view of the future critical need for engineers in the sector, cadet engineers are likely to be in cadet positions for a short and well-defined period under close supervision. The positions should remain temporary. If the temporary cadet positions are not better defined, then the positions should become permanent since they will then receive better definition.

Vacancies have existed in key senior engineering and management posts in WSB limiting the capacity of expatriate advisors to effect smooth transition at the completion of technical assistance contracts.

The potential of WSB to become financially self-sufficient as a parastatal organization is seen as dependent upon the quality and availability of skilled human resources. Shortages of staffing in engineering as well as in financial and accounting occupations are noted in the NAG National Plan (p. 15).

In RWSB, the derivation of Water Sector policy, data analysis and reporting and increasing emphasis on monitoring and regulation of cross-border water flows as well as responsibility for dam operation and maintenance place extraordinary responsibilities on this small agency.

WRB Annual Reports for 1985 and 1986 emphasize the lack of trained and experienced civil engineers in senior posts. There are currently no expatriate engineers in WRB, the only expatriate being a hydrologist who will depart in October 1987, and who currently is assisting a trainee to assume that responsibility.

There is a lack of mid-level technical staff to relieve the senior professionals in WRB of normal data management and other routine technical tasks. Capable research assistants and data entry and processing technicians are seen as essential to this agency if the necessary study of current processes, problems, and alternative solutions are to be effectively carried out. Microcomputer technology and expertise are already part of WRB's approach to its responsibilities, but these resources are currently underutilized in terms of capacity to receive and analyze sector data effectively. This will require training for both professionals and technical personnel within WRB in the future.

3.2.2 Water Technicians

Water technicians provide essential technical support functions in the WS&S sector. They also form the nucleus of individuals who, given adequate education, can be promoted to higher grade posts (e.g. Community Development Officers, Clerk of Works) and even to possible professional training overseas.

The need for trained technicians in the field is documented in the Swaziland Feasibility Study Mission Report to the Canadian High Commission (1987). Technicians are required not only to construct but to oversee maintenance and repair of water supply systems in rural areas. Vacancies in technician posts are documented at WSB. In addition other domestic agencies (e.g., Swaziland Railways) as well as neighboring countries have a demand for these technicians.

Effective current utilization of technicians in the public sector is inhibited by a present lack of training, lack of permanent positions in RWSB, (which has been a major sponsor of training as well as a significant employer of water technicians), and potentially more lucrative private sector employment.

Canadian plans, outlined in the Holland College report, are to reinitiate the technician training course at Swaziland College of Technology (SCOT), with changes and improvements following occupational analyses of the range of skills required by a water technician.

The Canadian report notes that there are no known female trainees awaiting entry to the program, although female graduates would be able to find employment in the field.

3.2.3 Health Inspectors/Assistants

The MOH engaged in a human resources planning exercise in late 1986 and early 1987 and issued a report to guide decisions on numbers of personnel needing training and numbers of new posts to be requested (MOH, 1987). In line with the integration of primary health care services at the community level and regionalization and decentralization of public health management, 177 new posts are being requested for primary health care services. A number of these (detailed in the next section) are for Health Inspectors/Assistants (HIs and HAs).

Effective utilization of these health personnel is currently affected by the reorganization in several ways. For example, three interlocking lines of authority are at present functioning at the regional and local levels. The Health Inspectorate, Regional Management Teams, and the residual vertical programs in malaria, tuberculosis, and bilharzia control provide a rather ambiguous organizational structure within which HIs and HAs must work. Supervision during this transition phase is thus not well defined.

In addition, training programs for HIs are understaffed and seen by those who have instructed as well as students of the program as incomplete in substantive coverage and supervision during field training. Due to inadequate staff, some HIs were reported as not having been trained, and supervision in the field was difficult to administer.

Training for HAs has not taken place since 1976, despite much discussion of the need. In view of the reorganization of HAs' responsibilities from those for vertical programs to those for integrated primary health care, training will have to be adapted to these new duties.

Several people in the health sector, both instructors and recipients of training, suggested a need for increased attention to the community development, health education, and supervision/management aspects of HI training.

Attrition within HA ranks is likely to increase in the future due to their high average age, especially those in the malaria unit.

3.3 Staffing Requirements

In light of the above factors concerning utilization and future human resource needs in the sector, this section presents staffing requirements for the next five years by broad occupational category for each of the major sector agencies. The detailed occupational matrices constructed for each agency for the purposes of projection have been aggregated here to the four summary occupational categories. The method for projecting occupational employment is to consider, with sector management personnel, the individual requirements of each agency and calculate staff totals accordingly, as discussed in Chapter 2.

3.3.1 Water Resources Branch

Figure 3.4 graphs actual and projected employment for WRB from 1984 to 1992. Table 3.4 presents projected employment levels by major occupational group. The projections assume annual agency growth rates for a five-year period as follows:

	Y E A R				
	87-88	88-89	89-90	90-91	91-92
GROWTH RATES	.162	.093	.043	.20	.20

These rates are derived from anticipated agency needs for personnel as documented in annual reports and recommendations from independent studies as well as from observations as a result of the present study. Since the number of laborers was not projected to increase over the period, rates of growth are computed for (E) and not for (TE).

Increases for 1987-88 in the level of staffing, while substantial, are at a rate of growth less than the actual rate from 1984-5 (.207). They reflect the anticipated staffing of a number of professional and technical positions related to approval of the National Meteorological Service project, the Maguga Dam, and the need for additional laboratory staff. Specifically, in the

FIG 3.4 ACTUAL AND PROJECTED WRB

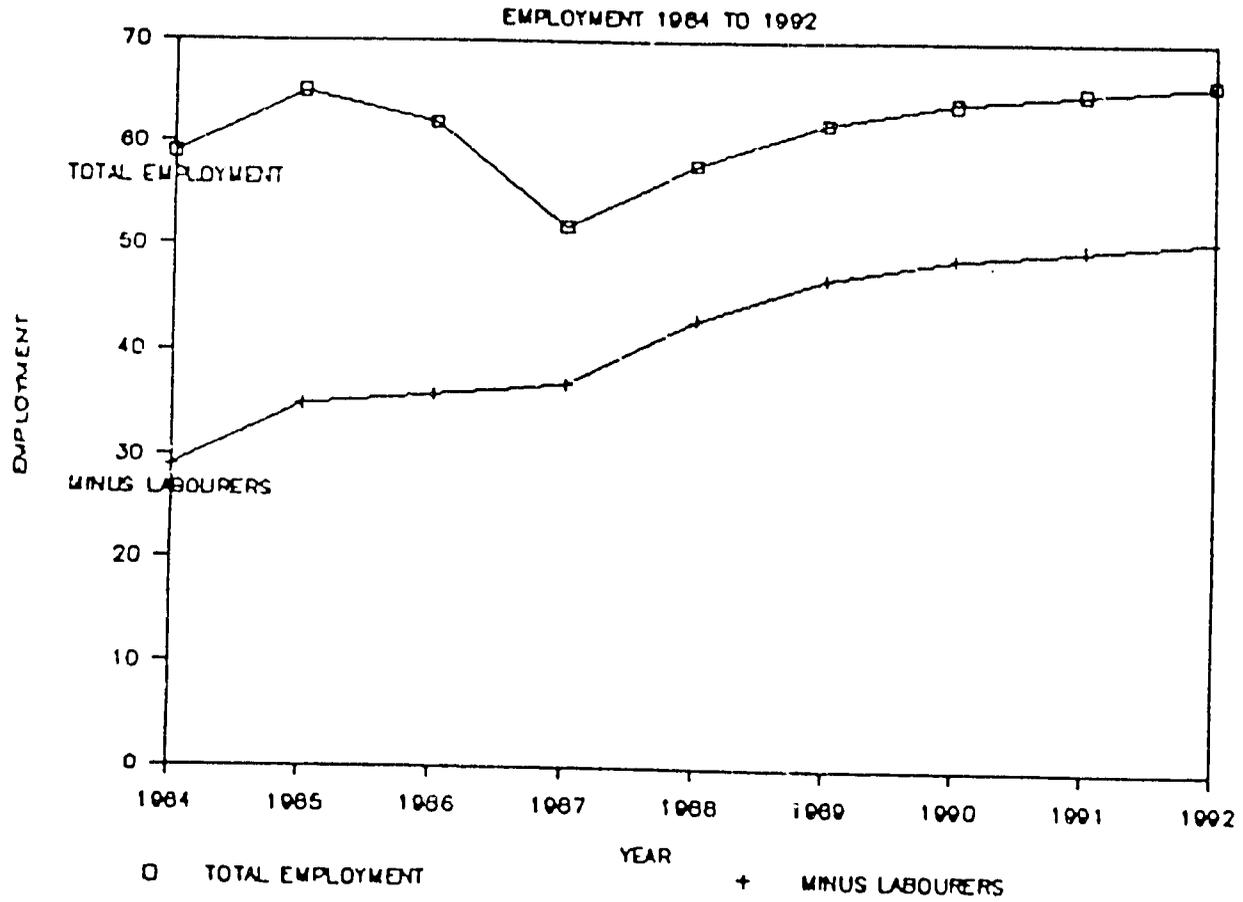


TABLE 3.4 PROJECTED OCCUPATIONAL EMPLOYMENT 1987 TO 1992 FOR WPR

OCCUPATIONAL GROUP	YEAR											
	1987	PROP	1988	PROP	1989	PROP	1990	PROP	1991	PROP	1992	PROP
PROFESSIONAL	9	0.216	11	0.256	12	0.255	12	0.245	12	0.240	12	0.235
TECHNICAL	23	0.622	26	0.605	29	0.617	31	0.633	32	0.640	33	0.647
ARTESANS	3	0.081	3	0.070	3	0.064	3	0.061	3	0.060	3	0.059
ADM/CLERICAL	3	0.081	3	0.070	3	0.064	3	0.061	3	0.060	3	0.059
TOTAL MINUS LABOURERS	37	1	43	1	47	1	47	1	50	1	51	1
LABOURERS	15		15		15		15		15		15	
TOTAL	52		58		62		64		65		66	

professional category, these projections allow for the addition of four individuals over the five-year period, a water resources engineer, a dam supervisor, and a meteorologist for whom posts already exist, and a river biologist for whom a post should be created. At this rate of growth, professional positions should stabilize at between 23 percent and 24 percent of the WRB workforce.

In technical occupations, growth will be primarily in hydrology, laboratory, meteorology and data processing personnel. Posts will need to be created for two additional meteorological assistants and one water bailiff, two instrument technologists, a laboratory technologist, technician, and assistant, and a data processing technologist familiar with microcomputer data entry and analysis. Existing posts will need to be filled for a hydrology technician and a water guard.

Growth is not projected for administrative/clerical staff since increasing use of microcomputers by senior staff should offset an increase in workload. It is likely that expatriate engineering skills will be needed in WSB as discussed later in this report. Numbers and specific expertise of these expatriate advisors will depend on the future role of the WSB relative to the planned National Water Authority.

3.3.2 Water and Sewerage Board

Figure 3.5 shows actual and projected employment for WSB from 1978 to 1992. WSB has the most complete time series data on occupations of the three agencies studied, although there are some inevitable discontinuities in occupational titles across the period.

Table 3.5 presents the projected employment in WSB from 1987 to 1992 by major occupational group. The projections assume little growth in 1987-88, but a four to five percent annual growth in (E) from 1988-89 to 1990-91 due largely to the extensive number of new positions requested in 1987. This growth is phased in gradually in the projections to maintain these growth rates. It should be noted that after an average annual growth rate of 10 percent in (E) from 1979-81, the WSB has remained almost static from 1981 to 1987, with only a two percent increment in 1984.

The details of and reasons for the requested new positions are contained in WSB memoranda and are only summarized here. The rationale for growth in WSB is premised on its need to become financially self-sufficient, and to implement all construction using WSB labor.

In the professional category, a net growth of 15 positions is projected over the five-year period. Some of these, for example in the cadet engineer occupations, will fluctuate due to attrition in senior positions and accompanying promotion from junior ranks. Increments include the addition of a financial officer, a surveyor, two engineers, a chemist, six data processing officers, and two additional clerks of works. Four cadet engineers are seen as necessary to assure steady assumption of responsibility in senior positions.

FIG 3.5 ACTUAL/PROJECTED EMPLOYMENT
FOR WSB 1978 TO 1992

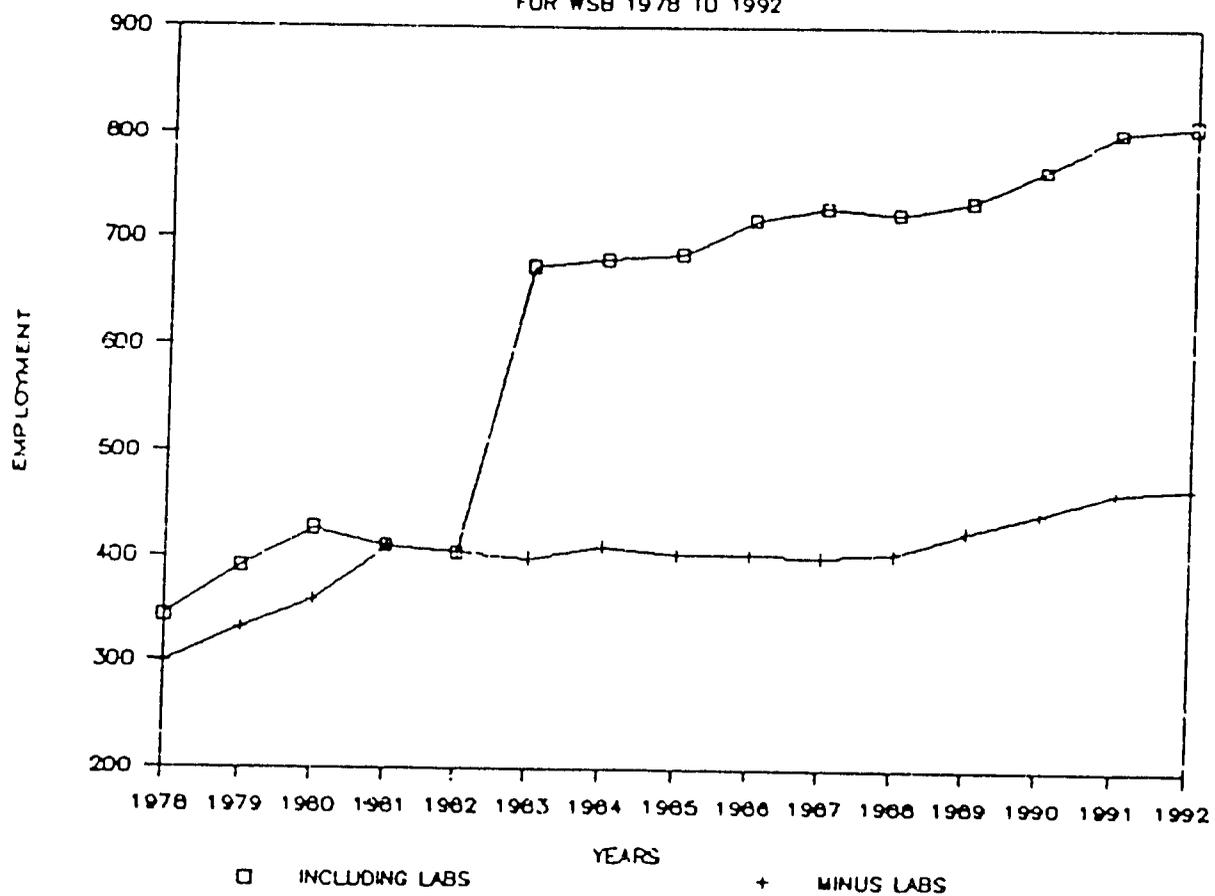


TABLE 3.5 PROJECTED EMPLOYMENT IN WSB FROM 1987 TO 1992 BY MAJOR OCCUPATIONAL GROUP

OCCUPATIONAL GROUP	1987	PROP	1988	PROP	1989	PROP	1990	PROP	1991	PROP	1992	PROP
PROFESSIONAL	29	0.072	32	0.079	42	0.099	42	0.095	44	0.095	44	0.094
TECHNICAL	65	0.162	65	0.161	70	0.165	70	0.158	75	0.162	75	0.160
ARTISAN	207	0.516	207	0.512	212	0.499	226	0.511	236	0.511	239	0.511
ADMIN/CLERICAL	100	0.249	100	0.248	101	0.238	104	0.235	107	0.232	110	0.235
TOTAL MINUS LABOURERS	401	1.000	404	1.000	425	1.000	442	1.000	462	1.000	468	1.000
LABOURERS	329		320		311		326		341		341	
TOTAL	730		724		736		768		803		809	

Ten additions to the technical workforce are projected over the five-year period. These are accounted for by an increase in inspector of works, water works supervisors, and static plant mechanics positions.

Artisans are projected to increase by a total of 29, with most of the growth in the next three years. The great majority of these additions will be in the water/sewer attendant categories, and some in the meter reader occupation.

Administrative/clerical growth is projected at ten persons over the five-year period, with the addition of one mechanical storekeeper, a security guard, and nightwatchmen.

It is anticipated that expatriate engineering advisors will be needed in WSB at least temporarily to replace those who have recently left the agency. However, there are important issues related to expatriate roles in the Water Sector that should be considered carefully before appointing more expatriates (see discussion below).

3.3.3 Rural Water Supply Board

Staffing for RWSB is projected at an approximately consistent level of employment (E) from 1988 to 1992. Figure 3.6 presents (TE) and (E) for RWSB for the five-year period. Table 3.6 shows the numbers and staffing patterns by major occupational group.

While total employment is dropping, as it has in general since 1982, the high number of temporary positions making up the total complement of RWSB make (E) a less useful measure of growth than it is in WSB, where most of the staff are permanent. Ten new positions were established for example in 1987 in RWSB, while the (E) increased by only five persons, implying that those positions were either offset by attrition, or filled by those already occupying temporary jobs.

3.3.4 Human Resources Needs Across Agencies

Total human resources needs within the three water agencies studied in detail are presented in Table 3.7. Employment (E) for the year by occupational category is in the first column. Openings due to growth and replacement needs are in the second and third columns respectively. Growth needs are retrieved from the detailed occupational matrices for each agency. Replacement needs are calculated at $(.035)E$ annually. This rate was originally estimated by Roy (1981) and is approximately the same rate used in other studies (e.g., ILO, 1987). Since no data were available for the present study on occupational turnover specifically, this rate is used throughout. For example, Table 3.7 shows that there will be a need for three professionals in WSB to be replaced between 1988 and 1990, one each year, calculated at $[(.035)(E)]$. During the same period in WSB, the professional workforce will grow by a total of 13 persons, three in 1988 and ten in 1989. It should be noted here that because planning cycles follow planning-year rather than calendar-year periods,

FIG 3.6 PROJECTED EMPLOYMENT FOR RWSB

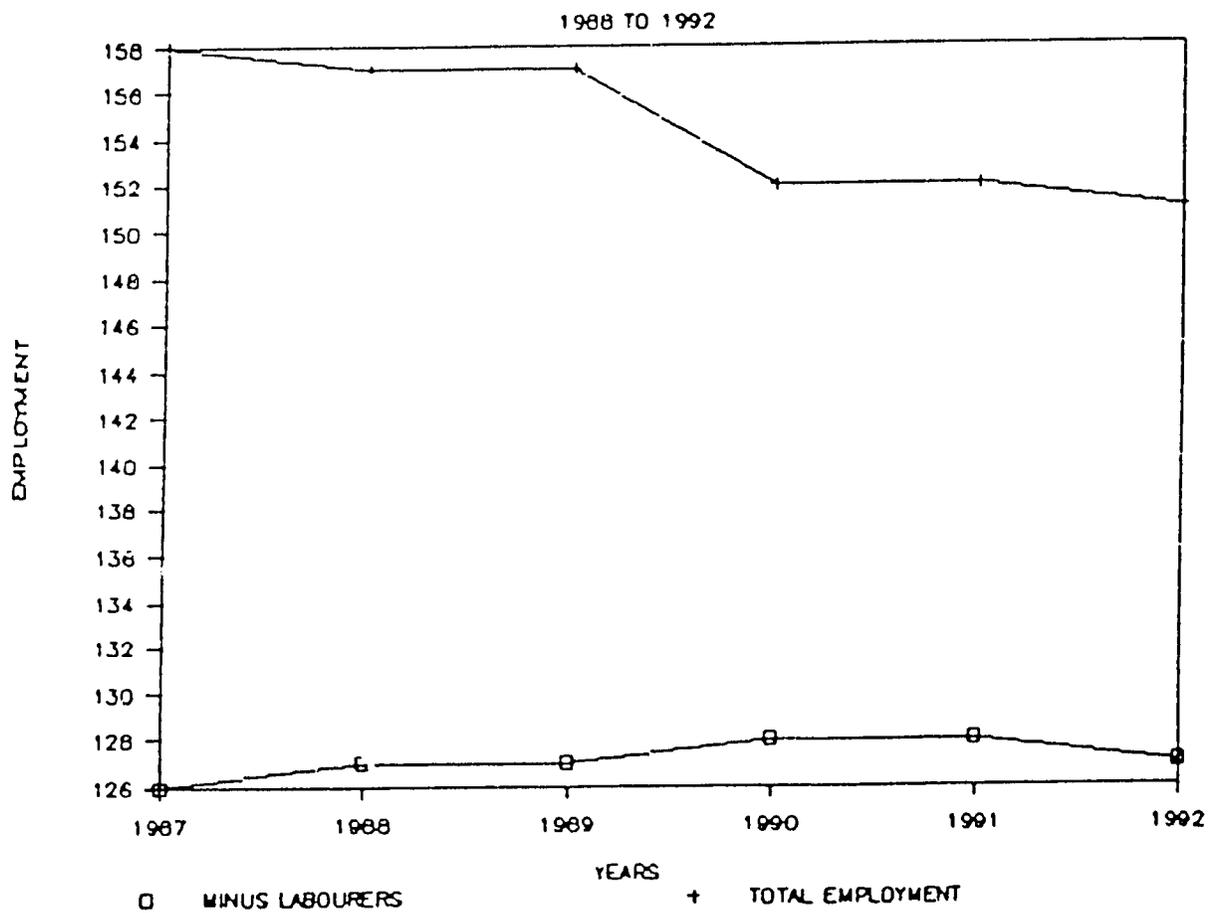


TABLE 3.6 ACTUAL AND PROJECTED EMPLOYMENT FOR RWSB 1987 TO 1992 BY MAJOR OCCUPATIONAL GROUP

OCCUPATIONAL TITLE	1987	PROP	1988	PROP	1989	PROP	1990	PROP	1991	PROP	1992	PROP
PROFESSIONAL	10	0.079	11	0.087	11	0.087	11	0.086	11	0.086	10	0.079
TECHNICAL	26	0.206	31	0.244	31	0.244	32	0.250	32	0.250	32	0.252
ARTESANS	63	0.500	57	0.449	57	0.449	57	0.445	57	0.445	57	0.449
ADMINISTRATIVE/CLERICAL	27	0.214	28	0.220	28	0.220	28	0.219	28	0.219	28	0.220
TOTAL MINUS LABOURERS	126	1.000	127	1.000	127	1.000	128	1.000	128	1.000	127	1.000
LABOURERS	32		30		30		24		24		24	
TOTAL EMPLOYMENT	158		157		157		152		152		151	

TABLE 3.7 HUMAN RESOURCES NEEDS BY YEAR AND MAJOR OCCUPATIONAL CATEGORY 1988 TO 1992

OCCUPATION GROUP	AGENCY	1988			1988			1989			1990			1991			1992			TOTAL NEEDS 1988 TO 1992	
		E	G	R	E	G	R	E	G	R	E	G	R	E	G	R	E	G	R		
PROFESSIONAL	WRB	11	3	0	3	12	1	0	1	12	0	0	0	12	0	0	0	12	0	0	0
	WSB	32	3	1	4	42	10	1	11	42	0	1	1	44	2	2	4	44	0	2	2
	RWSB	11	0	0	0	11	0	0	0	11	0	0	0	11	0	0	0	10	-1	0	-1
					7				12				1			4				1	25
TECHNICAL	WRB	26	3	1	4	29	3	1	4	31	2	1	3	32	1	1	2	33	1	1	2
	WSB	65	0	2	2	70	5	2	7	70	0	2	2	75	5	3	8	75	0	3	3
	RWSB	31	0	1	1	31	0	1	1	32	0	1	1	32	0	1	1	32	0	1	1
					7				12				6			11				6	42
ARTESAN	WRB	3	0	0	0	3	0	0	0	3	0	0	0	3	0	0	0	3	0	0	0
	WSB	207	0	7	7	212	5	7	12	226	14	8	22	236	10	8	18	239	3	8	11
	RWSB	57	0	2	2	57	0	2	2	57	0	2	2	57	0	2	2	57	0	2	2
					9				14				24			20				13	80
ADM/CLERICAL	WRB	3	0	0	0	3	0	0	0	3	0	0	0	3	0	0	0	3	0	0	0
	WSB	100	0	4	4	101	1	4	5	104	3	4	7	107	3	4	7	110	3	4	7
	RWSB	28	1	1	2	28	0	1	1	28	0	1	1	28	0	1	1	28	0	1	1
					5				6				8			8				8	36
TOTAL PERSONS					20				44				39			43				28	183

NOTE: (E) = employment by year; (G) = employment needs due to growth/decline; (R) = replacement needs

occupational demand needs due to growth are factored into the current year employment total rather than the next year employment total. This explains why, for example, in Table 3.7, the "professional" demand due to growth of three professionals in WRB is included in the 1988 total of 11 professionals, and so on across the five years.

Two-thirds of the needs are as expected, in technical and artisan occupations. Job opportunities due to growth account for 44 percent of the total. The remainder will be due to replacement needs from attrition (death, retirement, and job mobility).

Table 3.8 breaks out expected job opportunities for the sector, across all agencies, by major occupational category and for the priority occupations studied: engineering occupations, water technicians, health inspectors, and health assistants. The health projections are taken from the Health Manpower Requirements Study by the Ministry of Health (1987). The other data are from the agency occupational matrices.

Growth data for engineers includes cadet engineers and represents actual growth anticipated in the three WS&S agencies over the five-year period. Replacements are calculated on the assumption that 40 percent of professional staff are engineers across the three agencies, and that proportion of total professional openings due to replacement (N=3) is therefore assigned to engineers. It was not clear in discussions with individual agency managers/planners precisely which positions in the professional category would be filled in the future by expatriates. This issue is further addressed in Chapter 5.

Similar proportional assignment (27 percent) of replacement openings was made for water technicians. While this may appear high, there is evidence of trained water technicians going into a number of occupations in the water sector. The openings due to growth reflect actual agency plans for increases in employment of water technicians.

Major increases in the numbers of Health Inspectors and Health Assistants are contemplated by MOH as illustrated in the table. Attrition among Health Assistants is likely to be high over the five-year period in view of incumbents aging and retiring from the workforce.

3.4 Comparative Assessment of Staffing Requirements

The projected human resource requirements in this document are based on staffing levels perceived as needed by agency planners or managers. It is customary, however, in human resources planning to provide independent justifications for projected levels of staffing requirements on the basis of productivity, work to be performed, or services to be delivered. One way to estimate such requirements is to establish staffing ratios, either by calculating numbers of staff required by occupational category for each type of service (e.g., urban house connection, common yard connection, or stand post) or by examining other national staffing ratios and comparing them with existing and projected requirements.

TABLE 3.8 ANTICIPATED JOB OPPORTUNITIES BY OCCUPATIONAL GROUP AND
SELECTED OCCUPATION 1988-92

OCCUPATIONAL GROUP	TOTAL ESTIMATED JOB OPENINGS 1988-1992		
	GROWTH	REPLACEMENT	TOTAL
PROFESSIONALS	18	7	25
ENGINEERS	6	3	9
OTHER PROFESSIONALS	12	4	16
TECHNICAL (water agencies)	20	22	42
WATER TECHNICIANS	4	6	10
OTHER TECHNICAL (water)	16	16	32
HEALTH INSPECTORS	6	6	12
HEALTH ASSISTANTS	61	21	82
ARTESANS	32	99	131
ADMIN/CLERICAL	11	46	57
TOTAL	148	201	349

Both of these methods of deriving average staffing ratios have disadvantages. Requirements will depend for example on level of development and degree of automation and will vary considerably from urban/peri-urban to rural areas. Each country must develop its own estimate of staffing requirement per unit of service rendered, and other countries' requirements, even in the same region, can only serve as a guide. Data on numbers of households served and staffing per unit of service are incomplete in Swaziland. One of the recommendations of this report is to develop improved information on this and other aspects of the relationship between service delivery and occupational staffing patterns.

As a guide, however, for future HRD planning in the Swaziland Water Sector, data collected during this assessment were analyzed and compared with WHO specifications and data from other studies. WHO (1984) reports that ratios of Water Sector employees to population served fall generally in the range of one employee per 600 to 1,800 population served. For 1986, using census population estimates for that year (676,089 persons), and total staffing for 1986 in RWSB, WSB, and WRB of 927 employees (as reported in this paper), the resulting ratio of 1:729 is towards the high end of the WHO range. These rates were more specifically broken down by occupational category in 1980 by the National Action Committee for the Water Decade in Kenya as follows:

Occupational Category		Ratios
Professional	2.7	Employees/100,000 persons served
Sub-Professional	9.1	Employees/100,000 persons served
Skilled/Semi-Skilled	41.6	Employees/100,000 persons served
Total	53.4	Employees/100,000 = 1:1,800

While broad occupational categories may consist of quite different occupations in different agencies not to mention different countries and care must be taken not to carry these comparisons further than the data permit, it is instructive to examine staffing ratios in other nations in the African region. Mozambique and Uganda both have conducted human resources studies (summarized in the WHO Guidelines) which resulted in overall ratios from 1:917 to 1:1,231. Tanzania ratios were calculated at 1:1,600 by WASH, and the occupational staffing patterns were distributed across the Water Sector labor force as follows:

Engineers	4%
Technicians	14%
Skilled labor	28%
Administrative & Accounting	22%
Unskilled labor	32%
Total	100%

Although the detailed occupational matrices for these earlier studies were not available to the current study in Swaziland, the data from the Swaziland Water Sector for 1987-92 have been analyzed, and the roughly comparable staffing patterns for those years are presented in Table 3.9.

Particularly striking is the relatively low overall ratio of engineers to total sector employment. The variation in agencies is also marked, from a high of almost nine percent in WRB in 1988 to a low of less than one percent in WSB in 1987-1988.

TABLE 3.9 SECTOR STAFFING PATTERNS BY BROAD OCCUPATIONAL CATEGORY 1987 - 1992

AGENCY/SECTOR	OCCUPATIONAL GROUP	Y E A R											
		1987	PROP	1988	PROP	1989	PROP	1990	PROP	1991	PROP	1992	PROP
RWSB	ENGINEERS	4	0.025	4	0.025	4	0.025	4	0.025	4	0.026	4	0.026
	OTHER PROF., TECH., & SKILLED	94	0.595	94	0.599	94	0.599	95	0.625	95	0.625	94	0.623
	ACCOUNTANTS & ADM/SUPPORT	28	0.177	29	0.185	29	0.185	29	0.191	29	0.191	29	0.192
	LABOURERS	32	0.203	30	0.191	30	0.191	24	0.158	24	0.158	24	0.159
	TOTAL EMPLOYMENT	158	1.000	157	1.000	157	1.000	152	1.000	152	1.000	151	1.000
WRB	ENGINEERS	3	0.058	5	0.086	5	0.081	5	0.078	5	0.077	5	0.076
	OTHER PROF., TECH., & SKILLED	24	0.462	28	0.483	32	0.516	34	0.531	35	0.536	36	0.545
	ACCOUNTANTS & ADM/SUPPORT	10	0.192	10	0.172	10	0.161	10	0.156	10	0.154	10	0.152
	LABOURERS	15	0.288	15	0.259	15	0.242	15	0.234	15	0.231	15	0.227
	TOTAL EMPLOYMENT	52	1.000	58	1.000	62	1.000	64	1.000	65	1.000	66	1.000
WSB	ENGINEERS	6	0.008	6	0.008	10	0.014	10	0.013	8	0.010	8	0.010
	OTHER PROF., TECH., & SKILLED	286	0.392	288	0.398	304	0.413	318	0.414	337	0.420	340	0.420
	ACCOUNTANTS & ADM/SUPPORT	109	0.149	110	0.152	111	0.151	114	0.148	117	0.146	120	0.148
	LABOURERS	329	0.451	320	0.442	311	0.423	326	0.424	341	0.425	341	0.422
	TOTAL EMPLOYMENT	730	1.000	724	1.000	736	1.000	768	1.000	803	1.000	809	1.000
SECTOR TOTALS	ENGINEERS	13	0.014	15	0.016	19	0.020	19	0.019	17	0.017	17	0.017
	OTHER PROF., TECH., & SKILLED	404	0.430	410	0.437	430	0.450	447	0.454	467	0.458	470	0.458
	ACCOUNTANTS & ADM/SUPPORT	147	0.156	149	0.159	150	0.157	153	0.155	156	0.153	159	0.155
	LABOURERS	376	0.400	365	0.389	356	0.373	365	0.371	380	0.373	380	0.370
	TOTAL EMPLOYMENT	940	1	939	1	955	1	984	1	1020	1	1026	1

Chapter 4

OCCUPATIONAL SUPPLY

4.1 Review of Education and Training for the Sector

4.1.1 Types of Training

Education and training for all types and levels of work in the water supply and sanitation sector take the form of pre-service training to learn theory and basic operational processes, on-the-job training to perfect operational skills, and in-service training to learn new technical and management skills. The facilities available in Swaziland to meet the needs identified in Chapter 3 are reviewed in the following sections and some facts about the seven local institutions and their courses are provided in Appendix E. Partial information about external institutions and courses is provided in Appendices F and G. The effectiveness of these training activities is discussed in Chapter 6. The ILO report also contains some evaluative information on relevant Swaziland institutions.

4.1.2 Training of Artisans

At least three institutions in Swaziland, the Swaziland College of Technology (SCOT), the Vocational and Commercial Training Institute at Matsapha (VOCTIM), and the Manzini Industrial Training Center (MITC) offer training courses in building crafts. Two of them, SCOT and VOCTIM, are supported by the Ministry of Education. SCOT offers courses with accreditation by the City and Guilds of London in plumbing craft, bricklaying and concrete craft, carpentry and joining, electrical engineering craft, mechanical fitting, and plant maintenance. It also arranges qualifying "trade tests" on behalf of the Ministry of Education. These tests of increasing difficulty qualify individuals respectively as grade three, grade two, and grade one artisans. Apprentice craftsmen must take all three tests while students of the above courses take only the grade one test.

VOCTIM offers crafts courses in building and construction, woodwork, electrical engineering, mechanical engineering, and automotive engineering and will probably add plumbing. VOCTIM encourages the arrangement of an apprenticeship contract between each student and his future employer. Such a contract covers the full four-year training period, during which the student undergoes three periods of formal training and two one-year periods of on-the-job training with his employer, which VOCTIM calls a "dual training system." If this system is successful there is some indication that government sponsored artisan training may in future be concentrated mainly at VOCTIM.

These resources for pre-service training of artisans have not been utilized by the water sector. With rare exceptions artisans have been recruited directly from the untrained labor market, or at best from the private sector, and have learned on the job in sector agencies what they know of the techniques of spring protection, river intakes construction, well construction and protection, pipelaying, building masonry reservoirs, etc.

Many or most of these artisans have now taken the government trade tests, but figures are not available on the proportion of sector-employed artisans who are qualified.

Formal in-service training opportunities have not been offered to artisans in water sector agencies to learn new technical skills. A few instances were noted where artisans were given short in-service training in management in preparation for their re-assignment to supervisory positions.

4.1.3 Training of Technicians

Two institutions in Swaziland offer pre-service training for technicians in the sector. SCOT offers various technician training programs in mechanical, electrical, automotive, and construction engineering. The construction engineering department administers the water technician training program, which with the exception of the current academic year has been offered regularly for over ten years. The water technician course has not provided pre-service training for employment in the water sector agencies and in some private organizations. This program has also trained technicians from neighboring countries. The Swaziland Institute of Health Sciences (SIHS) offers training programs for various health technicians. The program in environmental health leads to a certificate of health inspector, which is endorsed by the University.

On-the-job training for technicians has been programmed in connection with project activities such as the Rural Waterborne Disease Control Project, but is not part of the regular activities of the sector agencies.

Numerous opportunities are available to technicians in sector agencies to upgrade their technical and managerial skills through short in-service training workshops organized by department and through short courses given by the Swaziland Institute of Management and Public Administration (SIMPA). In addition, a number of sector agency employees have been given the opportunity to attend the water technicians program at SCOT as in-service training.

No institution in Swaziland at present offers training for health assistants. Forty-eight health assistants were trained in three one-year pre-service training courses and assigned to duties in the rural environmental health program. Other health assistants have been employed subsequently for the malaria and schistosomiasis control activities and given on-the-job training for their work. All health assistants have recently been assigned overall field technician functions in small defined rural areas in the National Primary Health Care Program, for which they require additional technical training.

4.1.4 Training of Professionals

The University of Swaziland (UNISWA) offers pre-service training for certain professionals who are employed by or are potentially useful to water sector agencies. These professionals include chemists, biologists, and economists. In the next few years the University may expand its programs to include training of geologists, environmental scientists and industrial scientists and technologists (see Appendix E).

In recent years all Swazi candidates for training as engineers were obliged to complete two to four years of study at UNISWA before being accepted for overseas scholarships. This constraint is unlikely to change, but the availability of new environmentally-oriented courses and study programs make the would-be engineers' preparatory study more interesting and of potentially more benefit to future professional development than in the past.

It is recalled that the present educational system includes:

- Seven years primary school (of which the first three are taught in Swazi and the later years in English);
- The Swazi Primary School Certificate (required for admission to secondary school);
- Three years secondary school terminating at "Form III";
- The Swazi Junior Certificate (required for admission to crafts training programs at SCOT);
- Two years high school terminating at "Form V";
- The Cambridge Overseas School Certificate (COSC), or "ordinary" (O) level (required for admission to technicians training programs at SCOT and at SIHS and to all programs at UNISWA);
- Two additional years high school (lower 6, upper 6); and
- "Advanced" (A) level examinations (required for direct admission to degree programs at most external training institutions).

Four-year pre-service training courses for water supply or environmental (or sanitation or public health) engineers are offered in many external training institutions to qualified international students. A number of these programs have been followed successfully by Swazi students who returned to take positions in sector agencies. A partial list and description of these programs is contained in Appendix F.

Two-year pre-service training courses for water supply or environmental engineering technologies are offered at a number of external training institutions to qualified international students. This training has been accepted by sector agencies to prepare staff for positions as clerks of works. A partial list and description of these programs is contained in Appendix G. The technicians courses at SCOT are being revised with the aim of transforming some of them into three-year engineering technology courses. This may eventually obviate the need for overseas training of water engineering technologists.

On-the-job training of professionals has not been consistently programmed and executed in water agencies during recent years. Certain on-the-job training for both senior and junior staff has in fact resulted from international technical assistance activities, consultancies, construction contracts, and the assignment of expatriate specialists to fill vacant positions. In a few cases the last mentioned process has been recognized by a well-defined "counterpart" arrangement, such as that for the national public health engineer and the international public health engineering adviser in the Rural Water Supply Board. In other cases the counterpart arrangement was too vague or of too short duration to accomplish its training objective.

Opportunities are regularly made available to professionals in sector agencies to attend short courses at SIMPA and the Institute of Development Management (IDM) on general management, personnel management, financial management, and basic computer science. It is expected that when the water technician training program is resumed in 1988, a series of short technical courses will be arranged to keep sector professionals and technicians abreast of recent technical developments in water supply and environmental engineering. Some current international in-service training offerings are shown in Appendix H.

4.2 Current and Anticipated Supply of Human Resources

4.2.1 Sources of Occupational Supply

The occupational supply to satisfy demands in the water and sanitation sector during the next five years will have four components:

- (a) Swazis who complete their general education or pre-service training and who enter the labor force;
- (b) Swazis who are unemployed or who transfer from other employment;
- (c) Swazis who emigrate; and
- (d) expatriates.

The importance of these components varies between artisans, technicians, and professional employees.

4.2.2 Supply of Artisans

The number of Swazis who complete their general education or pre-service training for artisanal employment and enter the labor market for semi-skilled or skilled manual occupations during the next few years is expected to exceed the demand, according to the 1986 study of manpower, education, and training by ILO. This study estimates (pages 44-46) that the number of job opportunities for "skilled and semi-skilled clerical and manual occupations" during the period 1986-1993, after taking into account increase in employment,

vacancies, and replacement needs, will be 15,274 while the output of the education and training system for the same categories during the same period will be 79,314. Opportunities for untrained artisans to find employment in the water/sanitation sector agencies will evidently be slim.

4.2.3 Supply of Technicians

The number of Swazis who complete pre-service training at SCOT and SIHS for employment as water technicians, laboratory technicians, health inspectors, etc., or who undergo in-service training at SIMPA or IDM to qualify them for field supervisory posts or for new types of central technical posts (e.g., data management) seems likely to equal or exceed the demand over the next few years. The previously cited ILO report estimates that from 1986 to 1993 there will be 1,190 job opportunities for "subprofessional technical occupations, after taking into account increase in employment, vacancies, and replacement needs. This compares with an estimated 4,447 persons who will complete training for subprofessional technical occupations during this period.

The total output of qualified Swazi health inspectors from the SIHS over the five-year period 1982-1986 was 41 (including nine women). This is compared with the expected requirement during the next five years 1987-1992 for 12 Health Inspectors, of whom four are at present in training (Source: MOH, Health Manpower Requirements 1988/89-1992/93).

The total output of trained Swazi water technicians who completed Part II of the program during the two-year period 1985-1987 was 12 and those who completed only part I and may later complete part II was ten. Two others completed part I and have since accepted scholarships for engineering training in the USA. This is compared with an estimated additional demand for trained water technicians by the three principal water agencies WRB, WSB, and RWSB over the next five years of ten.

The total output of trained health assistants during the past ten years was nil; an undetermined number of health assistants have been employed during this time who received partial training while on the job. This is compared with a demand during the next five years 1987-1992 for 83 additional trained health assistants (Source MOH, loc. cit.).

Finally, the number of Swazis who completed special courses to qualify them for positions of increased responsibility in the water and sanitation agencies has not been accurately determined, partly because of incomplete records in the sector agencies and partly because of incomplete records of post-training employment in the training institutions. The impression gained is that, with the exception of WSB, the water and sanitation agencies are taking less than optimal advantage of the opportunities offered by these local institutions.

4.2.4 Supply of Professionals

The number of Swazis who will complete professional training qualifying them to apply for professional job openings in the water agencies (and corresponding job vacancies in municipal governments and in the private sector) is during the next five years likely to equal or exceed the demand in certain professions and fall short in others. These categories are distinguished as follows:

<u>Professionals who can be trained in Swaziland will be available</u>		<u>Professionals who require extensive external training will be in short supply</u>
chemists	UNISWA	civil engineers
biologists		hydrologists
surveyors	SCOT	meteorologists
		hydrogeologists
		geophysicists
accountants	SIMPA	
computer programmers	IDM	

UNISWA awards about 45 bachelor of science degrees per year, which should provide chemists and biologists for the water agencies (see Appendix E, Section 7, UNISWA). SCOT teaches plane surveying as part of its water technician program. SIMPA and IDM offer numerous courses in accounting and computer science. The Government has established an Institute of Accounting and is seeking external assistance for implementing it. All the foregoing professionals should be available to meet requirements in the five-year planning period.

The supply of civil engineers, surface and groundwater hydrologists, and geophysicists will fall short of demand for several years to come. Most of the actual and anticipated new vacancies for these specialties are expected to be filled by individuals now studying abroad who are scheduled to return to Swaziland within the next four years. Intensive on-the-job training and professional guidance will need to be provided for some time after they assume their new functions. In this connection, it is pointed out that some agency and sector responsibilities are evolving--development of groundwater resources and recognition of water resource planning needs, for example, which will put new professional and training demands on the sector agencies and hence delay achievement of occupational supply. In the meantime the occupational supply will have to be met by other means.

4.3 Occupational Supply Related to Occupational Demand

The relationship of supply to occupational demand can only be estimated approximately due to lack of reliable data on the movements of the labor force. With more precise information on labor force behavior and mobility within and between occupations, planners would have empirical bases on which to ground their predictions. There is little systematic information in Swaziland on the nature of employment of graduates or trainees of various

institutions, although some institutions have data on some programs and courses. In the absence of such systems across the sector, however, it is difficult to predict supply/demand relationships or to determine adequately the efficiencies associated with different types of education/training investments.

Table 4.1 illustrates by broad occupational category and for the detailed occupations in this study how supply relates to demand in the five-year period 1988-92. The expected job openings column is derived from the detailed occupational matrices for the three sector agencies as summarized in the right hand column of Table 3.8. Supply information is either taken from information received from the Swaziland education and training institutions listed in Appendix E or from the Health Manpower study cited earlier. The other subprofessional and technicians occupational supply estimate in the "Training is Planned" column is calculated from the 4,447 who will complete training over the eight year period 1986-1993, as reported in 4.2.3 above. Assuming equal amounts (556 persons) trained per year, 2,785 can be expected to become available for work during the five-year period 1987-1992.

TABLE 4.1 DEMAND/SUPPLY BALANCE 1988-92

OCCUPATIONAL GROUP	ESTIMATED DEMAND	ESTIMATED SUPPLY 1988-92		
	EXPECTED JOB OPENINGS 1988-92 (A)	NOW IN TRAINING PIPELINE (B)	TRAINING IS PLANNED (B)	TRAINING IS NOT YET PLANNED (B)
Civil Engineers	9	6	0	3
Other Water Professionals	2	2	0	0
Other Professionals	14	14	0	0
Water Technicians	10	0	10	0
Other SubProfessional & Technicians	32	...	2785(D)	...
Health Inspectors	12	4(C)	8	0
Health Assistants	82	0	0	82(C)

(A) Source: Table 3.8

(B) Source: Government of Swaziland, and Swaziland training institutions

(C) Source: MOH Health Manpower Survey

(D) Estimated from ILO Manpower Survey 1986

... = unknown

Chapter 5

CONCLUSIONS

5.1 Demand Conclusions

The following are the major conclusions concerning occupational demand in the Water Sector from analyses conducted during the present study.

1. The ILO report already referred to earlier identifies several important contextual factors relevant to the development of HRD strategies in the WS&S sector. An "impending unemployment crisis" and a growing imbalance between the skills requirements of available jobs and the skills structure of those seeking employment make it imperative that training opportunities be used optimally in Swaziland.
2. Employment in the WS&S sector agencies studied is distributed across two Ministries, MONRLUE and MOH, and is characterized by some major imbalances, such as, for example:
 - relative size of permanent and temporary staff (not counting laborers) in WSB vs. RWSB;
 - vacancies in senior positions in WRB; and
 - lack of adequate numbers of HIs and HAs in MOH.
3. The imbalance between RWSB (mostly temporary) and WSB (mostly permanent) may encourage a flow of persons from RWSB to WSB seeking permanent employment.
4. Anticipated growth in WSB total employment is estimated at from four to five percent in 1989 to 1991, while RWSB total employment is envisioned to remain approximately level over the five-year period.
5. There is no discernible policy in the Water Sector as a whole relevant to planning for the relative size of WSB and RWSB, and the difference in permanent/temporary structure within them. Consequently, a policy is needed to guide planning, and explicit and systematic commitments are needed to establish the necessary technical information systems to support planning decisions.
6. Expatriate assistance is needed at the senior professional level, for example, in WRB to guide the strategy for international negotiations in the future and in WSB to provide technical leadership in the provision of urban services.

Involvement of expatriates in government is a clear policy of the GOS but explicit procedures are imprecise in the WS&S sector for defining and monitoring the coordination of expatriates with local officers.

7. While the ratio of water sector agency personnel to population served is high in Swaziland compared to other countries, there are quite wide differences between staffing ratios in the three water agencies studied, with a relatively low overall ratio of engineers to total sector employment.
8. In the occupations we studied, job descriptions tended to be not usually referred to after hiring, and some individual employees had never seen their job descriptions. Supervision does not appear routinely to take job descriptions into consideration.
9. Specific training needs have been identified by the present study in relation to engineers, water technicians, and HI/HAs, but there also exist generalized requirements throughout the sector for management training for administrators and particularly information-processing and computer training for both agency research (WRB) and routine management in all agencies.
10. Although quite extensive data exist within some agencies in various forms on the characteristics of occupational employment, e.g., length of employment, pre-service and in-service training qualifications, sex, age, etc., these data are usually in disaggregated form, rendering HRD planning difficult.
11. Women are at present an underutilized resource for technical and professional occupations in the Swazi economy and the water/health sectors. Where appropriate, women could be encouraged to seek information on employment and training opportunities in the sector.

5.2 Supply Conclusions

The major conclusions related to occupational supply are as follows:

1. There is a pervasive assumption in Swaziland that overseas education and training is inherently valuable for Swazis seeking employment in their own country. While extra-national sources of education and training are inevitable in professions such as engineering where none are currently available in-country, overseas courses in subprofessional or technical areas should be carefully appraised and justified for their relevance to technical applications in Swaziland. Although donor emphasis on opportunities for overseas training is essential and a positive force for development, it is important for HRD planning in the water sector to evaluate overseas education and training assignments as they apply to each case, and as they relate to improved skills and productivity on the job.

2. Although it was not possible to evaluate in any depth the education/training sector, it is clear that Swazi education and training institutions offer many programs which are directly related to water sector activities. Greater use could be made of these facilities.
3. Several local institutions offer training in the building and equipment crafts, and the newest of them, Vocational and Commercial Training Institute Matsapha (VOCTIM) introduces an extended program of training and apprenticeship which has considerable potential for WS&S.
4. These crafts programs have not to date been used by sector agencies. If the content of some of these courses were slightly modified to include the special considerations of water/sanitation construction, their value to the water sector would be enhanced.
5. The two Swazi institutions, Swaziland College of Technology (SCOT) and Swaziland Institute of Health Sciences (SIHS), which for a number of years have offered specialized training for water technicians and health inspectors, plan to review their curricula. These reviews are timely and, given the appropriate input from employers, will permit some changes based on evaluation of skills learned and changing agency responsibilities and needs.
6. Although the new job description for health assistants was approved in May 1986, the resulting training requirements have not yet been formalized into a final training plan.
7. The University of Swaziland offers courses leading to bachelors' degrees in most of the specialized non-engineering fields such as chemistry, biology, and economics utilized by sector agencies and is likely in the near future to add a four-year degree course in environmental science. Closer links may be envisaged between UNISWA and the operating WS&S agencies in planning for professional training in the future.
8. The few anticipated job openings for civil engineers and other water-related professionals must be considered sector-wide and projected as accurately as possible in view of the long delay in filling them.

5.3 Supply/Demand Conclusions

1. The number of Swazis who will enter the labor market for semi-skilled and skilled manual employment during the next few years is likely to exceed the demand by a wide margin, thus putting a premium on workers whose skills have been developed in a well-planned training program including periods of study and apprenticeship.

2. The number of Swazis who complete technical training and enter the labor force as technical subprofessionals is also likely to exceed the overall demand. This is an important factor in planning future training for water technicians and Health Inspectors, since the projected five-year demand in each case is only enough to justify one cycle of training. The estimated five-year demand for Health Assistants on the other hand will justify at least five cycles of training.
3. According to the ILO study the number of Swazi professionals who will enter the labor force after obtaining a degree or diploma from UNISWA will be more than 250 during the next five years, nearly ten times the estimated sector demand for professionals during that period. It is reasonable to assume that most of the estimated demand for civil engineers and other water-related professionals will be met during the five-year period by trainees now studying abroad. Careful job assignments and well planned on-the-job training and continued opportunities for in-service technical and management training, however, will be crucial to the efficient performance of these newly assigned professional staff members.

Chapter 6
WATER SECTOR
HUMAN RESOURCES DEVELOPMENT PLAN
FOR
SWAZILAND

6.1 The Need for HRD Planning

The previous five chapters of this report have presented the results of the water supply and sanitation sector HRD assessment and have set those results in a context of overall population and labor market trends for Swaziland. Substantial investments are clearly being made by the Swazi public sector in the preparation and improvement of its workforce skills in-country as well as overseas. However, in face of fiscal and procedural constraints on job creation in the Swaziland government, ways must be found both to increase the efficiency and productivity of those currently employed and to ensure that those entering the labor market be adequately educated and trained.

There are several factors which will affect the WS&S sector work environment in the future. The labor force is in general young and increasing rapidly. The formal labor market is currently, and likely to continue to be, unable to provide employment to all those who seek it. Thus occupational supply, except for a few specialties in the technical and senior management occupations, is likely to exceed occupational demand, thereby increasing competition for jobs.

In such a volatile environment, agency HRD planning is critical to the effective functioning of government. Without cohesive HRD policies, personnel movements remain haphazard, often undocumented in the necessary detail, and often subject merely to the whim of managers. Without clear HRD management strategies based on accurate occupational information, pre-service education and training will remain unresponsive to workplace needs and inefficiencies will result (such as inadequate performance in the provision of services). In-service training then becomes prized often beyond its actual value in improved employee productivity. As a consequence, much of the necessary applied training is carried out on the job, placing unanticipated responsibilities on immediate supervisors and co-workers. In technical areas involving construction, supervision, or maintenance of large public facilities, such inefficiencies can be disastrous.

Skills gaps between job requirements and the qualifications and experience of those actually employed in those jobs are also expensive in terms of time and other resources in the short term. In the longer term, the risk is magnified for both employees and managers, in that those who are trained largely on the job are likely to be less flexible and less adaptable to retraining because they lack the more generalizable skills and basic competencies in the first place. The result is the creation of pools of employees who are only marginally capable even after considerable experience and specific on-the-job training, and who moreover find it difficult to adapt or progress as their jobs or responsibilities change over time.

In order to meet the challenges that these issues place before sector management, there will need to be set in place new mechanisms for HRD planning, not just at the individual agency level, but at the level of the sector as a whole. This will require that the following be addressed:

- organizational and structural relationships (who will have the specific responsibilities for sector HRD planning, and how will their activities be linked with other GOS agencies charged with related functions?);
- policy and strategy development (what will be the overall policies and consequent management strategies to be followed in HRD planning for the sector?);
- occupational information for HRD planning (what information collection and analysis procedures need to be designed in order to provide the necessary intelligence to management on skills needs in the sector?); and
- specific activities to meet immediate and longer-term human resources needs (how can the sector act to correct major human resources shortfalls identified in the HRD assessment summarized in this report?).

Accordingly, the HRD Plan outlined in the remainder of this chapter addresses each of these general areas of concern by recommending specific steps to be taken over the next five years.

6.2 Goals and Objectives of the HRD Plan

The goal of the HRD plan is to provide a blueprint for improved management of human resources development in the WS&S sector over the next five years. Policies and procedures developed, implemented, and refined during this time period will provide a foundation for sector HRD planning for the future. Such a management capacity within sector agencies based on ongoing occupational information will eventually eliminate completely the need to rely on outside consultants for costly, as well as often imprecise and unresponsive, "manpower" studies. Instead, the capability will be developed within the sector for monitoring and meeting its own human resources development needs.

The objectives of the plan are as follows:

1. To establish an organizational structure for sectoral HRD planning.
2. To establish HRD policy and strategies for the sector.
3. To assess occupational information available in the sector and to develop a sectorwide HRD information system (based on currently existing data where possible) for monitoring and evaluating sector HRD needs.

4. To provide sectorwide operational feedback to management through development and pilot testing of model procedures for linking job evaluation to training needs.
5. To provide short-term guidance to sector management for attending to urgent, short term HRD needs identified in the study.
6. To develop guidelines for the use of external technical assistance based on case study analyses of prior and current experience of this kind of assistance in the sector.
7. To improve, through special linkages with UNISWA, the preparation of civil engineers in the sector.
8. To develop means for ensuring that water technicians training is adequate to meet sector needs.
9. To strengthen the present approach to training Health Inspectors.
10. To refine and implement an effective Health Assistants training program.
11. To improve the training and subsequent performance of artisans in the sector through explicit linkages with Swazi institutions.

6.3 Projects

Following are the 11 projects corresponding to the above objectives that will be conducted in carrying out the proposed HRD plan.

PROJECT 1

Establishment of an Organizational Structure for Sectoral HRD Planning

Need

At present, there are two potential sources for HRD planning within the Government of Swaziland: a centralized ministerial or inter-ministerial group for overall planning for the GOS in general (such as is recommended in the ILO report) and individual agency managers in the various separate agencies of government who plan for their own agencies. There currently exists no centralized group which can plan for human resources needs across each of the constituent member agencies of the water sector. This is a shortcoming that can be met only by (a) recognizing that HRD considerations cross organizational boundaries and therefore that (b) some sectorwide mechanism is necessary to initiate and oversee such sectoral planning in the future.

Objectives

It is the purpose of this activity to identify a working organizational mechanism which has the consensus and approval of the TSG to address and implement as appropriate the recommendations of this report.

Outputs/Products

Accordingly, the output of this activity will be the identification of the most feasible operational structure for completing the activities referred to in the remainder of this chapter. Duties and functions of this organizational arrangement will be specified as well as a suggested schedule for accomplishment and review of its responsibilities.

Timing

Tasks 1 and 2: March 1988

ACTIVITIES

Task 1: Structure

Objective: The objective of this task is to specify how the HRD planning structure will be organized.

Description: Three working groups were initiated during the final stages of the current assessment study. These groups focused on three areas: HRD policy and strategy, water sector occupations, and health occupations. These groups had several advantages: they worked well, were constituted for the most part from existing agency representatives of the TSG, and therefore provided a useful TSG-based foundation with adequately broad perspectives for further sectoral HRD planning.

It is proposed that these groups remain as the major organizational mechanisms by which the recommendations of this report are implemented. To ensure adequate communication among groups, and between all of the groups and the TSG, a Group coordinator should be appointed. This person should be familiar with the HRD issues raised in this report, a Swazi national, and preferably from a central ministry in order to provide the linkage with overall government HRD policy so crucial to future public sector organization in Swaziland.

Task 2: Implementation

Objective: The objective of this task is to outline the process for addressing the report recommendations.

Description: The study recommendations and the HRD plan from the present study should be reviewed by the working groups, and either a consensus reached on the already proposed priorities for implementation, or new priorities generated. For purposes of simplification of the review process, it is suggested that the allocation of responsibilities to each group be as follows, based on the list of objectives given above:

HRD Policy/Strategy Group:

Objective 2
Objective 3
Objective 4
Objective 6

Water Sector Occupations:

Objective 5
Objective 7
Objective 8
Objective 11

Health Occupations:

Objective 9
Objective 10

PROJECT 2

HRD Policy and Strategy

Need

The first step in the planning process and a key to successful planning and program management is the development of clear policy guidelines. Policy forms the backbone of the planning process. It sets targets and provides a guide for orderly planning based upon a comprehensive analysis of needs. Without clear policy guidelines, planning and management tend to be ad hoc and without a clear sense of purpose or cohesion.

Strategies establish how policies will be carried out and goals will be met. There must be comprehensive coverage of all relevant policy issues. Projects are identified to implement strategies. Strategies should be consistent with policies and should constitute the framework within which program planning and implementation can take place.

Objectives

The purpose of this activity is the drafting of a clear set of policy guidelines and implementation strategies to guide sector management in meeting the HRD needs of the water supply and sanitation sector and assuring that inadequate human resources do not constrain planned development within the sector.

Outputs/Products

- HRD policy guidelines for the water supply and sanitation sector
- Strategies for implementing HRD policy guidelines for the sector

Timing

Task 1: Complete by end of 1988

Task 2: Complete by end of 1988

ACTIVITIES

Task 1: Development of Sectoral HRD Policy

Objective: To draft a sectorwide policy for HRD which:

- is based on a sectorwide needs assessment and is cognizant of overall sectoral development goals and plans
- is consistent with national HRD policy

- is acceptable to all agencies involved in sector and central ministries
- assures government support for sectoral HRD and
- provides comprehensive guidance for HRD planning and implementation and management of programs.

Description: A sectorwide HRD policy will be drafted to meet specific objectives defined above. This policy will consider at a minimum but will not be limited to:

- immediate and urgent HRD needs
- HRD information and systems for management
- analysis and monitoring of HRD data (scanning)
- job descriptions, grading, performance review, promotions, career development
- the consistency of sectoral HRD policy with other agency and national policy
- the structure and mechanisms for planning, implementing, and maintaining currency of sectorwide HRD
- the role of external technical advisors, including
 - criteria for use
 - supervision
 - criteria to govern counterpart/s and transition, and
 - monitoring of progress
- assessment of training needs and
 - assurance that training provided meets defined needs and
 - assurance that training provided (or accepted) fits into an overall training plan
- pre-service training to meet current and anticipated needs in terms of
 - content
 - numbers
- in-service training to
 - provide refresher review and updating of skills
 - provide new skills to meet changing needs, and
 - provide follow-up support to recipients of earlier training

- roles of local vs. international training and
- funding

Responsibilities:

Drafting of policy	TSG with MLPS
Approval of policy	NAG

Task 2: Development of Strategies for Implementing Sectoral HRD Policy

Objectives: To draft strategies for implementing sectorwide policies for HRD which are

- comprehensive addressing relevant policy issues
- realistic and can be carried out, and
- acceptable to all agencies involved in the sector and the central ministries

Description: Strategies consistent with the overall goal of improving sector HRD will be drafted to meet objectives listed above. Important components of the strategies already identified will be the projects listed in the remainder of this chapter.

Responsibilities:

Drafting of strategies	TSG with MLPS
Approval of strategies	NAG

PROJECT 3

Design and Implement an HRD Information System

Need

Without a cohesive HRD policy, personnel movements become haphazard, preparatory training remains unresponsive to workplace needs, and in-service training is no longer viewed in terms of its impact on performance. But implementation of policy depends on clear identification of needs and planning. Accurate and readily available information is a prerequisite for analysis of needs and effective and sound planning.

The absence of a system for documenting needs for skills levels for actual job requirement makes it difficult to meet HRD needs in Swaziland. While much basic information for HRD planning exists, it is scattered in different ministries and within ministries; it often does not exist in standard format convenient for analysis, and it often is not up-to-date. No information is compiled for the sector as a whole. As a result, the necessary information may not be readily available and may not lend itself easily to use as a basis for HRD planning and identification of training needs. A major recommendation of reports on the Swaziland public sector in the last year (ILO, 1986; ODA, 1987) has been the suggestion that the quality and handling of occupational or personnel information within public agencies be improved.

To conserve resources, the system proposed here can be directed initially towards "priority" occupations in the sector. Priority occupations have been defined earlier in this report, and are the target of Tasks 7 through 11 of this section. As the system is being developed, therefore, occupational data that are needed yet which are not currently collected can be sought in the data collection phase of this project, as detailed also in the relevant tasks for each occupation. As priorities change over time, the blueprint already established here can be used to update and/or expand the information system as immediately necessary.

Objectives: It is the objective of this project to design and implement an operating information system on occupations in the water supply sector. Such a system will strengthen annual reports, facilitate annual reporting procedures, and encourage forward planning for HRD in the sector.

This system should be microcomputer based and designed to provide tabular outputs as a basis for identifying and understanding needs, describing such HRD parameters as numbers of people employed, educational qualifications of people in jobs, distribution of vacancies, and labor turnover by occupation. This should be done in such a way that it will:

- facilitate analysis of occupational information;
- allow comparison of occupational categories, titles, and employment reporting procedures across sector agencies;
- permit periodic projection of occupational employment and identification of employment shortfalls, and

- permit sectorwide analysis of employment and training needs.

Outputs/Products:

- A sectorwide microcomputer-based information system providing
 - a foundation for sector wide HRD planning, including all information necessary for
 - (1) continuous assessment of sectoral HRD needs
 - (2) annual reporting, and
 - (3) continuous analysis of sectoral training
- periodic reporting by way of an occupational information summary to sector management.

Timing

- Task 1: May-June, 1988
- Task 2: See projects 7-11
- Task 3: See projects 7-11
- Task 4: May 1989
- Task 5: Begin June 1989

ACTIVITIES

Task 1: Identification of Data Requirements

Objectives: The objectives of this task are to identify information required to meet overall objectives of the information system and to design formats and protocols for collection and presentation of information.

Description: Since some information is already gathered on all employees and some agencies (e.g., MOH) have partial information systems in place, it will be important to build on existing information systems. These systems should be reviewed internally for completeness, discontinuities, and major shortcomings. Then with the help of a consultant familiar with occupational information system design, reasonable standardization should be attempted across elements so that sectorwide information, such as the following, can be maintained for each employee within occupational titles and categories:

- post, if established, and occupational title
- occupational title, if non-permanent
- nature of employment* (permanent, temporary, trainee/cadet, other
- if temporary, post requested/not requested)
- name*
- sex*
- local/other status*
- grade
- wage/salary*

- prior jobs held by incumbent
- pre-service training completed
- in-service training completed
- vacancy by occupation at the time of the reporting period
- separations** (reasons for leaving) within the occupation

(NOTE: * for the current employee and past employees in the occupation;
 ** only for past employees in the occupation)

The amount of actual data in the system can be reduced over time as certain elements which are repeated can be coded (e.g., in-service and pre-service qualifications and reasons for separation). The major differences between this and present employee information is that current data are principally employee-specific rather than post- or occupation-specific. Thus, for example, while individuals currently in an occupation are documented at any given point in time, the passage of multiple individuals through an occupational turnover, such as the number employed across time in a specific position, while perhaps known to individual managers, are thus lost to the system. It will be important, however, to work within sector management to define a minimum "core" of HRD data needed for acceptable HRD levels within the sector. Then formats for collection and organization of data, questionnaires, and tables for summarizing information will be prepared.

Responsibilities:

Identification of basic data needs	WG(P)
Design of formats	WG(P)

Task 2: Data Collection

Objectives: One objective is to collect data available from existing documentation and files and to identify sources, the form in which the data are available in each agency, and the extent to which they are current and to determine comprehensiveness of the data. A further objective of this task is to collect data from incumbents, supervisors, and users of services (initially, this will be done only for "priority" occupations as defined earlier) and to assess data available from existing systems and how these systems can be adapted for sectorwide use.

Description: Data will be collected employing both existing information systems and interviews with personnel, supervisors, and users of services. This will be done according to systems defined under Task 1. Consideration should be given to utilization of trained interviewers to assist in obtaining information from field sources.

While carrying out this task, attention will be given to the capacity of existing data systems to provide needed HRD information, meet unmet data needs, and identify required modifications. Attention will also be directed at assessment of the formats and protocols developed in Task 1 and tested under this task with a view to their eventual improvement under Task 4.

Responsibilities:

Collection of information:

Agency specific	Agency reps of WG(H) or WWG(W), PPOs
Field	Agency reps of WG(H) or WG(W) interviewers
Summarize agency information	Agency reps of WG(H) and WG(W)
Assessment of effectiveness of methods, and need for modification	WG(P)

Task 3: Data Summaries

Objectives: The objectives of this task are to summarize sectorwide occupational information and to determine sectorwide training needs.

Description: The data collected will be summarized and tabulated for individual agencies using formats developed under Task 1. Formats will be revised as required.

Based upon the summary of data collected and revised job descriptions prepared under projects 7 through 11, conclusions will be drafted as they relate to:

- existing skills
- needed skills
- sources of training
- entrance requirements for training and job performance
- pre-service training needs
- in-service training needs, and
- special requirements of information system

The analysis of data, identification of needs, and preparation of recommendations regarding specific job categories will be carried out under Projects 7 through 11, and close coordination will be required among working groups.

Responsibilities:

Coordination of activities under Task 3	WG(P)
Analysis and recommendations according to job categories	WG(H) or WG(W)
General conclusions, recommendations	TSG

Task 4: Design of computer based information system

Objective: The objectives of this task are to design a computer-based occupational information system.

Description: Criteria will be developed for data base location and access, and a computer based system for managing sectorwide occupational information will be designed with the assistance of a consultant. This will take into consideration experience gained and needs identified under Tasks 2 and 3. It must also be carried out with agency personnel officers and sector agency management. Specification will include:

- establishment of a work plan for designing, implementing, and evaluating the system with assigned responsibilities
- establishment of procedures for review of existing data
- establishment of data elements and acceptable formats
- establishment of output requirements and
- design and programming of system.

Briefing of sector agency management will be required to:

- assure thorough understanding of purpose
- assure that agency needs are met as well as sectoral needs and
- assure agency support.

Responsibilities:

Briefing of agency management	TSG
Design of system	WG(P) with Consultant under TSG guidance

Task 5: Put Information System into Operation

Objectives: The objective of this task is to put the occupational information system into operation through:

- placing agency data in required formats
- loading the system with agency data
- preparing system-wide matrices and tabulations
- preparing annual summaries and reports, and
- evaluating the system including its ability to support required analyses and operational management of the sector.

Description: For a description of the system see the design and implementation plan prepared under Task 4 above.

Responsibilities:

See design and implementation plan prepared under Task 4 above.

PROJECT 4

Develop and Test Training Needs Identification Procedures

Need

At present there is no consistent review. Nor do standardized procedures exist for establishing sectorwide personnel policies and training needs. There is limited analysis of training needs within agencies and none sectorwide. Yet, both consistent application of policies and training needs are necessary to assure that personnel have the technical and skills background to meet the demands of their jobs and the needs of government, that training resources are not wasted, that limited human resources are used to best advantage to government and the sector, that personnel have an opportunity to develop and advance to the best of their ability, and that morale remains high and personnel perform to acceptable levels of productivity.

Objective: It is therefore the objective of this project to develop and test standardized procedures for job and skills analysis within agencies and across the sector to:

- facilitate staff involvement in sectorwide HRD planning
- improve information flow between those responsible for identifying actual skills requirements and training institutions and
- provide guidance for continual efforts to make training programs responsive to agency and sector needs.

Outputs/Products

- Standard and objective procedures for (1) routinely identifying and defining sectorwide training needs and (2) annual performance reviews identifying individual training and career development needs,
- Analysis of training needs for all personnel categories,
- Clear personnel policies, and
- Procedures for review and up-dating job descriptions including sectorwide analysis of priority occupations.

Timing

Task 1: July, 1988
Task 2: July, 1988
Task 3: October, 1988
Task 4: October, 1989

ACTIVITIES

Task 1: Assessment of Annual Performance Review Process

Objective: To review existing procedures for annual performance reviews and recommend modifications where appropriate.

Description: This task should establish procedures which can be applied to the various categories of personnel. Procedures must be developed in close cooperation with the working groups and agency personnel responsible for implementing Projects 7 through 11. Annual performance review should provide feedback from job descriptions of individual employees during routine performance appraisals. This can serve three purposes: 1) increase the specificity of performance appraisals in relation to expected job performance and productivity; 2) provide opportunities for supervisors to update routinely job descriptions on the basis of employee input and their own observations; and 3) facilitate objective identification of training needs so that opportunities for further training can be presented to job incumbents by their supervisors and pre-service qualifications made clearer for hiring purposes.

Responsibilities:

Establish and test performance review	WG(P) in coordination with procedures agencies, WG(H) and WG(W)
Job description review	Agencies with feedback to WG(P), with WG(H), and WG(W)
Evaluation	WG(W)

Task 2: Review of Job Descriptions

Objectives: The objectives of this task are to establish and test procedures to review and revise job descriptions on a regular basis.

Description: Procedures will be established and tested for review and revision of job descriptions. These may include interview surveys of job incumbents and supervisors or direct observation. The methods and procedures developed may need to be agency--and perhaps occupation--specific, and selected by agencies in consultation with the TSG through the WG(P).

Review of job descriptions will include not only specific activities carried out, duties, and responsibilities but also skills and technical or related experience required for acceptable job performance.

Revised job descriptions must be accepted officially and submitted as required to the MLPS.

Responsibilities:

Establishment of procedures	WG(P) with WG(H) and WG(W) in consultation with PPOs
Test procedures	Unit heads and PPOs
Review and Assessment of results	WG(P)

Task 3: Identification of Sectorwide Training Needs

Objectives: The objectives of this task are to establish and apply standardized and objective procedures for identifying and defining sectorwide training needs.

Description: Under this task procedures should be established which can be applied to the various categories of personnel on a sectorwide basis. They must be developed in close cooperation with the working groups implementing Projects 7 through 11 and will depend as well on the analysis of basic occupational data under Project 3 and activities under Task 1.

Procedures developed must be consistent with relevant policies and procedures applied governmentwide. Mechanisms must be developed whereby results of analyses under Task 2 can be communicated to and utilized by training institutions to respond to sector needs. This task must also include assessment of procedures in terms of their workability and impacts.

Responsibilities:

Establish and test procedures	WG(P) in coordination with WG(H) and WG(H)
Evaluation	WG(P) with WG(H) and WG(W)

Task 4: Integration of Sectorwide Personnel Policies

Objectives: The objective of this task is to clear sectorwide personnel policies.

Description: Consistent with existing governmentwide policies and procedures, and in consultation with responsible ministry officials, clear personnel policies will be developed. This will require a review and analysis of existing governmentwide and ministry policies, procedures, and practices and may also include interviews with job incumbents and supervisors.

In developing policies, consideration should be given to:

- Emphasis on a few, effectively stated and feasible policies, rather than a wide range of less tangible statements,
- A focus on sectorwide, not just agencywide, personnel concerns, and

- Facilitation of improved management of sector human resources through explicit mechanisms for:
 - better understanding of work requirements, work context (e.g., compensation or alternative job opportunities) and worker abilities,
 - faster and more accurate identification of needs for pre- and in-service training,
 - use of occupational information to assist in making decisions on hiring or training requirements, and
 - clear guidelines for determining need for and qualifications and eventual effectiveness of expatriate technical assistance.

Responsibilities:

Development of personnel policies

WGs in coordination with PPOs, TOs

PROJECT 5

Address Immediate HRD Needs Within the Sector as Identified by the Present Study

Need

During the course of the present HRD study and assessment, a number of urgent personnel needs were identified within the sector for certain key occupations. Two major sector implementing agencies suffer the greatest need. They are the Water Resources Branch (WRB) and the Water and Sewerage Board (WSB).

The WRB: The WRB has three established posts for engineers that are currently vacant. They are the Senior Water Engineer and two Water Resources Engineers. There is currently one engineer in training in the United States who will be away for at least three years. Upon completion of his studies, it is expected that he will occupy one of the above-mentioned posts, thus leaving vacancies in two important posts.

In addition, the WRB is charged with Water Act Administration, and there is thus a need to assess the degree of retraining that will be required in order to upgrade the skills of the present Water Control Officers in water management techniques.

The WRB also has two established posts for hydrologists; one is currently vacant and the other has a person on post. However, the incumbent is currently away on training for at least a year. This implies that even upon his return, the agency will probably still be functioning at 50 percent strength in this respect.

Finally, the WRB is charged with dam operation and maintenance, thus requiring the services of a Dam Supervisor. However, before one can be recruited, the position of Dam Supervisor must first be re-evaluated in light of the serious responsibility associated with this occupation and the availability of adequately skilled personnel to fill the post. The advisability of contracting this responsibility out should be compared with developing the expertise internally in WRB.

The WSB: The WSB has four vacant posts in engineering. They are the Planning Engineer, until recently held by an expatriate; the Construction Engineer, also recently vacated by an expatriate; a Contracts Engineer; and a Water Engineer. Two engineers are currently undergoing training in the United Kingdom, one of whom is expected to return in August 1988. This leaves two engineering posts vacant.

Furthermore, the planning capability of the WSB is not only hampered by the lack of a Planning Engineer, but also by the fact that it is not yet known whether the WSB will remain a government agency or will become a parastatal entity. Thus, in the interim, agency planners must face considerable ambiguity and acknowledge all of the alternatives.

In addition to the four above-mentioned vacant posts, WSB has requested the post of a Quantity Surveyor. At present, the need for such a specialty in WSB is infrequent since construction is rarely handled by agency personnel. As the agency grows, however, it expects to complete more projects in-house

instead of contracting out, hence the perceived need for a Quantity Surveyor. At present this function is performed for the sector by a Ministry of Works employee, although this arrangement is not always satisfactory since there are multiple demands on his time. Furthermore, if the WSB were to become a parastatal, it is envisaged that it will generate additional revenue by contracting itself out for construction work. Again the perceived need for a Quantity Surveyor is demonstrated. This position is a good example of the ambiguity facing WSB in the absence of a decision whether it will become a parastatal agency. In effect, planning in WRB is being deferred until this decision is made.

Objective: The two major objectives of Project 5 are: 1) to seek external technical assistance on an interim basis for key vacant positions within WRB and WSB and 2) to expedite a decision on whether the WSB will become a parastatal organization or remain a Government agency.

Output/Products

Project 5 should result in the immediate filling of important posts within WRB and WSB and a final decision as to the future status of the WSB.

Timing

It is important to note that all the activities in this project must be completed by the end of 1988.

ACTIVITIES

Task 1: To Address the Immediate HRD Needs in the WRB

Description:

- a) To fill the two vacant posts of the Water Resources Engineers in the WRB.

Under this task two expatriates will be recruited and hired to fill the two Water Resources Engineer posts. They will be required to possess at least a bachelor of science degree in civil engineering, with subsequent specialization in water resources development. They should have at least five years experience in this field, preferably within the region. Computer literacy is essential. The expatriates must be available for a period of time long enough to ensure an effective transfer of responsibility to the local incumbent. The minimum recommended period for this transfer is one year after the return of the local engineer from training.

- b) The re-evaluation of the Water Control Officer occupation.

The current Water Control Officer position in WRB will be re-evaluated by the following means:

- individual job descriptions will be reviewed,

- educational qualifications and pre-service training will be reviewed with respect to their current job requirements,
- the on-the-job training program will be assessed,
- in-service training will be reviewed, and
- present tasks and time allocations will also be examined.

From the information obtained from these reviews, appropriate in-service programs will be sought and selected for meeting the specific needs implied by the agency responsibilities under the Water Act. A partial listing of relevant overseas and regional programs is included in Appendix F.

c) Filling one of the two hydrologist posts within WRB.

One expatriate will be recruited and hired to fill one of the hydrologist positions at WRB. The skills required for this post include not only the ability to collect and analyze hydrologic data but also the ability to decide on the appropriate water resource development resulting from the data. This may include selecting suitable dam locations, overseeing dam construction where necessary, advising on possible irrigation schemes, etc. This requires a civil engineer with post graduate specialization in hydrology.

d) Re-evaluation of the Dam Supervisor Post

The Dam Supervisor post will be reviewed on the basis of the level of responsibility required to fill the post. The following points will be taken into consideration in this review:

- the level of the remuneration offered for the job with respect to the responsibilities attached to the job;
- ease of communication and ability to work with supervisory staff at WRB headquarters;
- the possibility of finding suitably trained Swazi nationals to occupy the post, and, if such persons are unavailable,
- the level of pre-service, in-service, and on-the-job training required to bring the incumbent to the desired level of training for the job, and finally
- the possibility of contracting the job out to consultants or to major water users such as the Simunye Sugar Estate.

All the above activities will be done within the framework of the currently existing job description for a Dam Supervisor with modifications as appropriate. On the basis of this review, a decision will then be made whether to recruit a Swazi local, contract the work out to consultants, or whether to contract it out to one of the major industrial water users.

Responsibilities:

Recruitment of expatriates to fill water resource engineer posts	SE WRB; MLPS; DEP; WG(W)
Re-evaluation of Water Control Officers	SE WRB; MLPS; WG(W)
Filling of hydrologist post	SE WRB; MLPS; EP; WG(W)
Re-evaluation of Dam Supervisor Post	SE WRB; MLPS; WG(W)

Task 2: To Address HRD Needs Within WSB

Description: It is recommended that expatriate assistance be sought for two of the four vacant engineering posts in the WSB. The posts requiring immediate attention are those of the Planning Engineer and the Construction Engineer. Again here it is desired that the candidates have at least a B.Sc. in civil engineering and possess at least five years experience in urban water development. Yet again, recruitment and hiring of these personnel will be conducted on the understanding that there will be a phased transfer of responsibility to the young Swazi engineers soon to return from the UK. It is very important that the advisor/counterpart relationship between the external technical personnel and the local Swazi incumbents be very closely monitored. To this end, guidelines to the use of external technical assistance are being developed as described in Project 6 of this report.

Responsibilities:

Recruitment and hiring of expatriate engineers	Dir. WSB; MLPS; DEP; WG(W)
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Task 3: The Decision on the Future Status of the WSB

Description: It must be emphasized that while the decision to have WSB become a parastatal agency or not encompasses issues far beyond the scope of HRD planning, such a decision is critical to future HRD decisions that will be made within the WSB, i.e., the recruitment and hiring of a Quantity Surveyor. A full organizational review of the WSB should therefore be conducted to determine the viability of its becoming a parastatal organization. This evaluation should take into consideration:

- the financial viability of each of the alternative WSB organizational schemes, including WSB's ability to generate enough revenue to become self-sufficient, and

- the capability of WSB to function independently under current and envisaged staffing levels.

Responsibilities:

The decision as to whether or not WSB becomes a parastatal will be made at the level of the Cabinet.

PROJECT 6

Develop Guidelines for the Use of External Technical Assistance Based on Case Study Analysis of Prior and Current Experience of Such Assistance in the Sector

Need

In the past there have been instances where external (expatriate) assistance has been recruited without adequate screening or planning. This has led to situations where, despite extensive external assistance, there has not been subsequent effective localization of posts. This can arise because training (both academic and on-the-job) for Swazis has not been properly integrated with the external assistance provided or because of inadequate time for transition. There is thus a need to understand why these situations have occurred and how their recurrence may be avoided. A set of guidelines are therefore required that specify minimum conditions to be fulfilled before external assistance is recruited.

Objective

This activity will lead to a draft of a clear set of guidelines to guide the recruitment of external assistance to ensure that it meets the long-term needs of the water supply and sanitation sector. This would be achieved using information derived from a case study analysis of past and present external assistance provided to the sector.

Outputs

A set of guidelines for the recruitment of technical assistance and data from a case study analysis of various agencies' external technical assistance and training.

Timing

Task 1: due 1988
Task 2: July 1988 to November 1988
Task 3: January 1989 to June 1989

ACTIVITY

Task 1: Identify Information Required from Case Studies.

Description: Define the minimum information required from each case study and identify the key factors likely to determine the success of external assistance, such as, for example:

- position filled
- skills offered
- terms of reference
- date of arrival and departure
- counterpart position
- type of training provided (academic and on-the-job)

- timing of training
- handover periods
- quality of technical assistance
- were terms of reference met?
- if not why?
- were skills transferred efficiently and effectively, and has localization been possible?
- if not, why?

Responsibility:

Information specification

WG Interviews

Task 2: Carry out case studies

Description: For RWSB, WSB, WRB, through interviews and review of documentation, design and analyze case studies of technical assistance received both currently and over the last three years.

Each case study would be analyzed with the view to assessing:

- the appropriate roles for advisor
- the extent of structure vs. flexibility in the advisor/advisee relationship and
- key factors that determine the success of external technical assistance.

Responsibility:

Case Studies

WG
Interviews

Task 3: Draft Policy Guidelines and Criteria for the Recruitment of Technical Assistance.

Description: Based on government policy and the results of the case study analysis, draw up guidelines for the recruitment of external assistance and the design of associated training programs. This would include but not be limited to:

- criteria for establishing need (e.g., no suitably qualified Swazis);
- preconditions for the recruitment of external assistance (e.g., existence of terms of reference definition of role, answering urgent needs, counterparts in place, bonding, institution building)
- criteria for selection of external assistance

- procedures and criteria for monitoring external technical assistance, and
- criteria for extending external or terminating assistance project.

Responsibilities:

Draft guidelines and criteria

WG(P)
Interviews

PROJECT 7

Training of Civil Engineers

Need

As noted earlier in this report, there is an acute need for well-trained civil engineers in the water sector, particularly in senior posts. The quality of these professionals is critical to the provision of effective WS&S services. Thus, it is important that the mechanism for early and continuing education and training for these individuals be improved.

Objectives

The objectives of this project are to introduce water resource management at an early stage of engineering students' academic training and to stress the critical need for such expertise in Swaziland, to provide pre-service training for engineers to meet sectoral needs and to provide on-the-job and in-service training to ensure the satisfactory performance of incumbent engineers.

Outputs/Products

The training and performance of civil engineers will be improved through the following activities:

- (1) Increased interest in the sector and new opportunities for supervised sector experience for UNISWA undergraduates.
- (2) Recruitment of promising candidates as engineer trainees.
- (3) Appropriate selection and follow-up of external engineering training, including monitoring progress of each trainee.
- (4) Optimal utilization of each qualified engineer upon return to Swaziland.
- (5) Planned on-the-job and in-service training of all engineers.

Timing

This project will be continuous throughout the five-year plan period, beginning in 1988.

ACTIVITIES

Task 1: Dissemination of Information on Water Resource Management.

Objectives: The objective of this task are to disseminate information that will sensitize students to the need for effective water resource management, and to develop a seminar course that will introduce engineering students as well as other potential water sector professionals to the needs of the water supply sector in Swaziland.

Description: All UNISWA students of physical and social science will be informed during their first year, through lectures and printed material, about the critical need for effective water resource management in the future. At this stage students will be made aware of UNISWA courses that relate to these issues.

A seminar course in drinking water supply and sanitation technologies will be designed and offered at the end of the third academic year. This course will be open to students of either physical or social science. This course will include:

- introductory seminar sessions and assignments of individuals or small groups to various water sector agencies, at their headquarters and field units, at which stage there will be an explanation of field work
- three months (vacation) work with agency staff on-site at headquarters and in the field
- the preparation of technical reports by the students, and
- concluding seminars for presentations and discussions of reports.

Responsibilities:

Disseminating information on water resource management	UNISWA
Conducting seminar course	UNISWA, Water Sector agencies TSG

Task 2: Interview Students on Probationary Assignment

Objectives: The objective of this task is to initiate a process by which engineering and other professional candidates can be effectively selected.

Description: Sector agencies will interview students during their fourth probationary assignment. During this period, engineer trainees will work under supervision as water technicians, inspectors of works, plant operators, surveyors, designers, assistant hydrologists, health inspectors, etc. GOS remuneration of these trainee engineers and the creation of posts to accommodate them will be arranged in accordance with the policies developed under Project 2 above.

Responsibilities:

Interview and recruit trainees	Water sector agencies, TSG, MLPS
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Task 3: Selection of Engineering Candidates

Objective: The objective of this task is the selection of suitable candidates for training in engineering.

Description: Engineer trainees who successfully complete the first half of their trainee assignments will be recommended by an executing agency to the Ministry of Labor and Public Services (MLPS) and a donor agency for a four-year civil engineering scholarship at an external institution (see Appendix F). Arrangements with the training institution will make clear the purpose and desired content of the training course (e.g., degree in civil engineering with specialization in the design and construction of small water supplies and wastewater disposal schemes or degree in civil engineering with specialization in regional water resource planning) and will include a six-monthly check by GOS on each student's progress. Requests by training institutions or by students for extension of the training period to undertake additional studies will normally not be considered.

Responsibilities:

Selection of candidates
for engineering training

Water sector agencies, TSG, MLPS,
Estates

Task 4: Placement of Returning Engineers

Objectives: The objectives of this task are to effectively place returning civil engineers.

Description: Upon return to Swaziland, each qualified civil engineer will report to the agency where initial employment experience was gained and where subsequent employment is anticipated. At this time, all vacancies for civil engineers will be reviewed by the TSG which, if necessary, will suggest assignment of the returning engineer to another agency having a greater need for a trained civil engineer.

Responsibilities:

Placement of returning engineers

TSG, MLPS

Task 5: On-the-Job Training Program

Objectives: The objective of this task is to provide an effective on-the-job training program to ensure satisfactory performance of the civil engineering incumbent.

Description: On-the-job and in-service training of each engineer will be developed and carried out during a suitable period after his/her entry into service. This training will be designed based on:

- careful definition of the post tasks, based upon the job description and the work actually done by the incumbent, both in the office and in the field

- assessment of the incumbent's previous training, including the skills he/she has learned
- determination of the additional skills he/she needs to perform the post tasks correctly, and
- preparation of an individual on-the-job and in-service training plan for the incumbent.

Responsibilities:

Formulation and execution of
on-the-job training program

Water Sector Agency, WG(W), MLPS

PROJECT 8

Training of Water Technicians

Need

Water technicians occupy key positions in the Rural Water Supply Board and the Water and Sewerage Board, providing the technical support primarily for water supply construction and maintenance units. With further training, they can become supervisory personnel including waterworks supervisors, laboratory and maintenance supervisors, and clerks of works.

The training of water technicians takes place in two parts separated by a period of work experience. There is continuous demand for new water technicians to fill new and vacated posts. Furthermore, the need for trained water technicians is regional and substantial, and immediate interest in this training has been expressed from Lesotho, Botswana, Zambia, Mozambique, and Tanzania. However, considerable prior work has been done in the development of water technicians' training by the Canadian International Development Agency (CIDA,) and it is therefore important that these activities will be coordinated with CIDA efforts.

Objectives

The objectives of Project 8 are to provide pre-service training to meet sectoral and regional needs for water technicians and to provide on-the-job and in-service training to meet the needs of existing water technicians for refresher and specialized training.

Outputs/Products

- Information relating to job performance of existing water technicians (former trainees)
- Revised job descriptions, reflecting actual duties, responsibilities, and skill requirements
- Training needs specified through on-the-job performance information and analysis of job descriptions
- Revised pre-service course curriculum as required to meet assessed pre-service training needs
- In-service training programs and courses to meet assessed needs of existing water technicians and former trainees
- Assessment of need for and feasibility of water technology course
- Implementation of pre-service training, and
- Implementation of on-the-job and in-service training.

Timing

Task 1: April-May 1988
Task 2: May 1988
Task 3: May-June 1988
Task 4: July 1988
Task 5: July-December 1988
Task 6: January-June 1989
Task 7: August 1988
Task 8: January 1989

ACTIVITIES

Task 1: Assessment of Pre-service Training Needs

Objectives: The objectives of Task 1 are to assess pre-service training needs based upon analysis of skills possessed and skills required to meet demands of jobs as they exist at present and to assess entrance qualifications and pre-service experience of candidates for water technician training.

Description: It is anticipated that training of water technicians will be initiated at SCOT in July 1988 with technical and material support from CIDA. Preparation is scheduled to begin three months prior to the beginning of training. CIDA support for water technician training will continue through March 1992. During this time, Part I will be offered as four 12-month courses. Part II will be offered as three six-month courses beginning in January of each of the years 1989 through 1990. Task 1 will therefore be carried out during the three-month preparatory period.

Information will be obtained from all persons who have received Part I and Part II water technicians training on the following:

- Educational qualifications
- When pre-service training was obtained
- On-the-job training
- In-service training (identify courses and instructions)
- Jobs held/areas of experience, and
- Present activities and allocation of time of each.

In addition, previous trainees and their supervisors will be asked to assess the scope, suitability, and quality of the skills acquired during pre-service training and whether they met needs of the job.

Information collected will be organized and analyzed to meet defined objectives and to provide a basis for implementing the assessment of entrance requirements and training needs (Task 3) and curriculum review (Task 4). It will also be entered as appropriate (e.g., coded) into the data bank (Project 2 above).

Responsibilities:

Design of data collection formats	TAs with WG(P) and WG(W)
Collection of file data	SE, RWSB: Dir, WSB; PROs
Collection of field data	TOs, SE, RWSB; DIR, WSB; with TAs
Analysis of data	TAs with WG(W)

Task 2: Review and Revision of Job Description

Objectives: It is the purpose of Task 2 to review water technician job descriptions and to redefine them as necessary, in order to:

- facilitate yearly evaluation of job performance
- identify individual needs and career development choice, and
- provide a basis for assessment of overall sector training needs.

Description: The job descriptions for all posts currently held by trained water technicians will be reviewed to determine the correspondence between the concepts and skills specified and those needed (see Task 1 above). Note will be taken of serious imbalances, i.e., skills essential to the performance of the tasks which have been omitted and specified areas of competence which are not needed for the understanding and performance of the tasks. These apparent imbalances will be drawn to the attention of the responsible agency managers and changes recommended in the job descriptions where appropriate.

Responsibilities:

Review and revision of job descriptions	SE, RWSB; Dir, WSB
Analysis of tasks performed	SE, RWSB
Skills requirements	Dir, WSB
Submission of revised job descriptions	PRO, MONR

Task 3: Analysis of Pre-service Training Needs

Objectives: Based on revised job descriptions and analysis of pre-service training and entrance qualifications, the objectives of Task 3 are to identify knowledge and skills required in training of water technicians to meet sectoral needs and define pre-service training needs of water technicians.

Description: The results of the analysis of knowledge, skills, and job performance undertaken under Task 1 and the results of the analysis of job descriptions undertaken under Task 2 will be used to identify and define specific sectorwide training needs with respect to (1) the basic set of knowledge and skills required of all water technicians and (2) special knowledge and skills required by water technicians occupying specialized positions.

Responsibilities:

Analysis of sectoral training needs

TAs with WG(W)

Task 4: Review of Pre-service Curriculum

Objectives: Based upon results of analysis of training needs (Task 3), the objective of Task 4 is to review the pre-service curriculum and design a revised curriculum.

Description: Most Swazi water technicians fulfill one of the following functions:

- assistant hydrologists
- planning and building small rural water systems
- supervising construction of hydraulic works
- on-site disposal of wastewater, and
- community organization and participation.

A thorough review of the curriculum will be carried out with the help of a consultant. The results of activities (1) and (2) above (review of previous training, job performance, and job description) will be important contributions to the study of the curriculum. This activity will produce curriculum revisions based on empirical assessments of performance requirements.

Task 5: Design of In-service and On-the-job Training Programs

Objective: Based upon results of analysis of training needs (Task 3), the objective of Task 5 is to design an in-service and on-the-job training program for water technicians.

Description: Short technical courses will be developed to meet identified needs of both technicians and professionals. These courses will be offered mainly to enable water technicians to review basic technology. They may also be used to present new developments or approaches in water supply and waste disposal technology. A sample of professional and subprofessional agency staff will be canvassed for suggestions to assist SCOT in preparing course proposals.

Curricula will be designed as required with respect to:

- refresher courses
- supplemental training for selected specialities
- supplemental training for existing water technicians trained prior to revision of curriculum
- professional development.

A program of on-the-job and in-service training will be prepared for each "water technician" employee, tailored to meet the particular requirements of his job. It should be noted that the project documents and works schedule for the CIDA-supported program at SCOT include provision for short courses directed at the needs of staff trained as water technicians.

Responsibilities:

Planning of in-service training programs WG(W) with TAs

Task 6: Assessment of the Need for and Practicality of a Three-Year Engineering Technology Course

Objective: The objective of this task is to determine the feasibility of in-country training for water engineering technologist.

Description: The feasibility will be explored of offering a full three-year course for water engineering technologists, in line with the trend in other engineering programs at SCOT (see also section 4.1.4 of this report). If it is considered feasible to do so, an analysis of training needs followed by planning and design will be required.

Responsibilities:

Feasibility study TAs with WG(W)

Task 7: Implementation of Pre-service Training.

Objective: The objective of Task 7 is to implement pre-service training according to revised curriculum.

Description: Training will be implemented according to project documents for CIDA supported training program at SCOT.

Responsibilities:

Implementation of pre-service training TAs

Task 8: Implementation of In-service Training

Objective: The objective of Task 8 is to implement in-service and on-the-job training of water technicians.

Descriptions: Short courses, workshops, and other in-service and on-the-job training will be offered according to the training plan and course curricula developed under Task 5. Training activities will include refresher training, supplemental updating of knowledge and skills to meet changing needs of water technicians for supplemental specialized training, and professional development. Short courses will be developed and presented at SCOT. Where necessary trainees will be trained abroad.

Responsibilities:

Overall oversight of in-service training WG(W)

Conduct of individual training activities as per in-service training plan

PROJECT 9

Training of Health Inspectors

Need

Training of Health Inspectors in Swaziland began in 1980 with support from WHO and is carried out at the Institute of Health Sciences. Training was originally designed to meet the demand for Health Inspectors in Botswana, Lesotho, and Swaziland. Since its inception, however, there has been no further assessment of the training needs of health inspectors or of the ability of the curriculum to meet these needs. There is, however, reason to undertake such a review and assessment at this time in view of:

- changing job requirements and responsibilities resulting from recent changes in operational programs
- the imminent expiration of the WHO project in support of Health Inspector training, and
- expanded staffing of the Health Inspector training program providing an opportunity to complete an assessment and redesign of the curriculum as indicated.

The need is sectorwide, and this assessment therefore involves all major employers of Health Inspectors and faculty of the Institute of Health Sciences. To assure that regional needs are met, similar assessments should ideally be undertaken in Botswana and Lesotho.

Objectives

The objectives of Project 9 are to review job descriptions for Health Inspectors in light of actual job duties performed and skills needed and to design and provide adequate pre- and in-service training for Health Inspectors.

Outputs/Products

The following are the outputs for this project:

- job performance requirements data for Health Inspectors
- job descriptions to reflect more accurately their actual duties, responsibilities, and skill requirements
- training needs based on job performance information and analysis of job description
- revision of curricula and training to reflect identified needs, and
- implementation of pre-service and in-service training programs and courses for Health Inspectors.

Timing

Task 1: May-July 1988
Task 2: August 1988
Task 3: September-November 1988
Task 4: February-March 1989
Task 5: April 1989
Task 6: June 1989

ACTIVITIES

Task 1: Analysis of Job Performance Requirements for Health Inspectors

Objectives: The objectives of Task 1 are to determine skills required to meet demands of Health Inspectors jobs as they exist at present and to identify entrance qualification and pre-service experience of candidates for health inspector training and practicing Health Inspectors, and to assess in-service training with respect to effectiveness and scope.

Description: Information will be obtained from all Health Inspectors on the following:

- educational qualifications (JC, COSC, Grade, Subjects)
- pre-service training (SIHS or elsewhere)
- on-the-job training
- in-service training (identify courses and institution)
- jobs held/areas of experience, and
- present activities and allocation of time to each.

In addition, assessments will be obtained from health inspectors and their supervisors concerning the scope, suitability, and quality of skills acquired during pre-service training and whether they meet the needs of the job.

Information collected will be organized and analyzed to meet defined objectives and provide a basis for implementing the assessment of training needs (Task 3) and the curriculum review (Task 4). It will also be entered into the data bank (Project 2 above).

Responsibilities:

Design of data collection formats	WG
Collection of file data	SHI/CHI
Collection of field data	Training officer, Interviewers
Analysis of data	WG

Task 2: Review and Revision of Job Descriptions

Objectives: As a result of changes in the nature of tasks performed by health inspectors, job descriptions and skills required have changed in recent years. It is the purpose of Task 2 to redefine the job descriptions of health inspectors and the skills health inspectors must possess to:

- facilitate yearly evaluation of job performance
- identify individual training needs and career development choices, and
- provide a basis for assessment of overall sectoral training needs.

Description: Job descriptions for all health inspectors will be reviewed in the light of information obtained under Task 1. The correspondence will be determined between duties and responsibilities and required concepts and skills specified in the existing job descriptions and tasks actually performed or skills actually needed. Tasks currently omitted may include for example:

- control of malaria, schistosomiasis, and other infectious and communicable diseases
- insect and rodent control
- organization and planning of program and work
- management and supervision
- planning and execution of water source protection, latrine construction, and on-site wastewater disposal.

Job descriptions of health inspectors will be revised to reflect actual tasks performed, responsibilities, and knowledge and skills required. Revised job descriptions will be submitted as required through ministries to the Ministry of Labor and Public Service and will be available to the TSG for analysis of sectoral training needs.

Responsibilities:

Review and revision of job descriptions	CHI/SHI
Training Officers Analysis of tasks performed and skills requirements	CHI/SHI/Training officers
Submission of revised job descriptions	Training Officers

Task 3: Assessment of Training Needs

Objectives: From revised job descriptions and analysis of pre-service training, entrance qualifications, and in-service training (Task 1), to identify knowledge and skills required in training of health inspectors to meet sectoral needs and define pre- and in-service training needs of health inspectors.

Description: The results of the analysis of knowledge, skills, and job performance of Task 1 and the results of the analysis of job descriptions of Task 2 will be compared to identify and define specific sectorwide training needs with respect to (1) the basic set of knowledge and skills required of all health inspectors and (2) special knowledge and skills required by health inspectors occupying specialized positions, e.g., in the Malaria, Bilharzia, or Public Health Engineering units.

Responsibilities:

Analysis of sectoral training needs WG

Task 4: Curriculum Review

Objectives: Based upon results of analysis of training needs (Task 3), the objective of Task 4 is to review existing curricula and design revised curricula.

Description: The existing curricula and in-service training offerings will be reviewed in the light of sectoral training needs identified under Task 3. Curricula will be revised as required with respect to:

- Pre-service training
 - curriculum content as related to training needs,
 - identification of gaps and areas needing strengthening in the existing curriculum staffing,
 - facilities required, and
 - equipment and materials required.
- In-service training
 - refresher courses,
 - supplemental training for selected specialities, e.g., malaria, bilharzia, public health engineering,
 - supplemental training for existing Health Inspectors trained prior to revision of curriculum, and
 - professional development.

New and revised courses required for pre-service training will be identified and their objectives and content will be defined. Staffing, facilities, equipment, and materials requirements will also be established. This task will serve also as part of a curriculum review under the new Health Inspector training project.

In-service training needs will be defined in terms of:

- in-country, regional, international short courses
- workshops
- on-the-job training, including follow-up supervision and support
- follow-up workshops, and
- apprenticeships.

These may include short courses offered thorough the Institute of Health Sciences.

Responsibilities:

Curriculum revision and review, planning of in-service training programs	WG/CHI/SHI/IHS
Pre-service curriculum review	WG/IHS/CHI

Task 5: Implement Revised Pre-service Curriculum

Objective: To implement pre-service training according to revised curriculum.

Description: Staffing will be established according to recommendations and proposals under Task 4. Facilities, equipment, and material will be provided as recommended under Task 4. Courses will be established and course materials developed by staff according to revisions and proposals prepared under Task 4.

Responsibilities:

Implementation of revised pre-service curriculum	IHS
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Task 6: Implement In-service Training Program

Objective: The objective of Task 6 is to implement in-service training program according to the training plan established under Task 4.

Description: Short courses, workshops, and other in-service and on-the-job training activities will be implemented according to the training plan and course curricula developed under Task 4. Training activities will include refresher training, supplemental updating of knowledge and skills to meet changing needs of health inspectors, supplemental specialized training, and professional development. Where necessary, trainees will be trained abroad.

Responsibilities:

Overall oversight of in-service training	WG
Conduct of Individual training activities	IHS,SHI, or as appropriate

PROJECT 10

Training of Health Assistants

Need

Training of Health Assistants was carried out in 1976. During this period approximately 44 Health Assistants were trained and employed by the Health Inspectorate where they were assigned to implement sanitation and spring protection projects in rural communities. Since 1976 there has been no further training of new Health Assistants, and in-service training, where it has taken place, has often been inappropriate. Attrition has reduced the number of Health Assistants working in the sector to about 30, or one for every 20,000 rural people. As a result of these events, the rapidly changing and expanding role of Health Assistants, and a rapidly increasing demand for their services as well as the implementation of linked water and sanitation projects, sector goals have been seriously compromised and progress has been retarded.

Objectives

It is the purpose of this project to increase the supply of Health Assistants active in rural areas to a level required to meet demands and implement sector development as planned and to prepare Health Assistants to meet their often-changing responsibilities. Specifically, the objectives of this project are to:

- Finalize and implement full-time pre-service training
- Design and implement an interim system for training of Health Assistants to meet immediate and urgent needs until full-time pre-service training can be started.
- To update skills of existing Health Assistants who have received little and often inappropriate refresher training or continuing education required for their changing and expanding responsibilities.

Outputs/Products

This program will result in the following:

- data on job performance requirements of the Health Assistants
- revised job descriptions to reflect more accurately actual duties, responsibilities, and skill requirements
- training needs based on job performance information and analysis of job descriptions

- recommendations to the MOH concerning appropriate steps to be taken to obtain funding and implement training
- interim systems for pre-service training based on assessed training needs
- in-service training for Health Assistants based on assessed training needs
- implementation of interim pre-service training
- implementation of full-time pre-service training, and
- implementation of an in-service training program.

Timing

Task 1: May-July 1988
 Task 2: August 1988
 Task 3: September-November 1988
 Task 4: February-March 1989
 Task 5: February-April 1989
 Task 6: May-June 1989
 Task 7: September 1989
 Task 8: January 1991
 Task 9: August 1989

ACTIVITIES

Task 1: Analysis of Job Performance

Objectives: The objectives of Task 1 are to determine skills required to meet demands of duties and responsibilities of jobs as they currently exist, to identify entrance qualifications and pre-service experience of assistants, and to assess in-service training with respect to effectiveness and scope.

Description: Information will be obtained from all Health Assistants on the following:

- educational qualifications
- pre-service training
- on-the-job training
- in-service training (identify courses and institution)
- jobs held/areas of experience
- present activities and allocation of time to each.

In addition, assessments will be obtained from Health Assistants and their supervisors concerning the scope, suitability, and quality of skills acquired during pre-service training and whether they meet the needs of the job.

Information collected will be organized and analyzed to meet defined objectives and provide a basis for assessment of training needs (Task 3) and curriculum designs (Tasks 4-6). It will also be entered into the data bank (Project 2 above).

Responsibilities:

Design of data collection formats	WG
Collection of file data	SHI/CHI/TO
Collection of field data	SHI/TO/Interviewers
Analysis of data	WG

Task 2: Review and Revision of Job Descriptions

Objectives: As a result of changes in the nature of tasks performed by Health Assistants, job descriptions and skills required have changed in recent years. It is the purpose of Task 2 to redefine the job descriptions of Health Assistants and the skills Health Assistants must possess to:

- facilitate yearly evaluation of job performance
- identify individual training needs and career development choices, and
- provide a basis for assessment of overall sectoral training needs.

Description: Job descriptions for all Health Assistants will be reviewed in the light of information obtained under Task 1. The correspondence will be determined between duties and responsibilities and required concepts and skills specified in the existing job description and tasks actually performed or skills actually needed. Tasks currently omitted may include for example:

- control of malaria, schistosomiasis, and other infectious and communicable diseases
- insect and rodent control
- organization of work; work planning
- planning and execution of water source protection, latrine construction, and on-site wastewater disposal

Job descriptions of Health Assistants will be revised to reflect actual tasks performed, responsibilities, and knowledge and skills required. Revised job descriptions will be submitted as required through ministries to the Ministry of Labor and Public Service and will be available to the TSG for analysis of sectoral training needs.

Responsibilities:

Review and revision of job descriptions	CHI/SHI/TO
Analysis of tasks performed and skills requirements	CHI/SHI/TO
Submission of revised job description	TO

Task 3: Assessment of Training Needs

Objectives: From revised job descriptions and analysis of pre-service training, entrance qualifications, and in-service training (Task 1), the objectives of Task 3 are to identify knowledge and skills required in training of Health Assistants to meet sectoral needs, and define pre- and in-service training needs of Health Assistants.

Descriptions: The results of the analysis of knowledge, skills, and job performance under Task 1 and the results of the analysis of job descriptions under Task 2 will be compared to identify and define specific sectorwide training needs with respects to (1) the basic set of knowledge and skills required of all Health Assistants and (2) special knowledge and skills required by Health Assistants occupying specialized positions, e.g., in the Malaria or Bilharzia units.

Responsibilities:

Analysis of sectoral training needs	WG
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Task 4: Curriculum and Training Plan Review

Objective: Based on results of analysis of training needs (Task 3), the objective of Task 4 is to review proposed curriculum and plan for pre-service training of Health Assistants and revise as necessary.

Description: The proposed curriculum for Health Assistant training (prepared by the WHO consultant) will be reviewed, with specific reference to needs identified during earlier analysis.

A proposal will be prepared for funding based upon the final revised curriculum. This must include institutional arrangements for carrying out training.

This task will conclude with submission of the proposal for approval, funding, and related support through appropriate channels.

Responsibilities:

Review of proposed curriculum	SHI/WG/IHS
Preparation of proposal	SHI/TO
Submission of proposal	TO

Task 5: Interim Training Plan

Objectives: Based upon results of analysis of training needs (Task 3), the objectives of Task 5 are to design curriculum and plan for an interim program for training of Health Assistants employing:

- short orientation and introductory course
- short formalized training courses, and
- supervised on-the-job training and follow-up to short courses.

Description: In developing an interim training plan for recruited Health Assistant trainees and generalized Health Assistant training, the following guidelines will be considered as an interim alternative to full-time and more formalized training proposed under Task 4:

A relatively short (approximately one-month) introductory course should be considered, emphasizing the basic features of the national Primary Health Care Program, the supportive and referral roles of government health personnel, and practical instruction (including "hands-on" experience) on spring protection and latrine construction. This course should be made available to all existing Health Assistants, incumbents as well as new recruits, totaling about 150 in all. This would require six or seven repetitions of the course for 20 to 25 Health Assistants each. It should be planned and conducted if possible by SIHS staff at the SIHS. Consideration should be given to utilizing international resources.

The introductory field course should be followed by a program of field training and specialized short courses. Health Inspectors would be directly involved and play a major role in providing water supply, sanitation, and vector control field training. They will provide planned on-the-job training for Health Assistants, including supervision of latrine construction and spring protection and will assure that technical and logistic elements are constantly available on site for the Health Assistants.

Generalized Health Assistants should be deployed initially to areas where their specialized experience (e.g., malaria control, schistosomiasis control) will be applicable. All trainees should receive guidance and support from the Health Inspector of the region to which he/she is assigned in preparing periodic work schedules and lists of needed supplies. Once a year, the Health Assistant should participate in a review of his/her progress under the

training program, the written record of which should include the following elements:

- the incumbent's statement of achievements, advances, shortfalls, and reasons for shortfalls
- supervisor's comments
- incumbent's initial or additional comment
- endorsement/comment of chief of the regional health team
- endorsement of the Chief Health Inspector (the completed annual performance appraisals will be filed in MOH personnel office), and
- review with IHD Faculty.

In addition to on-the-job training under the Health Inspectorate, apprenticeships should be considered in specialized areas of responsibility such as spring protection (with the Rural Water Supply Board) or malaria and bilharzia control.

In addition to the introductory course, other short courses should be considered to provide group instruction and discussion.

The proposal should, in addition, clearly identify responsibilities for implementing tasks and contain a proposed scheme of service and budget. The scheme of service should include both a grading and a promotion scheme. The budget should include requirements for external funding or other support.

Responsibilities:

Design of curriculum and proposal	SHI/PPO/TO/IHS
Approval of plan of MOH	PO
Submission to MOLPS	HP/PPO/TO

Task 6: In-service Training Plan

Objectives: Based upon results of analysis of training needs (Task 3), the objective of Task 6 is to design a curriculum and program as well as a plan for implementing in-service training of health Assistants utilizing as required:

- workshops
- short courses
- apprenticeships

- on-the-job training and follow-up

Descriptions: In order to provide existing Health Assistants with additional background and skills required to meet identified changing needs and to provide periodic refresher training, a program of in-service training will be developed to cover a two-year period. This program will be based on the analysis of training needs and will include appropriate means for providing training as identified above.

Curriculum and content will be designed.

Based upon program and curriculum, a proposal will be prepared for implementation identifying external support needs. This proposal will be submitted as appropriate through the MOLPS.

Responsibilities:

Program design	SHI/WG
Curriculum design	SHI/WG
Approval and submission to MOLPS	HP/PPO/TO

Task 7: Implementation of Interim Training Plan

Objectives: The objective of Task 7 is to implement interim pre-service training for Health Assistants.

Descriptions: Following necessary approvals of the training plan, scheme of service, and establishment of positions, responsible persons will take appropriate action to obtain funding and carrying out interim pre-service training program.

Responsibilities:

Overall coordination of interim training program	SHI/TO
Implementation	Identified in training plan

Task 8: Implementation of Full-time Pre-service Training

Objectives: The objective of Task 8 is to implement full-time pre-service training for Health Assistants.

Description: As indicated in proposal.

Responsibilities: As indicated in proposal.

Task 9: Implementation of In-service Training

Objectives: The objective for Task 9 is to implement the in-service training program for Health Assistants.

Descriptions: Short courses, workshops, and other in-service and on-the-job training activities will be implemented according to the training plan and course curricula developed under Task 6. Training activities will include refresher training, supplemental updating of knowledge and skills to meet changing needs of Health Assistants, and supplemental specialized training.

Responsibilities:

General oversight of in-service training	WG
Conduct of individual training activities	IHS, HI or as appropriate

PROJECT 11

Training of Artisans

Need

While it is anticipated that artisans will be trained at SCOT and VOCTIM in excess of needs, the premium in years to come will be on training to meet specific needs of the water and sanitation sector.

Objectives

The objectives of Project 11 are to provide pre-service training to meet sectoral needs for artisans and to provide in-service training to meet the needs of artisans for improvement of skills and acquisition of new skills as required.

Outputs

The following will result from this project:

- information relating to training and job performance requirements of artisans
- revised job descriptions to reflect accurately duties and skills required
- a "cooperative" pre-service training program and in-service training for employed artisans.

Timing

Task 1: July 1988

Task 2: July 1988

Task 3: September 1988-May 1989

Task 4: September 1988-May 1989

Task 5: January 1989

Task 6: July 1989

ACTIVITIES

Task 1: Assessment of Pre-service Training Needs Objectives

Objectives: The objectives of Task 1 are to assess pre-service training needs based upon skills possessed by artisans and skills required to meet demands of jobs as they exist at present and to assess entrance qualifications and the pre-service experience of employed artisans.

Description: Criteria will be developed for attaining a sample of the activities and skills needs of artisans working in the water sector. Information then will be collected from selected artisans on the following, including dates:

- educational qualifications (primary school certificate, JC, etc.)
- pre-service training (formal, apprentice, certificates)
- on-the-job training in sector agency.
- jobs held
- present tasks and allocation of time to each.

In addition, information will be obtained from each selected artisan and his/her supervisor concerning their judgment of the skills acquired during the pre-service training or the on-the-job training. (All information will go to the data bank, Project 3.)

Responsibilities:

Design of data collection format	WG(W)
Collection of file data	SE, RWSB
Collection of field data	SE, RWSB: Dir., WSB
Analysis of data	WG(W)

Task 2: Review and Revision of Job Descriptions

Objectives: The objective of Task 2 is to review job descriptions and redefine as necessary.

Descriptions: The job description for the selected water artisans will be reviewed to determine the correspondence between the skills specified in the job description and those needed to perform satisfactorily the tasks actually assigned to each of them. Note will be taken of essential skills which have been omitted from the job descriptions, and these will be drawn to the attention of the artisans' employers with appropriate recommendations.

Responsibilities:

Review and revision of job descriptions	SE, RWSB; Dir., WSB
Analysis of skills requirements	SE, RWSB; Dir., WSB
Submission of revised job descriptions	PPO, MONR

Task 3: Plan and Design "Cooperative" Pre-service Training

Objectives: From revised job descriptions and analysis of pre-service training needs, the objectives of Task 3 are to identify skills which must be developed during pre-service training and to design a "cooperative" training program.

Description: Water artisans work in all agencies as carpenters, masons, plumbers, mechanics, electricians, and occasionally as assistants to technicians. Few artisans have had formal training. Neither the available courses nor pre-service apprenticeships in the private sector have prepared them for protecting springs, constructing concrete reservoirs, laying pipelines, etc. This activity (organization of a "cooperative program") will comprise:

- a review of the information from Tasks (1) and (2)
- designing one or more water artisan "cooperative courses" in co-operation with VOCTIM or SCOT
- seeking agreement in principle of a "cooperative" training program, and
- seeking government funding or donor support to cover the cost of the formal training.

Responsibilities:

Skills identification	WG(W)
Design of "cooperative" program	WG(W), SCOT, VOCTIM

Task 4: Design In-service Training of Artisans

Objectives: The objective of Task 4 is to develop an in-service training program to improve and broaden the skills of artisans.

Descriptions: Short courses will be developed in cooperation with water agencies and one or more training institutions to enable incumbent artisans to enhance or to diversify their manual skills, especially in spring protection, reservoir construction and pipe laying. A new role for which artisans will need new skills is that of a drilling team assistant. (Short courses will be developed independent of the long-term co-operative training program.)

Responsibilities:

Design of in-service training	WG(W)
Programs	SCOT, VOCTIM

Task 5: Implementation of "Cooperative" Pre-service Training

Objective: The objective of Task 5 is to initiate "cooperative" pre-service training.

Description: A trial project will be designed to train water artisans for employment in WSB and RWSB. It is suggested that WSB and RWSB each agree to employ 20 masons as trainees. At the end of a period to be determined (e.g., two years), the successful candidates would become qualified water artisans. During the training period, each candidate would spend equal periods in formal training and on the job. To accommodate the gradually increasing agency labor demand, the following plan would be followed. The 20 candidates would be divided into four groups of 5 (A, B, C, D) who would be deployed as follows:

Semester	Groups at institutions	Groups WSB	on-the-job RWB
I 88	A + B	-	-
II 88	C + D	A	B
I 89	A + B	C	D
II 89	C + D	A	B
I 90	-	A + C	B + D
II 90 etc.	-	A + C	B + D

In 1989 the cooperative training plan for water artisans would be evaluated and a decision made by the water agencies to continue or to discontinue it.

Responsibilities:

The same as indicated in the plan for "cooperative" pre-service training, in Task 3 above.

Task 6: Implementation of In-service Training

Objective: The objective of Task 6 is to initiate in-service training

Description: As indicated in training plan.

Responsibilities: As indicated in training plan.

APPENDIX A

References

APPENDIX A

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APPENDIX B

Officials Contacted

APPENDIX B

Officials Contacted

Ministry of Health	Principal Secretary Chief Public Health Inspector Asst. Chief Health Insp. Sen. H.I. detached to RWSB PHC Project Tutor Hhohho Reg. Health Asst. Manzini Act. Reg. Hlth Insp. Manzini Reg. Health Insp. Dir. Health Education Unit Dir. Health Education Unit WHO Tutor in Envir. Hlth	Tim Zwane Leslie Mtetwa Richard Mamba Dudu Dube Margaret Croce Wilson Nkampule Jeey Nxynala Joseph Matsenjwa Pinera Mthembu Nester Shongwe Frank Maitin
Ministry of Natural Resources, Land Use and Energy	Under-Secretary Training Officer Planning Off./Economist Rur. Wat. Sup. Board Senior Eng. RWSB Public Hlth Eng. RWSB Pub. Hlth Engg. Advisor RWSB Cadet Engineer Manzini Dist. Clerc of Wks RWSB Manzini Microtechn. RWSB Manzini Com. Dev. Off RWSB Manzini Technician RWSB Manzini Lab. Techn. RWSB Manzini Lab. Techn. RSWB Foreman Grade 1 Wat. & Sew. Board Director WSB Asst. Dir (Technical) WSB Planning Engineer WSB Surveyor WSB Constr. Dept. C.O.W. WSB Manzini Op. & Maint.C.O.W. Wat. Resources Br.Sen.Wat.Eng. WRB Water Control Engineer Dept. of Geol.Surv. & Mines Assistant Director Housing Branch Resp. Officer	A.N.N. Maseko Dumisele Mavimbela June Richards Napoleon Ntezinde Madoda Dlamini A.W. Hoadley Melvin Mayisela Emanuel Lukele Tembe Nkambule Elija Skonje Joel Mabuza Zaneli Nkohyane Victoria Dlamini Sipho Matisa P.M. Mbhamali Cailus Dlamini S. Jegatheesan A. Sibandze S. Malambe R. Groning Robert Thabede Steven Dlamini A.M. Wilakati K.A.H. Mazawa
Ministry of Agriculture	Land Use Planning represent.	John Jabu
Min. of Labor and Public Service	Management Services Div.	Rep. Milton Dlamini

Dept. of Economic Planning		Michael Adamson
Mbabane Town Council		A.S. Mabusu
Manzini Town Council	Town Clerk (Act.) Chief Health Inspector (Act.)	C.D. Nxumalo Motsa
Ministry of Interior	Township Engineer	
University of Swaziland	Dean Faculty of Science	Abraham Xaba
Swaziland College of Technology	Princial Vice Principal Head Construction Department Head Teach.Train.& Curr.Dev. Dept.	L.B. Lukhele R.E. Lewy J. Atteu I. Philip
Vocational and Commercial Training Inst. Masapha	Assistant Project Head	Joseph Ulrich
Swaziland Inst. of Management and Public Admin.	Principal	M.J. Ziyane
Institute of Dev. Management	Swaziland Country Director	Bhekhe Dlamini
UN Development Programme	Resident Representative	C.P.C. Metcalf
European Economic Community	Technical Attache	W. Polderman
Canadian Embassy Pretoria	Counsellor (Development) Counsellor (Dev.) Designate	Irene Mathias David Viveash
British High Commission	Aid/Commercial Attache	Graeme Gibson
USAID	Regional Hlth & Popn Officer Asst. Health Dev. Officer Asst. Health Dev. Officer Swaz. Manpower Dev. Proj. Ch. of M. S&T/H Washington S&T/H Washington Director of WASH Project Deputy Dir. WASH Program WASH Resp. Officer for ACT 354	Alan C. Foose Mary P. Selvaggio Renata Perry Louis Mitchell John Austin Dennis Long Leo A. St. Michel Dennis Warner Fred Rosensweig

APPENDIX C

Team Itinerary

APPENDIX C

Team Itinerary

AUGUST

- 12-13 Team planning meeting and briefing of AID representatives at WASH office.
- 16 Team arrived in Swaziland. First meeting with RWSB Public Health Engineering Advisor.
- 17 Meeting at USAID. Meeting with Under-Secretary Ministry of Natural Resources Land Use and Energy. First meeting with National Action Group Technical Subcommittee. First meeting with RWSB staff.
- 18 First meeting with Principal Secretary Ministry of Health.
- 20 First meeting with MOH Chief Health Inspector. Meetings with representative of Department of Economic Planning and UNDP Resident Representative.
- 21 Meetings with Principal SIMPA and Assistant Principal SCOT. First meeting with WSB Planning Officer.
- 24 Meetings with Principal SIMPA, Assistant Principal, Head Building Department and Head Teacher, Training and Curriculum Development Department of SCOT, Principal and WHO Tutor IHS, Director HEC and Technical Attache' EEC.
- 25 Meetings with MOH Chief Health Inspector and Deputy Chief of Personnel. Meeting with representative of MOAC/LUPS.
- 26 Meeting with WRB Senior Water Engineer and staff and with WSB Director and staff. Meeting with Mbabane Town Council. Meeting with PHC Training Officer.
- 27 Field Trip to Siphocosini Valley, Bhunya, Manzini PHE Laboratory and Manzini Regional Health Office.
- 28 Field Trip to Manzini Regional RWSB Office

SEPT.

- 1 Visit to Manzini Town Council and Health Inspectorate. Second meeting with Technical Sub-Group.
- 2 Meeting with USAID Regional Health and Population Development Officer and staff. Meeting with British High Commission AID/Commercial Attache. First meeting with representative of MLPS/MSD.
- 3 Visit to WSB installations and offices in Manzini. Meeting with Canadian government representatives.
- 4 Visit to UNISWA and meeting with Dean of Faculty of Science. Visit to VOCTIM and meeting with Assistant Project Head.
- 4 Meeting with Health Inspector attached to RWSB Headquarters. Mbabane.
- 8 Meeting with Ministry of Labor representative and staff from RWSB and WSB.
- 9 Meeting with Mr. Bhekie Dlamini, Swaziland Country Director of the Institute of Development Management.
- 10 Final Meeting with TSG.
- 11 Wrap up meeting with USAID Mission
- 12 Team leaves the field

APPENDIX D

Occupational Groups and Component
Occupations for Water Sector Agencies

OCCUPATIONAL GROUPS AND COMPONENT OCCUPATIONS FOR RWSE

OCCUPATIONAL TITLE	GRADE
PROFESSIONAL	
Senior Engineer	22
Planning Engineer	21
Design Engineer	20
Clerk of Works	19 to 17
Water Quality Analyst	17
Public Health Engineer	17
Accountant	16
Advisors	
TECHNICAL	
Inspector of Works	17 to 16
Community Development Officer	16 to 15
Foreman	15
Draughtsman	15
Engineering Assistant	15
Water Technician	14 to 12
Mechanical Technician	14
Construction Technician	14 to 12
Asst Community Development Officer	13
Static Plant Mechanic II	12
Micro Technician I	12
Maintenance Techn	12
Technician Assistant WC	8
Lab Technologist	.
Lab Technician	14 TO 8
IVS Water Qual Techn	
IVS Maintenance Techn	
Microtechnician	
ARTESANS	
Builders/Bricklayers/Plasterers	14 to 10
Plumbers/Pipefitters	14 to 10
Carpenters	14 to 10
Motor Mechanic	14
Mechanics	14 TO 12
Artisans and apprentices	10 to 14
Welders	10
Fitter & Turner	10
Drivers	9 TO 7
Heavy Plant Operator	9
ADMINISTRATIVE/CLERICAL	
Storekeeper	12
Senior Clerical Officer	10
Administrative Support	10 to 6
Typist	9 to 7
Junior Clerical Officer	6
Storeman	6
Nightwatchman	3
Messenger	3
Cleaners	1
LABOURERS	
Induna Laborer	5 to 1
Labourers	1

DETAILED OCCUPATIONAL GROUPINGS AND 1986/7 POSTS
 FDF WSB

POSTS OCCUPATIONS/GROUP	GRADE
PROFESSIONAL	
1 Director	24
Senior Water Engineer	22
2 Asst Director	22
9 Financial Controllers/Accountants	22 to 15
1 Surveyor	20
1 Training Officer	20 to 19
4 Engineer	20
1 Chemist	20
Data Processing Officer	19
2 Personnel Officer	19 to 15
4 Clerk of Works	19
1 Transport Officer	18 to 14
Cadet Engineer	17
TECHNICAL	
1 Instrument Mechanic	17
4 Draughtsmen	17 to 14
12 Inspector of Works	17 to 16
1 Lab Technician/Technologist	17
2 Technical Electrician	15
5 Building/Workshop Foreman	15 to 14
1 Surveyor Technician	15 to 14
4 Technician	15
5 Static Plant Mechanic	15 to 9
1 Panel Beater/Spray Painter	14 to 10
21 W/Works Supervisors	13 to 16
2 Water Sewage Work Supervisor	12 to 13
4 Lab Asst	11 to 8
ARTISAN	
10 Motor Vehicle Mechanic	14 to 9
Carpenter	14 to 11
5 Electrician/Technician	14 to 9
33 Plumber	14 to 6
9 Builder	14 to 9
3 Welder	14 to 6
4 Survey/or Assistant	13 to 6
45 Drivers/Operators	10 to 5
1 Steel Fixer	10
Pointers	10 to 14
Trainee Electrician	9 to 8
Drainlayer/Pipefitter	9 to 13
Painter	9 to 13
13 Meter Reader	9 to 4
Technical Assistant	8
79 Water/Sewer Attendant	8 to 5
Bricklayer (untested)	6
Tyre Repairer	3
Pump Attendant	2 to 1
ADMIN/CLERICAL	
1 Personal Secretary	17 to 14
4 Storekeeper	14 to 11

1 Mechanical Storekeeper	14
9 Asst Accounts Officer	14 to 5
Asst Accountant	12
19 Accounts Officer	10 to 7
Billing Officer	9
4 Clerical Officer	8 to 7
1 Progress Control Clerk	8 to 7
9 Shorthand Typists	7 to 9
5 Storeman	6 to 5
2 Junior Clerical Officer	6 to 5
5 Induna	5
Treasurekeeper	5
2 Groundsman	5 to 4
6 Security Guard	5 to 4
General Asst	4
2 Telephonist	4 to 3
12 Night Watchman/Gateman	4 to 3
Cleaner	3 to 2
2 Messenger	3 to 2
LABOURERS	
Labourers	1 to temp
OTHER	
14 Other occupations	

392 TOTAL ESTABLISHED POSITIONS 1986/87
from Establishments Register 1987/88

OCCUPATIONAL GROUPS AND COMPONENT OCCUPATIONS FOR THE WATER
RESOURCES BRANCH

PROFESSIONAL

Senior Water Engineer
Water Resources Engineer
Hydrologist
Water Control Officer
Dam Supervisor
Chemist
Trainee Hydrologist
Trainee Meteorologist
River Biologist
Meteorologist

TECHNICAL

Hydrology Technician
Trainee Hydrology Technician
Trainee Technician
Hydrology Assts
Met Assistants
Water Bailiff
Dam Operator
Water Guards
Construction Foreman
Lab Assts
Lab Tech
Data Processing Technicians

ARTISANS

Drivers

ADMINISTRATIVE/CLERICAL

Typist
Accounts Clerk
Junior Clerical Officer

LABOURERS

Labourers

APPENDIX E

**Pre-service and In-service Training Available in
Swaziland for Positions in the Water Supply and Sanitation Sector**

APPENDIX E

Pre-service and In-service Training Available in Swaziland for Positions in the Water Supply and Sanitation Sector

1. MANZINI INDUSTRIAL TRAINING CENTER

This is a privately supported school for crafts training which offers short duration courses and which partially offsets its operational costs by selling goods and services produced by students.

2. EDUCATIONAL AND COMMERCIAL TRAINING INSTITUTE MATSAPHA

Organization and purpose

The Institute was opened in 1987. Its objective is to provide systematic training at craft level emphasizing practical skills to secondary school leavers and other young unemployed persons with the aim of helping Swaziland's public and private sector establishments to recruit skilled craftsmen and clerical workers from the local market and with the additional aim of promoting self-employment. The Institute is operated under the responsibility of the Ministry of Education and is supported technically and financially by the Federal Republic of Germany and the European Economic Community.

Facilities and fees

The Institute occupies classrooms, shops, and living facilities on a large tract of high land near UNISWA. The staff includes nine Swazi and six expatriate teachers. There are at present 60 students and the capacity of 240. The cost is at present 60 students and the capacity of 240. The cost is partially subsidized by the Ministry of Education, but Day students pay about E 400 (E 1.97 = US \$1) per year for tuition and lunch and boarders pay about E 500 per year.

Programs

The initial course offerings are:

building and construction	12 students/year
woodwork	12 students/year
mechanical engineering	24 students/year
automotive engineering	24 students/year
bookkeeping and accounting	24 students/year
secretarial studies	24 students/year

It is planned to add other programs later, and plumbing is likely to be included.

The program for commercial subjects lasts one year. The program for technical subjects lasts four years, of which a total of two years will be passed at the Institute and two years interspersed in planned apprenticeship with the trainees' future employers in a "dual training system." The students may take trade test III after three years and trade test II after five years.

The concept of the Institute is to give the student an in-depth practically oriented training and to assist the employer to carry out systematic instruction. For this reason the Institute considers it preferable that the student and the future employer enter into an apprenticeship contract.

Previous water sector trainees

No trainees are at present earmarked for the water sector agencies.

3. SWAZILAND COLLEGE OF TECHNOLOGY

Organization and purpose

The Mbabane Trade School, established in 1946 to teach building and carpentry, became the Swaziland Industrial Training Institute in 1967. After the addition of technician training it became in 1967 the Swaziland College of Technology. Its institutional mission is to provide training to engineering craftsmen and technicians, for commercial and catering personnel and for teachers of these specialties. The College is entirely supported by the Government, although certain of its programs receive external assistance.

Facilities and fees

The College's classrooms, laboratories, administration, hotels and kitchen for 600 students occupy 34 buildings on a space of about five hectares. The College has a teaching staff of 67 and an administrative staff of five. Foreign students pay about E 2,500 per year for tuition, board and lodging. Swazi students pay about E 500-600 per year depending on the program followed.

Programs

The 42 courses currently offered are given by eight teaching sections:

Engineering & Science Dept.	Mechanical Engineering Section
	Electrical Engineering Section
	Automotive Section
Construction Department	Building Section
	Woodwork Section
Commercial and Catering Dept.	Commercial Section
	Hotel and Catering Section

Teacher Training and Curriculum Development Department and Services Section

The water technicians training program includes the following subjects:

Part I (12 months)	Part II (6 months)
Piping and plumbing	Planning, design, construction,
Construction	operation and maintenance of:
Concrete	Springs, dams, intakes, rainfall
Surveying	catchments
Topographic mapping	wells
Drawing	pumps
Water Quality	water treatment systems

Hydraulics	sanitary sewer systems
Mathematics	sewage treatment systems
	solid waste treatment
	Water distribution/sewage collection
	water resources
	Practical projects (design and construction)
	Project management and Technical English

Previous water sector trainees

From January 1985-June 1987 24 Swazis followed the water technicians program, 18 completed part I and 12 completed Part II. Of the completers of Part II, the subsequent employment was as follows:

WRB	1	8%
RWSB	5	45%
WSB	3	25%
SRW	1	8%
overseas study	1	8%
private sector	1	8%
		100%

From 1980-1985, four draftsmen and one engineering assistant of the WSB completed either or both parts I and II of the Construction Technicians program. From 1983-1985 six WSB technicians completed part II of the electrical technicians program. In 1985 four WSB inspectors of works/foremen completed the construction site supervision course.

4. SWAZILAND INSTITUTE OF HEALTH SCIENCES

Organization and purpose

The Institute is an autonomous educational institution within the Ministry of Health mandated to train various categories of paramedicals to meet the health needs of the Kingdom of Swaziland. It works with approved service delivery agencies to provide structured practical learning experiences for students.

The Institute's program and the development of its physical infrastructure have been supported by USAID, WHO, and other organizations.

Facilities and fees

The Institute classrooms and laboratories are housed in a single building, adjacent to which the Health Education Center occupies a separate building. The Institute faculty, including guest lecturers currently numbers 41. One tutor teaches environmental health.

Program

The major program areas are dental health, environmental health and nursing. The environmental health program has the following subjects over a three year period.

Mathematics	44 hours
Physics and Chemistry	88
Anatomy and physiology	220
Microbiology and parasitology	88
Public health legislation	44
Health education	88
Water supply (given at SCOT)	308
Food technology	484
Building construction (given at SCOT)	396
Insect and vermin control	132
Public health practice and administration	220
Integrated urban and rural development	220
Wastes collection, treatment and disposal	264
Epidemiology and communicable diseases	176
Environmental and occupational health	88
Social medicine and community health	110
Maternal child health and family planning	110
Port sanitation and international health	88
First Aid	88
Sanitation programs	110
Field visits and private study	924
Total	4,290 hours

Previous water/sanitation sector trainees

From 1983-1987 43 Swazis (including 12 women) completed the course.

5. SWAZILAND INSTITUTE OF MANAGEMENT AND PUBLIC ADMINISTRATION

Organization and purpose

The objectives of the Swaziland Institute of Management and Public Administration are to reduce the critical managerial constraints on the capabilities of the Civil Service through training, to develop the institutional capability of public sector institutions to meet their developmental objectives, to enhance performance standards in the public sector, to assist the Government to meet its manpower commitment to the Southern African Development Coordinating Conference, and to lay a firm foundation for initiating research in the operations of public sector institutions in Swaziland. The Institute is entirely supported by the Government, but some of its programs receive external assistance. Started with help from Ford Foundation, NORAD, CIDA.

Facilities and fees

The Institute occupies three buildings on a three hectare plot outside Mbabane. It has lecture and seminar facilities and a conference center for 200 persons. The library of management, finance, public administration and government publications is accessible for reference purposes. Accommodation is available for out-of-town students. The Institute has six IBM compatible microcomputers. It has software for "integrated accounting" used in private sector training. It is developing software for public sector and education applications. The teaching staff comprises seven full time instructors and will soon number 11. Fees vary with individual courses.

Programs

The Institute has four program areas each of which has courses of interest and relevance for upgrading the administrative knowledge and skill of sector personnel. The present courses are:

water sector training

Accountancy and financial management

Financial management and budgeting	4 weeks
Certificate in accounting AAT	6 months
Inst. of Bankers certif.	33 weeks
SIA level I	40 weeks
ACCA level I	9 months
AAT first year	9 months
AAT level 2	34 weeks
AAT level 3	34 weeks
Storage and stock control	2 weeks

General management and supervision

Managing educational institutions	2 weeks
General management	4 weeks
Supervisory skills development	4 weeks
Induction	3 weeks
Public relations	2 weeks

Personnel management and industrial relations

Introduction to personnel management	2 weeks
Training of teachers	4 weeks
Introduction to industrial relations	2 weeks

Computer sciences

The computer as a tool for the manager	2 weeks
Computer applications in accounting	3 weeks
Introduction to the Basic language	7 weeks
Understanding computers	3 months
Advanced programming in Basic language	7 weeks
Word processing theory and practice	4 weeks

Previous water sector trainees

Twenty-five in-service trainees were sent from water sector agencies in recent years (see above)

6. INSTITUTE OF DEVELOPMENT MANAGEMENT

Organization and purpose

The IDM was established in 1974 to provide education and training for middle level and senior managers and administrators in civil service, parastatal organizations and the private sector in Botswana, Lesotho and Swaziland. Since 1975 it has included also training of first line supervisors and clerks. The IDM Management Resource Center undertakes consultancies and related research to assist management. The IDM is autonomous and is governed by a Board composed of representatives of government, industry and universities in each country of the region.

Facilities and fees

Courses given in each country are open to participants from all three. The center in Mbabane will shortly have its capacity and hotel facilities enlarged. The faculty in the three countries consists of 23 full time and three part-time lecturers and the administrative staff consists of 24 persons. Attendance fees for short courses are about E 200 per week for day students and E 300 per week for boarders.

Programs

Of the 72 courses listed in the 1987 catalog, the following appear to be of potential use to professional and technician members of the water supply and sanitation agencies.

Accounting and finance

Accounting I	3 weeks
Accounting II	3 weeks
Internal auditing	4 weeks

Business Administration and Management

Purchasing and supply management	4 weeks
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Communication

Communication for managers	6 weeks
Effective written communications	3 weeks
Public relations	3 weeks
Public speaking skills	2 1/2 weeks

Training and development

Training skills	3 weeks
Training and coordination	3 weeks

Electronic data processing

Computer appreciation for managers	11 days
Management information systems	4 weeks
Introduction to microcomputers	1 week
Word processing	11 days
Database	2 weeks

General management

Introduction to management	4 weeks
Certificate in management	18 weeks
Organizational behavior seminar	2 weeks
Human resources planning and forecasting (concepts, approaches and objectives; micro- level planning; information systems and inventories; training and development; organizing a human resources planning unit	2 weeks
Management by objectives	2 weeks
Certification in construction management supervision	15 weeks

Human resources management

Introduction to personnel management	7 weeks
Certificate in personnel management	18 weeks
Performance evaluation workshop	1 week
Interview techniques	1 week
Job description preparation workshop	1 week
Job evaluation workshop	5 days

Office Management

Better work methods	4 weeks
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Project planning and management

Managing rural development projects	4 weeks
Project planning and appraisal	

IDM special programs

Women managers in organizations	
The role and management of public enterprise	5 days

Previous water/sanitation sector trainees

Three senior managers and clerical staff of WSB attended unspecified courses during the past 5 years.

7. UNIVERSITY OF SWAZILAND

Organization and purpose, facilities and fees

Originally part of a joint venture with Botswana and Lesotho, the University of Swaziland was established under its present name in 1981. The main campus occupies a complex of buildings in Matsapha where all faculties except Agriculture are located. The normal hotel capacity is 1,200 but there are at present 1,600 boarders and additional hotel space is needed. The University depends on Government for funding. Five percent of the students are foreign. Swazi students pay a nominal fee for tuition and lodging.

Programs

The Faculty of Science currently has five departments: mathematics, biology, chemistry, physics and geography. With support from the European Economic Community it plans to create two new departments or program areas: computer science and environmental studies. The latter will seek to combine studies of physical and human geography. Economics and demography are taught by the Faculty of Social Science.

The University at present offers programs leading to certificates, diplomas and bachelors degrees. In the next years programs leading to the masters degree may be added, e.g., in biology and geography. Discussions are under way with UNESCO to obtain international support for a new program in industrial science and technology, which it is proposed to launch within the Department of Physics as a joint venture with SCOT. The program would include theoretical training in UNISWA and practical training in SCOT and in private and public enterprises and would have the overall aim of sensitizing students to future career opportunities.

Previous water/sanitation sector trainees

Virtually all Swazi professional staff now working in sector agencies completed 2-4 years of study at UNISWA before going abroad for engineering or other specialized study.

APPENDIX F

External Training Institutions Offering
Four-Year Training Programs in Water Supply or
Environmental Engineering

APPENDIX F

External Training Institutions Offering Four-Year Training Programs in Water Supply or Environmental Engineering

The following nine USA universities offer training programs designed to meet the needs of students from developing countries and emphasizing the "hands-on" approach to learning technical subjects. These programs lead to a degree of Bachelor of Science. One of them has a program accepting students with advanced standing, such as those who have completed a BSc at UNISWA (see Pennsylvania State University). One of these universities (the East Tennessee State University) offers courses which would be useful primarily for pre-service training of professionals to be employed in the "water resource" agencies WRB and DGSM. The remaining eight offer courses potentially useful for pre-service training of engineers to be employed in all four water agencies WRB, DGSM, WSB, and RWSB. (The summarized information is from WASH Field Report No. 117 Training in Water and Wastewater Institutional Programs: Long-term, Short-term and Study Tours, March 1984). Programs emphasis shown in parenthesis.

East Tennessee State University
P.O. Box 22960A
Johnson City, Tennessee 7614
Contact: Monroe Morgan

Water/wastewater program (water planning, wastewater planning)

Field trips, cooperative education program and special inter-session training for foreign students. Five to ten percent of students come from Ethiopia, Sudan, Kenya.

University of Florida
217 A.P. Black Hall
Gainesville, Florida 32611
Contact: Dr. Warren Viessmann, Jr.

Water/wastewater program (water planning, design and construction, wastewater planning, design and construction)

Program includes the possibility of credited internships with industry, heavy laboratory emphasis and association with Florida's regional operators course for hands-on training in operation and maintenance. Foreign students comprise 10-20 percent of the program, coming from Asia, Latin America and Afghanistan.

University of Maryland
Dept. of Civil Engineering
College Park, Maryland 20740
Contact: Dr. Robert Ragan

Four laboratory courses, field trips and design laboratory 10-30 percent of civil engineering students are foreign, coming from Asia, Latin America, Africa and the Middle East--Iran, Egypt.

One professor has a degree from Taiwan and several have consulted on appropriate technology in developing countries. Water/wastewater program (water planning, design and construction, wastewater planning, design and construction)

Michigan State University
Dept. of Civil and Sanitary Engineering
East Lansing, Michigan 48824
Contact: Dr. M.L. Davis

Water/wastewater program (water planning and design, wastewater planning and design)

One or two laboratory courses per semester are required and students may work in local plants on an individual basis. Ten percent to 50 percent of civil engineering students are foreign, coming from Asia, South America, Africa and Middle East - Jordan, Syria. Four professors are from overseas: China, the Netherlands, Syria and Pakistan.

Northeastern University
360 Huntington Avenue
Boston, Massachusetts 02115
Contact: Dr. O'Shaunessy

Water/wastewater program (water planning, design and construction, wastewater planning, design and construction)

Emphasis on laboratory, involvement in cooperative education program and setting up a small-scale plant as a class project. Forty percent of the students in the civil engineering program are from other countries. Many professors have been educated or have taught overseas.

Pennsylvania State University
Water Resources Engineering Technology
Capital Campus W261
Middletown, Pennsylvania 17057
Contact: Charles Cole

Water/wastewater program (water planning, design, construction and operation and operation and maintenance)

Note: This is a two-year BS program for graduates of two-year associate programs or other appropriate programs. There is a one semester course in operation of a water/wastewater treatment plant, in addition to field trips. Course emphasis is on applied engineering. Some professors are from Pakistan, India, Iran and Chile.

Tufts University
Anderson Hall
Medford, Massachusetts 02155
Contact: Dr. Linfield Brown

Water/wastewater program (water planning and design, wastewater planning and design)

Twenty-five percent of the program consists of laboratory work. Internship possibilities exist. Ten percent of students are from other countries, primarily from Africa and the Middle East.

University of Wisconsin
Dept. of Civil and Environmental Engineering
3230 Engineering Building
Madison, Wisconsin 53706
Contact: Dr. William Boyle or Dr. Paul Berthouex

Water/wastewater program (water planning, design and construction, wastewater planning, design and construction)

Summer field study required; mandatory thesis/research; use of Madison's wastewater treatment plant as a laboratory. Foreign students comprise 30 percent of the program, coming from Turkey, Syria, Iran, Iraq and India. Some of the professors have worked with WHO and USAID in Asia and Africa. Seminars for foreign students are held on international problems.

Worcester Polytechnic Institute
Dept. of Civil Engineering
Worcester, Massachusetts 01609
Contact: Dr. K. Keshavan

Water/wastewater program (water design, wastewater design)

Two required individual planning and design projects; extensive laboratory work also required. Foreign students comprise 5 percent of the student body, coming mainly from South America and the Middle East. Half the professors are from overseas; India, Hungary, Turkey and the Middle East. Some professors have worked with UNESCO.

APPENDIX G

**External Training Institutions Offering Two-year Training
Programs in Water Supply or Environmental Engineering Technology**

APPENDIX G

**External Training Institutions Offering Two-year Training
Programs in Water Supply or Environmental Engineering Technology**

The following four USA colleges offer two-year training programs in water supply and wastewater engineering technology leading generally to "associate" degrees in the specified areas of study. All of them emphasize the "hands-on" approach to learning. Program emphasis is shown in parenthesis.

Charles County Community College
Water Quality Training Center
P.O. Box 910
La Plata, Maryland 20646
Contact: J. Blair

Water/wastewater program (water design, operation and maintenance, wastewater design, operation and maintenance)

Laboratory training in operation and maintenance of pumps, motors, etc. On-the-job training is possible under supervision of professionals in local treatment plants.

Trainees from Egypt.

Green River Community College
12401 SE 320th Street
Auburn, Washington 98002
Contact: Fred Delvecchio

Water/wastewater program (water operation and maintenance, wastewater operation and maintenance)

Pilot facilities for water/wastewater practical training. Laboratory training in operation and maintenance of pumps, motors, etc.

Ulster County Community College
Dept. of Water Quality
Stone Ridge, New York 12484
Contact: Richard Glazer

Water/wastewater program (water operation and maintenance, wastewater operation and maintenance)

On-the-job work in treatment plant and laboratory training in the operation and maintenance of pumps, motors, etc. (Ulster's vocational course has received national recognition.)

Utah Technical College
Provo Division of Continuing Education
1395 North 150th Street East
P.O. Box 1609
Provo, Utah 84603
Contact: Debbie Horton

Water/wastewater program (water design, operation and maintenance, wastewater design, operation and maintenance)

Field assignments and an internship working part-time in a local plant. program staff have designed and written training and operation/maintenance manuals for U.S. water/wastewater facilities.

APPENDIX H

**Short In-service Training Courses Currently Offered
for Water/Wastewater Sector Professionals**

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Short In-service Training Courses Currently Offered for Water/Wastewater Sector Professionals

The following courses are being arranged by the World Bank, Economic Development Institute. Inquiries should be addressed to

Ms. Socorro de Paez,
Chief Training and Support Unit,
Economic Development Institute,
World Bank,
1818 H. Street, NW,
Washington, D.C. 20433,
or telegraph EDI INTBAFRAD.

1. Seminar for Trainers in Water supply and Sanitation October 1987.

Jointly offered with CEFIGRE at the Kenya Water Institute and International Training Center for Water Resources Management.
2. Course on Urban Finance and Management
Kenya, February-March 1988

Intended for senior and mid-level managers from key national agencies.
3. Workshop for managers of training institutions

Kenya, no dates yet.
4. Rural water supply and sanitation courses

Two courses are planned during the second half of 1988, venue and dates as yet unknown.