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ENVIRONMENTAL SANITATION MASTER PLAN FOR TRAINING AND EDUCATION IN TANZANIA

WASH FIELD REPORT NO. 58

SEPTEMBER 1982

Prepared for:
USAID Mission to the United
Republic of Tanzania
Order of Technical Direction No. 75

WATER AND SANITATION
FOR HEALTH PROJECT



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September 17, 1982

Mr. Arthur M. Handly
Mission Director
USAID
Dar es Salaam

Attn: Mr. Paul Ehmer, Health Officer

Dear Mr. Handly:

On behalf of the WASH Project, I am pleased to provide you with 35 copies of a report entitled, Environmental Sanitation Master Plan for Training and Education in Tanzania.

This is the final report by Robert Gearheart, Eugenia Eng and John Briscoe, and is based on their trip to Tanzania from February 22 to March 22, 1982.

This assistance is the result of a request by the Mission on September 25, 1981. The work was undertaken by the WASH Project on December 23, 1981 by means of Order of Technical Direction No. 75, authorized by the USAID Office of Health in Washington.

If you have any questions or comments regarding the findings or recommendations contained in this report, we will be happy to discuss them.

Sincerely,

Dennis B. Warner, Ph.D., P.E.
Director
WASH Project

cc: Mr. Victor W.R. Wehman, Jr.
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FOR TRAINING AND EDUCATION
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Prepared for the USAID Mission
to the United Republic of Tanzania
Under Order of Technical Direction No. 75

Prepared by:

Robert A. Gearheart
John Briscoe
Eugenia Eng

September 1982

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TABLE OF CONTENTS

Chapter	Page
LIST OF ABBREVIATIONS AND ACRONYMS.....	vii
EXECUTIVE SUMMARY.....	ix
1. THE WATER SUPPLY AND SANITATION SECTOR.....	1
1.1 Water Supplies in Tanzania.....	1
1.2 Sanitation Facilities in Tanzania.....	4
1.3 Ministries Involved.....	4
2. GENERAL FINDINGS.....	9
2.1 Ministry of Water (MAJI).....	9
2.1.1 Role, Responsibilities and Interagency Relations.....	9
2.1.2 Organizational Structure and Budget.....	11
2.1.3 On-Going Water and Sanitation Projects.....	11
2.1.4 Proposed Projects.....	15
2.1.5 Occupational Categories and Job Descriptions....	15
2.1.6 Existing Manpower Staffing Mix.....	15
2.1.7 Manpower Projections.....	16
2.1.8 Present Production of Manpower.....	18
2.2 Ministry of Lands, Housing and Urban Development (ARDHI).....	19
2.2.1 Role, Responsibilities and Interagency Relations.....	19
2.2.2 On-Going Sanitation Projects.....	20
2.2.3 Occupational Categories and Job Descriptions....	25
2.2.4 Existing Manpower and Staffing Mix.....	28
2.2.5 Manpower Projections.....	28
2.3 Ministry of Health (AFYA).....	28
2.3.1 Role, Responsibilities and Interagency Relations.....	28
2.3.2 Organizational Structure and Budget.....	31
2.3.3 On-Going Water and Sanitation Projects.....	33
2.3.4 Proposed Projects.....	40
2.3.5 Occupational Categories and Job Descriptions....	40
2.3.6 Existing Manpower and Staffing Mix.....	42
2.3.7 Manpower Projections.....	44

Chapter	Page
2.4 Other Ministries.....	46
2.4.1 Ministry of Manpower Development and Administration (UTUMISHI).....	46
2.4.2 Institute of Adult Education (IAE) of Ministry of National Education.....	48
2.4.3 Community Development Department of the Prime Minister's Office.....	50
3. EVALUATION OF MANPOWER UTILIZATION AND STAFF PERFORMANCE....	51
3.1 MAJI.....	51
3.1.1 Organizational Level.....	51
3.1.2 Occupational Level.....	51
3.1.3 Individual Level.....	51
3.2 ARHDI.....	52
3.2.1 Organizational Level.....	52
3.2.2 Occupational Level.....	53
3.2.3 Individual Level.....	53
3.3 AFYA.....	54
3.3.1 Organizational Level.....	54
3.3.2 Occupational Level.....	54
3.3.3 Individual Level.....	55
4. INVENTORY OF TRAINING RESOURCES AND ACTIVITIES.....	58
4.1 MAJI.....	58
4.1.1 The MAJI Institute.....	58
4.1.2 Assessment and Evaluation.....	60
4.2 ARDHI.....	62
4.2.1 The ARDHI Institute.....	62
4.2.2 Assessment and Evaluation.....	63
4.3 AFYA.....	65
4.3.1 Training Schools.....	65
4.3.2 Continuing Education.....	68
4.4 Ministry of Education (ELIMU).....	69
4.4.1 University of Dar es Salaam, Department of Civil Engineering.....	69

Chapter	Page
4.4.2 Dar es Salaam Technical College.....	70
4.4.3 Post-Primary Technical Education Schools.....	70
4.5 Other Training Institutions.....	70
4.5.1 National Vocational Training Schools.....	71
4.5.2 Institute of Development Management.....	71
4.5.3 The National Institute of Productivity.....	71
5. RECOMMENDATIONS FOR MANPOWER DEVELOPMENT AND TRAINING.....	72
5.1 MAJI.....	72
5.1.1 Professional Continuing Education.....	72
5.1.2 Training and Continuing Education of Technicians.....	72
5.1.3 Training and Continuing Education of Skilled Workers.....	74
5.1.4 Training and Community Participation.....	74
5.2 ARDHI.....	75
5.3 AFYA.....	76
5.3.1 Manpower Availability and Training.....	76
5.3.2 Manpower Utilization and Training.....	77
5.3.3 Continuing Education.....	78
5.3.4 Community Participation and Training.....	79
5.3.5 Coordination and Training.....	79
6. CONCLUSIONS.....	81
6.1 The Determination of Targets.....	81
6.2 The Integration of Water Supply and Sanitation.....	81
6.3 Implementation Constraints.....	82
6.4 The Coordination of Training Programs.....	82
6.5 Training of Trainer Programs.....	83
6.6 Training for Community Participation.....	83
6.7 Improvement in Management and Administration.....	83
6.8 Development of a Balanced Technical Labor Force.....	84
6.9 The Formulation of Continuing Education Programs.....	84
6.10 Training for Design and Construction Versus Training for Operation and Maintenance.....	84

Chapter	Page
6.11 The Numbers of Cadres to Be Trained.....	84
7. DONOR INTEREST IN TRAINING IN THE ENVIRONMENTAL SANITATION SECTOR.....	85
7.1 Management Training.....	85
7.2 The ARDHI Institute Public Health Engineering Course...	85
7.3 Training of Technicians at the MAJI Institute.....	86
7.4 Training of Craftsman.....	87
7.5 Support for the Low Cost Sanitation Unit, ARDHI Ministry.....	88
7.6 Support for AFYA.....	89
7.7 Manpower Planning and Training.....	89
7.8 Donor Agencies Contacted by the WASH Team.....	89

APPENDICES

A. Order of Technical Direction.....	91
B. Itinerary	96
C. Officials Interviewed.....	98
D. Schemes of Service.....	102
E. Bibliography.....	113

TABLES

1. Community Water Supply - Composition of Services 1975 and 1980.....	2
2. Excreta Disposal - Comparison of Service 1975 and 1980.....	3
3. Central Government Expenditures by Function.....	8
4. Selection of Responsibility within MAJI.....	10
5. Bilateral and International Organizations Model in the Water Supply Sector.....	14
6. Existing Manpower in the Water Sector in the Regions of Dar, Dodoma, Kagera, Kigoma, Findi, Mara, Mtwara, Shinyanga, Tabora.....	17
7. Summary of Proposed Staff Requirement for Morogoro's Sanitation Project.....	22

	Page
8. Proposed Staffing Guide for Arusha's Low Cost Sanitation and Sewerage Project.....	24
9. Schedules of ARDHI Staffing Guide. Annual Estimates 1982/83 -- Establishment and Strength of Personnel for Period Ending June 1983.....	29
10. Projected Needs for Public Health Engineers and Public Health Technicians in the Town Councils.....	30
11. Planning Process For Health Development.....	34
12. Development of Rural Health Care Service Providers in Tanzania.....	35
13. Total Development Expenditure in Health Sector.....	36
14. Distribution of Health Facilities in Tanzania Mainland in 1979.....	41
15. Total Recurrent Expenditure in Health Sector.....	43
16. AFYA Projected Manpower Needs in the Sanitation Sector.....	45
17. Selected Manpower Projecture UTUMISHI.....	47
18. MAJI Institute Curriculum.....	59
19. MAJI - Number of Students Attending Regional Training 1981/1982.....	61
20. Public Health Engineer Curriculum.....	64
21. Health Officer Curriculum.....	66
22. Environmental Health Assistant Curriculum.....	67
23. Salary Structure for Health Officer.....	68
 FIGURES	
1. Tanzania Government Organization.....	5
2. Decentralized Decision Making Process.....	6
3. Budget Preparation Process.....	7
4. Organization Chart for MAJI Ministry.....	12
5. Organization of MAJI - Regional Land.....	13

	Page
6. Proposed Organization Structure and Staffing Requirements for Morogoro's Sanitation and Sewage Collection Treatment System.....	23
7. Organizational Chart for AFYA.....	32

LIST OF ABBREVIATIONS AND ACRONYMS

Tanzanian Organizations

AFYA	Ministry of Health
ARDHI	Ministry of Lands, Housing and Urban Development
ELIMU	Ministry of Education
IAE	Institute of Adult Education
KILIMO	Ministry of Livestock
LCSU	Low Cost Sanitation Unit
MAJI	Ministry of Water and Energy
NAC	National Action Committee for International Drinking Water and Sanitation Decade
PMO	Prime Minister's Office
UTUMISHI	Ministry of Manpower
WMPCU	Work Master Plan Coordinating Unit, Maji

Other Organizations

DANIDA	Danish International Development Authority
ETMA	Environmental Training and Management in Africa Program
FINNIDA	Department of International Development Cooperation, Finnish Ministry of Foreign Affairs
ILO	International Labour Organization
IRC	International Reference Centre, The Hague, Netherlands
NORAD	Norwegian Agency for International Development
ODA, UK	Overseas Development Administration, United Kingdom
SIDA	Swedish International Development Agency
UNICEF	United Nations Children Fund
UNDP	United Nations Development Program

USAID United States Agency for International Development

WASH Water and Sanitation for Health Project

Miscellaneous

FTC Full Technicians' Certificate

OTD Order of Technical Direction

PHE Public Health Engineer

PHT Public Health Technician

RMO Regional Medical Officer

TRD Training for Rural Development Project

VHW Village Health Worker

Currency Equivalents, March 1982

Currency Unit = Shillings (TSh)

TSh 1 = US\$0.12

US \$1 = TSh 9.2

EXECUTIVE SUMMARY

In December, 1980, the USAID Mission in Tanzania received a request from the Government of Tanzania to prepare an educational master plan for environmental sanitation. A preliminary review of the scope of such a master plan was carried out in February 1981 by two WASH consultants. Following the government of Tanzania's response to this preliminary review, a second WASH team was sent to Tanzania in February and March 1982 to develop an environmental sanitation master plan for training and a strategy for implementation in coordination with a Government of Tanzania ad-hoc committee made up of representatives of the relevant Tanzania Ministries involved in environmental sanitation and training. These include, the Ministry of Water (MAJI), the Ministry of Lands, Housing, and Urban Development (ARDHI), The Ministry of Health (AFYA), the Ministry of Manpower (UTUMISHI) and the Ministry of Education (ELIMU). Based on discussions within these Tanzania agencies with the ad-hoc committee and with donor agency representatives in Tanzania, the following recommendations are made:

1. The National Action Committee should:
 - a. Specify an integrated water supply and sanitation policy. In urban areas this would include defining the responsibilities of MAJI, ARDHI, the town councils, AFYA and the National Water and Sanitation Authority. In rural areas this would include defining the responsibilities of MAJI, AFYA, the Community Development Department and the village councils.
 - b. Appoint a training task force which will report periodically to the National Action Committee.
2. The MAJI Ministry should:
 - a. Agree to assume responsibility for training public health technicians (PHTs).
 - b. Undertake a thorough revision of the concept of, and training carried out by, the MAJI Institute, including:
 - o Revising the job description and career objectives of the Full Technician Certificate (FTC) technicians;
 - o Revising admission policies, staff recruitment procedures, curricula and practical training activities of the FTC course;
 - o Setting up a unit for supporting the Regional Craftsmen Training Programs;
 - o Setting up a unit for supporting regional training programs for village caretakers;

The Overseas Development Administration of the United Kingdom, the Canadian High Commission, the Australian High Commission, and the Embassy of the German Federal Republic all expressed interest in providing the technical assistance necessary in undertaking this revision of the MAJI Institute.

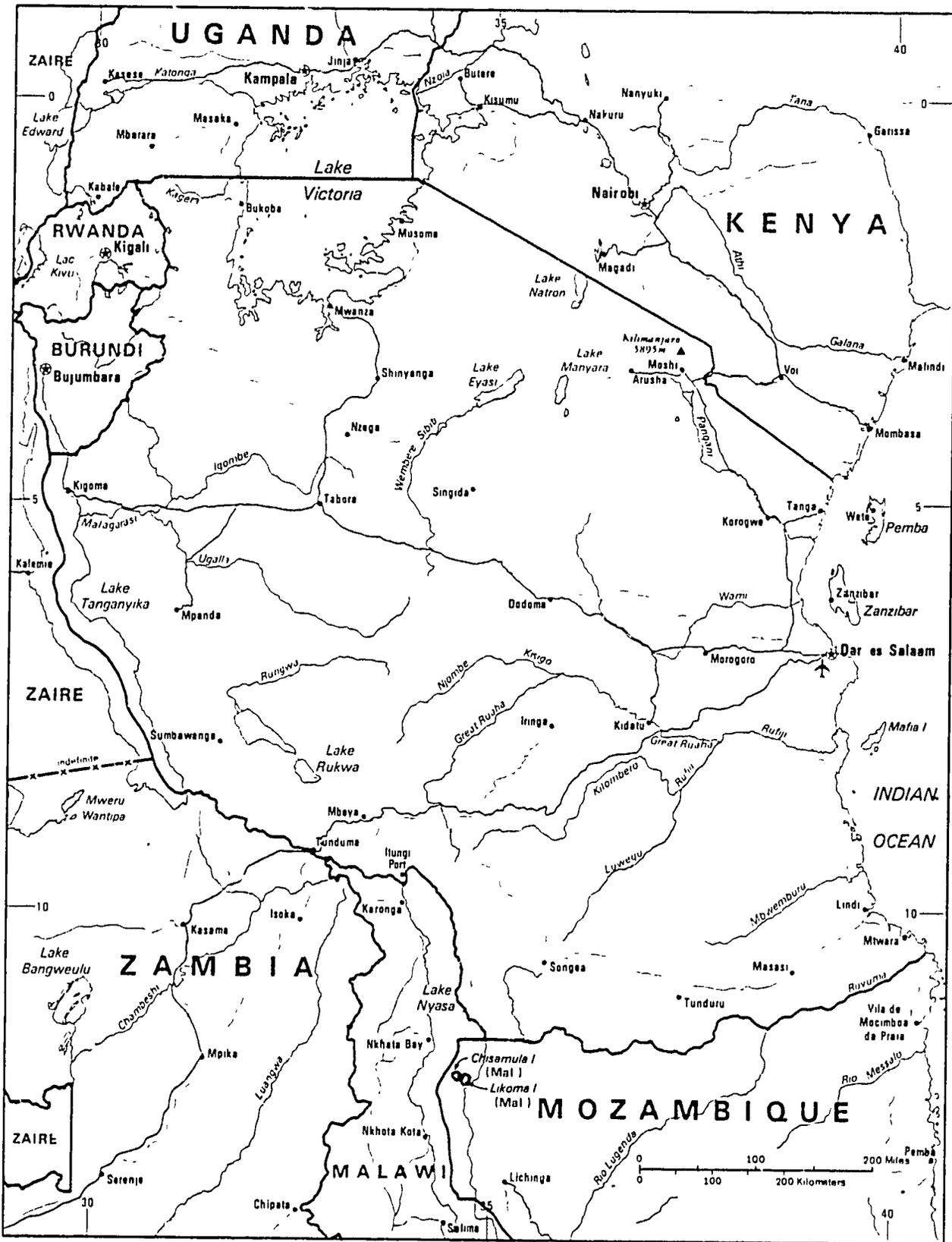
- c. Provide the resources necessary to improve the regional craftsmen training programs. The International Labour Organization (ILO) is in the final stages of agreeing to seek funds for such a program. The bilateral donors, including the Swedish International Development Agency (SIDA) and the Norwegian Aid Agency (NORAD), are interested in supporting such programs in the regions in which they operate.
 - d. Initiate short management courses for MAJI personnel who exercise management responsibilities. SIDA has expressed a strong interest in working with MAJI in developing such courses in conjunction with a foreign and a local management training institute.
3. The AFYA Ministry should:
- a. Revise the curricula of the health officer and health assistant training schools with assistance from the Institute of Adult Education.
 - b. Provide improved materials for the health officer and health assistant training schools.
 - c. Consider converting some schools for training rural medical aides into schools for training health assistants.
 - d. Strengthen the technical capacity of the sanitation unit in AFYA ministry.

Donors who indicated interest in these recommendations include DANIDA, SIDA, UNICEF, and WHO.

4. The ARDHI Ministry should:
- a. Identify technical training needs for sewerage and low cost sanitation systems, possibly as a part of the training and education component of the Dar es Salaam, World Bank-funded project.
 - b. Identify management and administrative training needs for the (proposed) personnel in the town councils who will be responsible for these systems.
 - c. ARDHI Ministry should assume responsibility in the areas of information storage, retrieval, development, and dissemination for low cost sanitation technology as well as operation and maintenance aspects of sewerage and sewage treatment systems. This technical assistance function should be supported with human and monetary resources.
 - d. Come to an agreement with MAJI Ministry whereby the training of public health technicians would be undertaken by the MAJI Institute.

- e. Reinforce the training staff of the public health engineering course of the ARDHI Institute and select Tanzanians for advanced engineering education to develop self-sufficiency in the public health engineering program. The European Economic Community, the UNDP, the Embassy of the Federal Republic of Germany, and the Australian Government have all expressed interest in a staff assistant program for the Public Health Engineering course.
- f. Come to an agreement with MAJI Ministry whereby the management training of senior ARDHI and town council sanitation staff can be undertaken in conjunction with the proposed MAJI management short courses. As indicated earlier, SIDA is interested in collaborating in such management training courses.
- g. Draw up standards for the design of sewerage and low-cost sanitation plans in Tanzania. USAID has indicated interest in providing the technical assistance necessary for drawing up such standards.

Tanzania



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 Mercator Projection
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 Boundary representation is
 not necessarily authoritative

- Railroad
- Road
- ✈ Airport

Chapter 1

WATER SUPPLY AND SANITATION SECTOR

For purposes of this report, the words "environmental sanitation" are taken to mean the provision, protection and treatment of water supplies, and removal, treatment and disposal of excreta. Solid waste collection and disposal and drainage of storm water were not considered in this report. This document is the report of the three-person WASH team which was in Tanzania for a total of 70 person-days during February and March 1982 (see Appendix A for Order of Technical Direction).

The objective of the WASH team was to develop an environmental sanitation master plan for training, and a strategy for implementation in coordination with an ad hoc committee:

Mr. Simbeye - Public Health Officer, Ministry of Health (AFYA)
Mr. Njau - Sanitary Engineer, Ministry of Lands, Housing and Urban Development (ARDHI)
Mr. Kadula - Senior Manpower Officer, Ministry of Manpower (UTUMISHI)
Mr. Boydell - Sanitary Engineer, ARDHI
Mr. Schonborg - Sanitary Engineer, Ministry of Water (MAJI)
Mr. Thabit - Training Officer, MAJI
Mr. Ehmer - USAID/Tanzania

A 35 page Summary Report of the findings and recommendations of the WASH team was distributed in May, 1982.

This chapter will briefly describe the existing status of the water supply and sanitation section in Tanzania. Following chapters provide detailed findings and analysis leading to the WASH team's recommendations for developing an environmental sanitation master plan for training.

1.1 Water supplies in Tanzania

Table 1 shows the coverage for both water supply and sanitation in 1975 and 1980. Actual coverage is much lower in both cases. In the case of water supply, more than 50 percent and up to 75 percent of the water supply systems are periodically not working, due to problems of fuel, maintenance and repair capability and management deficiencies. It is suspected that many are not adequately treating the water

Until recently the emphasis in rural areas has been on diesel pumped systems and, where feasible, gravity fed systems. Now the much more economical schemes which rely on shallow wells and handpumps are being introduced where hydro-geological conditions exist.

No charges are made for water in rural areas. Revenues from metered urban water supplies (house connections) cover an estimated 75 percent of the operating expenses for urban and rural water supplies. Approximately TSh. 40 million are required for annual operation and maintenance. The operation of

Table 1:
COMMUNITY WATER SUPPLY
Comparison of Services 1975 and 1980

		1975		1980	
		No. of systems in thousands	%	No. of systems in thousands	%
URBAN POPULATION SERVED	By House Connections	264	14	546	25
	By Public Standpost	1,054	54	1,274	57
	Sub - Total	1,318	68	1,820	82
RURAL POPULATION SERVED		2,416	17	4,500	28
G R A N D T O T A L		3,734	23	6,320	34

Source: World Bank Technical Advisory Group Report

Table 2:
EXCRETA DISPOSAL
Comparison of Services 1975 and 1980

		1975		1980	
		No. of systems in thousands	%	No. of systems in thousands	%
URBAN POPULATION SERVED	Connected to Public Sewerage Systems	155	8	266	12
	Pit Latrines, Septic Tank Soakaway Systems	1,048	54	1,798	81
URBAN AND RURAL	Bucket Latrines	161	2	184	2
RURAL POPULATION WITH ADEQUATE DISPOSAL SYSTEMS		3,553	25	6,500	40
G R A N D T O T A L		4,917	30	8,543	46

Estimated Populations 16.15 million (1975) and 18.45 million (1980).
88% Rural and 12% Urban.

Source: World Bank Technical Advisory Group Report

piped systems are estimated to cost TSh. 30 per capita per year while shallow wells with handpumps cost TSh. 3 per capita per year. The capital costs of piped systems in rural areas vary from 100 - 500 TSh. per capita per year. The official Decade target is to have water within 400 meters of every home by 1991.

1.2 Sanitation Facilities in Tanzania

The official statistics are reported in Table 2. Again, they have to be treated with caution. None of the public sewerage systems is functioning adequately (in Dar es Salaam, for instance, only one of 17 sewage pumping stations works, and one out of nine oxidation ponds are functioning), and many of the septic tanks do not function. In rural areas, however, the surveys done as part of the various regional water master plans indicate that between 80 percent and 95 percent of rural families have pit latrines. Although results from different surveys differ, the most reliable of these suggests that some type of latrine is used by a high proportion of the rural population.

1.3 Ministries Involved

The following Ministries have responsibilities in the environmental sanitation sector:

The Ministry of Water (MAJI) is responsible for the formulation of policy and the implementation of projects relating to drinking water supplies in urban and rural areas;

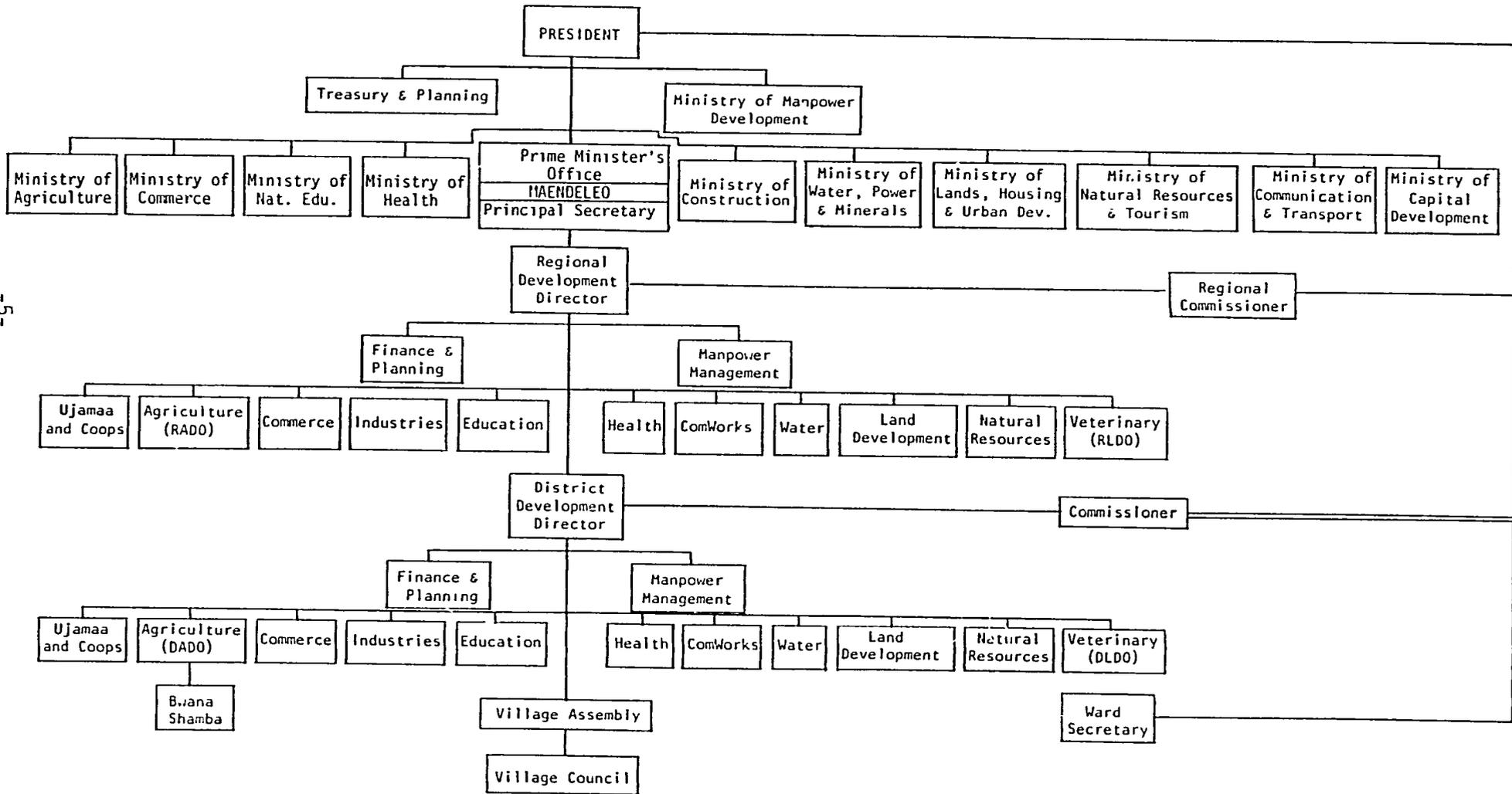
The Ministry of Lands, Housing and Urban Development (ARDHI) is responsible for the formulation of policy regarding sewerage, low-cost sanitation and drainage in urban areas, and acts as a technical agent for Town Councils for planning, designing and construction management aspects of the project. The Town Councils are responsible for the maintenance and operation of the facilities.

The Ministry of Health (AFYA) is responsible for urban sanitation (in conjunction with the Town Councils), rural sanitation, water quality surveillance and water pollution control.

Central ministries play a role in the planning of national programmes, but they are not necessarily formally involved in the planning of regional programmes which (in principle) generate from the village level through the District and the Region to the PMO (Figure 1). The process of decision making under the decentralized system operative in Tanzania is shown in Figure 2. The procedure for budget preparation in Tanzania is shown in Figure 3. A summary of central government expenditures by percent of the total budget for the Years 1975 through 1979 is shown in Table 3. In general, there was a decline in support of health sector and infrastructure programs in 1979 as defense programs increased significantly. The last two years have generally followed the same pattern, as determined by interviewing Ministry personnel.

FIGURE: 1

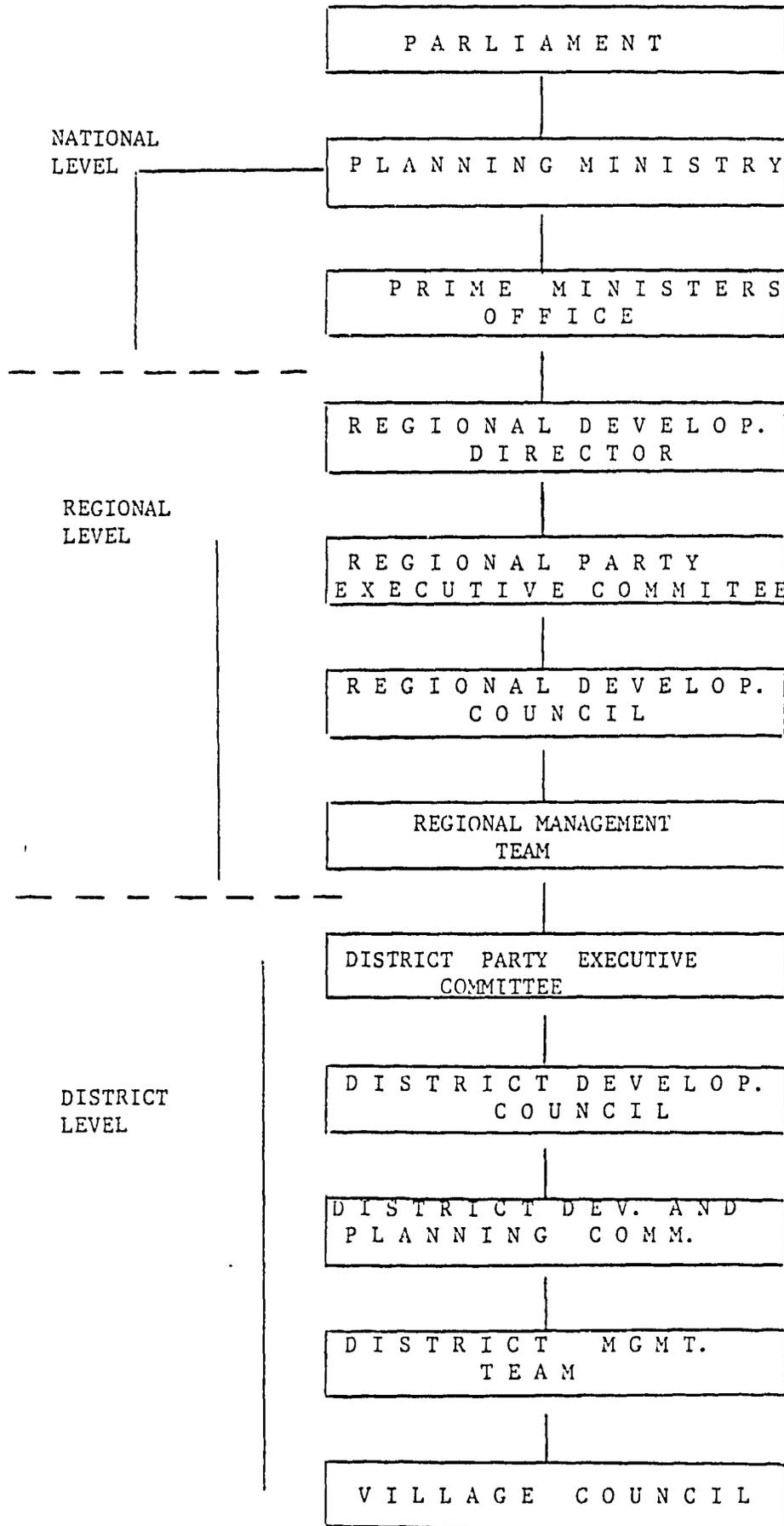
TANZANIA GOVERNMENT ORGANIZATION:
DEVELOPMENT MINISTRIES, (NATIONAL, REGIONAL AND DISTRICT LEVELS), WARD AND VILLAGE OFFICIALS



-5-

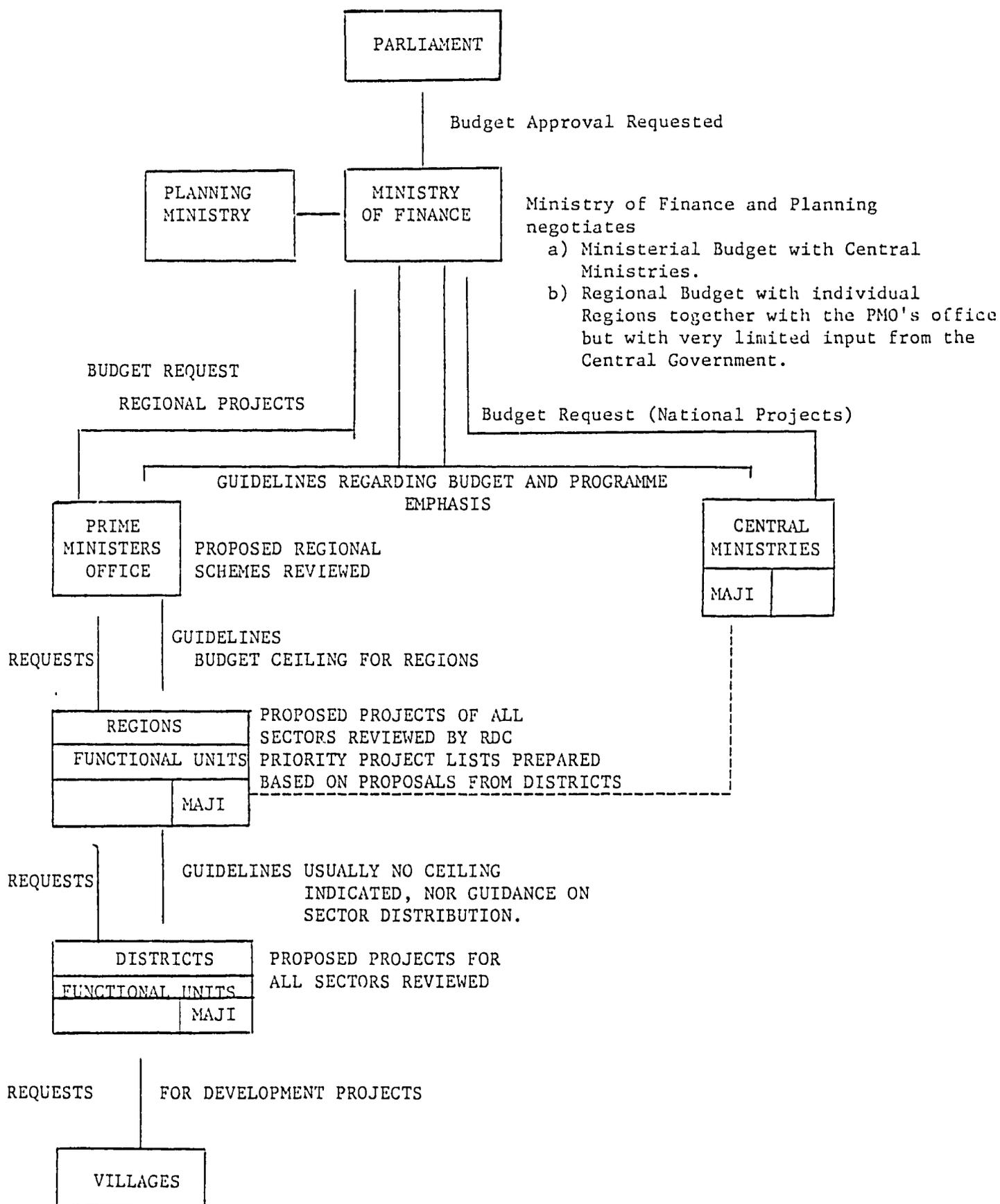
Source: Health Sector Report - Tanzania

Figure 2: Decentralized Decision-Making Process



Source: Training for Rural Development Report

Figure 3: Budget Preparation Process



Source: Rural Water Supply Sector Study Report 1977.

Table 3:

CENTRAL GOVERNMENT EXPENDITURES BY FUNCTION
(PERCENTAGE SHARE OF TOTAL EXPENDITURES)

	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>
General Public Services	18.1	19.0	19.3	18.0	19.6
Defense	12.0	12.2	12.3	14.8	23.7
Education	12.5	14.1	13.6	14.5	11.3
Health	7.0	7.1	7.1	7.3	5.4
Social Security & Welfare	.3	1.3	1.2	.1	1.0
Housing & Community Activities	1.7	1.9	1.2	.1	1.3
Other Community & Social Services	2.1	2.4	2.3	2.1	1.6
General Admin.,. Regulat. & Research	8.5	5.8	7.0	7.9	6.9
Agriculture, Forestry & Fishing	15.6	14.2	11.6	9.3	6.8
Mining, Manufacturing & Construction	4.2	1.9	7.4	8.8	6.2
Electricity, Gas, Steam & Water	9.9	8.6	5.4	4.9	5.6
Roads	3.6	4.8	5.9	4.8	3.9
Inland & Coastal Waterways	.1	nil	.1	nil	nil
Other Transport & Communications	1.2	1.5	.6	.7	3.5
Other Economic Services	.3	.1	.1	.3	.1
Other Purposes	3.0	5.0	5.0	4.6	3.2
	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>

Sources: AID/Tanzania Report

Chapter 2

GENERAL FINDINGS

2.1 Ministry of Water (MAJI)

2.1.1 Role, Responsibilities and Interagency Relations

Until 1978 the Sewerage and Drainage Division was a division within the MAJI Ministry. With the reactivation of the town councils at about that time, it was decided that the Division should move to the Ministry which would be working more directly with the town councils. For this reason the Division went to ARDHI. The way in which MAJI Ministry interacts with the District, the Regions and the Prime Minister's Office (PMO) in the planning, control, design, construction and operation and maintenance of water supply schemes is illustrated in Table 4.

It should be noted in particular that MAJI does not have staff at the sub-district level. Several donors (including the Swedish and Danish aid agencies SIDA and DANIDA) have urged MAJI to consider establishing an extension unit which would act as the liaison between the villagers and MAJI and which would play a central role in the crucial issue of maintenance and operation.

The community participation project to be carried out by the International Reference Centre in the Netherlands considered various options for improving MAJI's liaison with the villages. It was considered to be difficult for the technically-trained and maintenance personnel of MAJI to perform the function of community organization and education, and it was eventually decided that extension should take place not through the creation of extension units within the office of the Regional District Engineer's Office, but through the structure being created by the Regional Department of Community Development.

In principle, AFYA acts as a regulating body, ensuring that the water produced by MAJI is of acceptable quality. In practice, however, MAJI has virtually no contact with AFYA (except when there are outbreaks of cholera) and would function in precisely the same way if AFYA had not regulatory responsibility.

Irrigation schemes of the Ministry of Agriculture sometimes include drinking water supply schemes. There appears to be no coordination with MAJI in the process.

In June of 1981 an act was passed concerning the National Urban Water Authority (NUWA). This is a parastatal which is to begin functioning in July of 1982. Various donors (including SIDA, NORAD--the Norwegian aid agency--and the World Bank) have pushed strongly for the NUWA to assume responsibility for urban drainage, sewerage, and sanitation in urban areas. According to the MAJI Work Master Plan Coordinating Unit (WMPCU), MAJI does not envision the NUWA including sewerage, sanitation and drainage in its mandate.

MAJI has never developed the links with the Small Scale Industrial Development Organization (of the Ministry of Industry) which would be necessary for the manufacture of simple water equipment (such as handpumps).

Table 4: DELINEATION OF RESPONSIBILITY WITHIN MAJI

RESPONSIBILITY PROJECT PHASE	DISTRICT	REGION	PMO	MAJI
PLANNING AND CONTROL	-Work with wards and villages to define needs and priorities	- Assist District in translating needs to projects -Prepare Regional Annual Plan according to Guidelines -Prepare Quarterly Progress Reports	-Work with MAJI to set planning guidelines based on regional requests and long-term strategy -Review Regional plans to ensure consistent with guidelines -Review Regional performance against plan and take action as required	-Prepare long-term strategy -Define specific guidelines on an annual basis -Evaluate Regional plans to ensure technically feasible and consistency with guidelines -Plan national projects for submission to Development plan -Review sectoral performance and recommend action as required
DESIGN		-Prepare designs for own projects calling on Ministry for assistance where required		-Assist Region in design of special projects when required -Prepare standardized designs for projects that occur frequently -Review regional design for technical viewpoint for -Design or get contractor to design national project -Perform research and investigation services for Region
CONSTRUCTION	-Assist in construction by mobilizing and supervising selfhelp	-Schedule on projects procure own "common" supplies -Construct all Regional projects-seeking assistance from Ministry where required	-Assist the Region in solving problems or resolving conflict that may arise during construction	-Perform all drilling operations -Allocate specialized equipment to regions (e.g. earthmoving) -Assist Regions in solving problems -Provide centralized procurement for Region -Construct or supervise continuation of national projects
OPERATION & MAINTENANCE	-Provide minimum maintenance service for projects in the District	-Operate and maintain large projects -Train staff in District to operate and maintain projects		-Establish operation and maintenance procedures -Assist Region in operation and maintenance problems -Operate and maintain plant and equipment assigned to the Ministry

MAJI is developing links with the Community Development Department (of the PMO) in connection with the IRC project for community participation in water supplies.

2.1.2 Organizational Structure and Budget

In 1978-79 the budget for water supply was TSh. 311 million, of which 72 percent was in foreign exchange and 28 percent local currency.

For the structure of the MAJI Ministry see Figure 4. For the structure of MAJI in the regions, see Figure 5

2.1.3 On-Going Water and Sanitation Projects

A brief summary of the enormous on-going activity in the water supply sector on the part of donors is presented in Table 5.

In the absence of a National Water Master Plan, the strategy pursued by each of the donors varies considerably. The Finns have implementation units linked to specific projects. The Danes, Norwegians and Swedes have implementation units which are more closely linked to the office of the Regional Water Engineer. The Dutch operate with minimal connections to the Regional Development Director or the Regional Water Engineer.

An important and different project is the Dutch-financed IRC Project for community education and participation. This is a 16-month project whose objective is to provide support to community water supply and sanitation agencies for developing and field-testing a community education and participation component. As described in above, the project will work through the Community Development Department of the PMO, a department which will ultimately be staffed to the ward level.

Of the donor-assisted water supply projects identified on the table, two deserve particular attention in this context.

The first of these is the UNICEF-funded water supply and sanitation project in Wangingombe, Iringa Region. This project is described in detail in Section 2.3. The involvement of MAJI in the project is of particular interest in the present context. MAJI was entirely responsible for the design and construction of the water supply and distribution system, with community participation being organized by the Party. MAJI is not, however, involved in any way in the sanitation project. Rather, the implementation of the sanitation program is carried out through a team comprised of representatives of the Party, AFYA, and UNICEF.

The other project which is important in the present context is the NORAD-funded project for Regional Water Supplies in Kigoma and Rukwa. The Norwegian government has decided to push ahead with an integrated water supply and sanitation project despite the absence of clear guidelines for the Government of Tanzania as to how such integration should take place. The NORAD consultants, in the Regional Water Master Plan, proposed that the extension unit

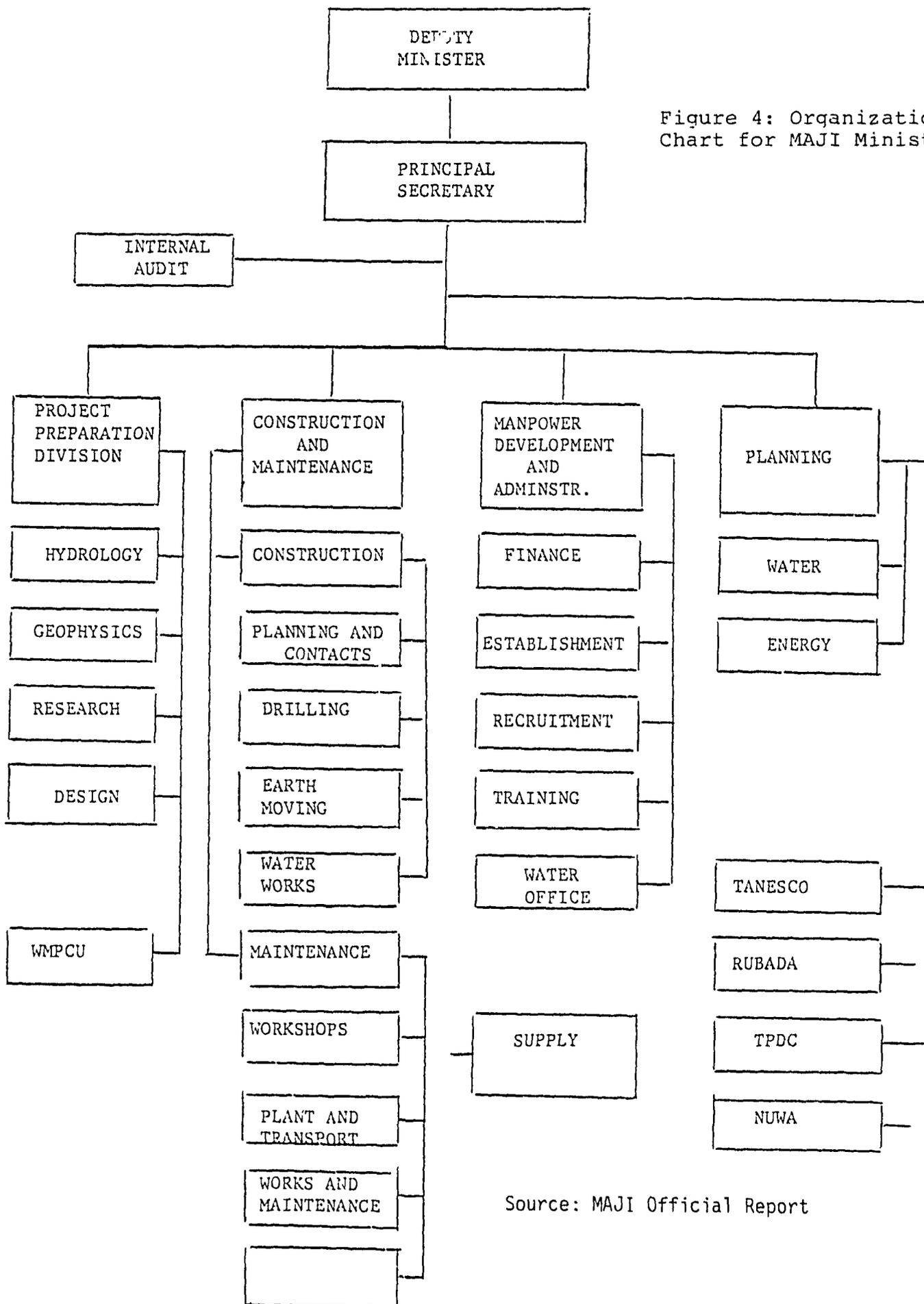
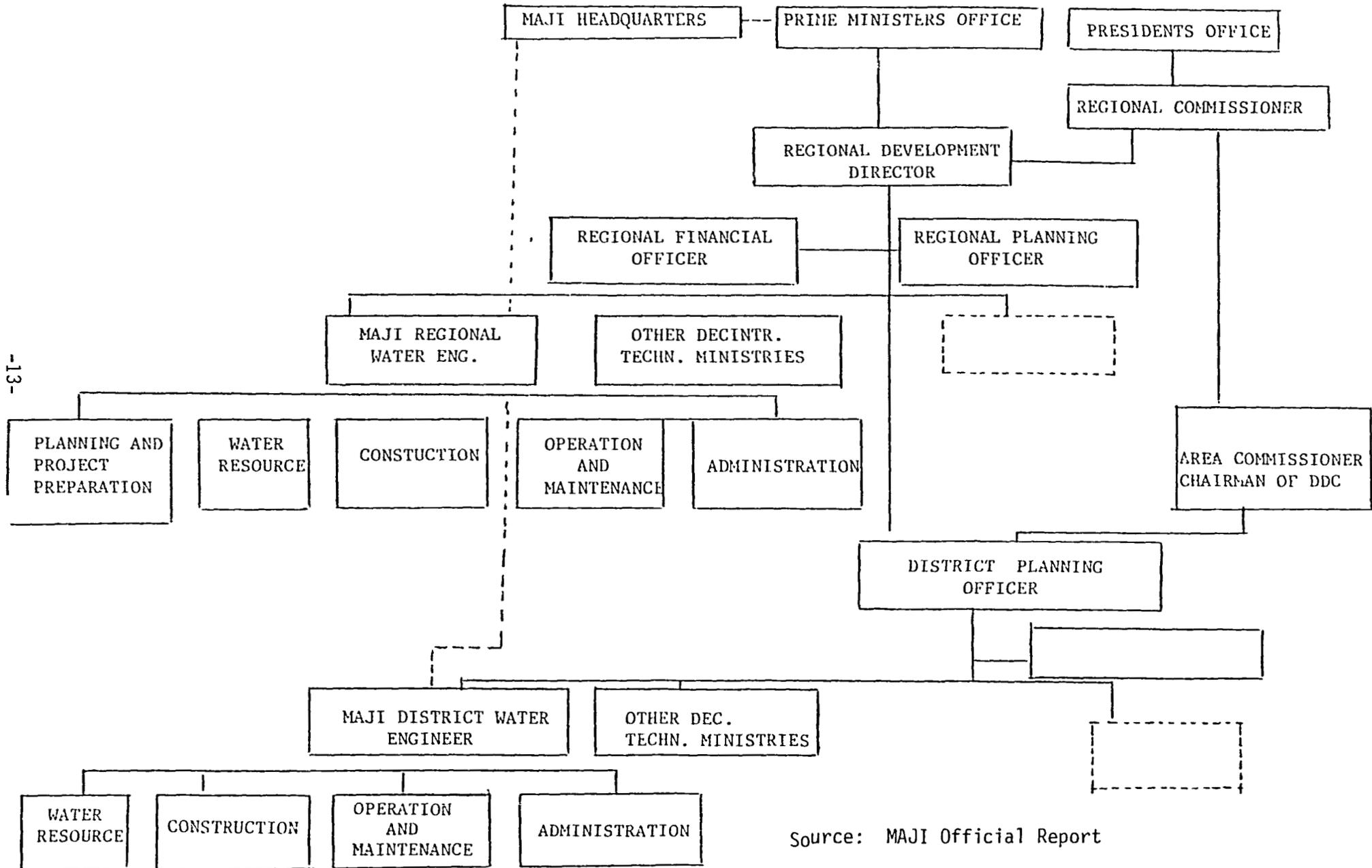


Figure 4: Organization Chart for MAJI Ministry

Source: MAJI Official Report

Figure 5: ORGANIZATION OF MAJI - REGIONAL LEVEL



Source: MAJI Official Report

TABLE 5 : BILATERAL AND INTERNATIONAL ORGANIZATIONS
INVOLVED IN THE WATER SUPPLY SECTOR

AGENCY	PROJECT REGION(S)	STAGE OF IMPLEMENTATION AND REMARKS
Australian Government	Singida	Project under implementation
British High Commission	Lindi and Mtwara	Project under implementation only financing materials
Canada Government	Coast & Dar es Salaam	Study and survey phase
DANIDA	Iringa, Mbeya and Ruvuma	Project started implementation
Federal Republic of Germany	Tanga	Almost completed
Finland Government	Lindi and Mtwara	Project under implementation
Japanese Government	Kilimanjaro	Study and survey phase
Norway Government	Kigoma and Rukwa	Started implementation
Royal Netherland Govt.	Morogoro & Shinyanga	Completed Shinyanga and started implementation in Morogoro
SIDA	Mwanza, Mara and Kagera	Implementation stages
World Bank	Tabora	Also financing some rural integrated projects

Sources: UNDP/WHO Report by Hassan

responsible for the sanitation project be part of the implementation team developed for the water supply project. In the on-going negotiations on this project the Government of Tanzania has apparently accepted the NORAD concept of a integrated water supply and sanitation project, but has not agreed that implementation of the sanitation project would be through the water implementation unit. Rather, it has been suggested that the lead in a sanitation implementation unit must be taken by the Department of Community Development.

2.1.4 Proposed Projects

It is expected that the major projects outlined in the previous section will be continued through the Decade.

The Decade target in Tanzania of a water supply for all by 1991 within 400 meters of the house is apparently no longer considered feasible by many senior Tanzanian officials or by the donor agencies. It nevertheless remains the official goal of the Government and Party.

As yet no sanitation targets for the Decade have been set.

If an when an integrated water supply-sanitation policy is formulated it could be expected that some of the money allocated for rural water supply might be transferred to sanitation projects but it is also to be expected that such a policy would attract additional donor support to the overall water supply-sanitation sector.

2.1.5 Occupational Categories and Job Descriptions

The occupational categories, job descriptions, Grade levels, service structures and salary structures of MAJI engineers and technicians (including skilled workers) are presented in Appendix D.

2.1.6 Existing Manpower Staffing Mix

The most recent attempt at a comprehensive survey of existing manpower in the water sector was a questionnaire survey which was carried out in 1976 with "poor results".

More recently, detailed manpower surveys have been carried out by the West German consultants of Friedrich, Ebert and Stiftung for the Ministry of Manpower. The results of this survey are too general to be of use in the water sector.

Since July 1979 the International Reference Centre in the Hague has had funding from the Dutch Government to carry out an interview-based survey of water sector personnel at the regional, district, and village level. Due to a variety of problems this survey has still not been carried out. At present it is planned to initiate the survey in December of 1982.

Thus, although the Manpower Development Division explicitly recognizes the importance of a systematic survey of existing manpower in the water sector as a prerequisite to a successful training program, such information remains unavailable.

To provide some provisional information on existing Tanzanian manpower the Water Master Plan Coordinating Unit (WMPCU) initiated an interview-based survey of each region in late 1981. The WMPCU kindly made available the existing raw data for the 10 regions surveyed to date, namely: Dar es Salaam (urban), Dodoma, Kagera, Kigoma, Lindi, Mara, Mtwara, Shinyanga and Tabora. These regions include 52 percent of the population of Tanzania. While it should be noted that the raw data reveal a considerable diversity in the availability of technicians and skilled manpower in the different regions, only a summary compilation of these data is shown in Table 6.

In interpreting the data from Table 6, it should be noted that no expatriate personnel is included in the table. Since there is a large cadre of expatriate professional personnel working in the water sector in Tanzania, the actual ratio of engineers:technicians:skilled laborers is not the 1:3:4 implied by Table 5, but is rather more like 1:1.5:2. Given Tanzania's commitment not to depend on foreign personnel, however, Table 6 serves as a basis for subsequent projections of available manpower.

2.1.7 Manpower Projections

At present about 35 percent of the population of Tanzania is served by an improved water supply system. While the goal of water for all by 1991 is still officially sanctioned it is clear that this goal will not be met. This was realistically expressed by the Minister of Water and Energy in opening the first meeting of the National Action Committee (NAC) of the International Water Supply and Sanitation Decade of January 1982.

According to WHO, the Minister said that "Due to financial and other constraints, the implementation of water and sanitation programmes would not be so dynamic, and, as such, members and the public at large should not be disappointed or frustrated." WHO also reported that "Similar caution was voiced by the Principal Secretary of MAJI when he opened the first meeting of the Technical sub-committee of the NAC." The donors, too, recognize more realistic targets for the Decade. In Kigoma Region, for example, NORAD recognizes that a realistic target for the Decade is to supply 61 percent of the villages with protected water supplies.

For the purpose of making reasonable manpower projections it will be assumed that 70 percent of the population of Tanzania will have access to clean water by 1991. That is, the population to be served will be about 18 million.

MAJI Ministry has made no detailed projections of the manpower needs for the Decade. In this section, the team will derive what it believes to be reasonable figures for the manpower which will be necessary by 1991. It is the team's hope that these "projections" will soon be superseded by figures based on a more thorough analysis of Tanzania's needs. This should not be a very difficult task since the Regional Water Master Plans are available for most regions and it should be possible to make detailed manpower projections for each of the regions based on these plans.

Table 6:

Existing Manpower in the water sector in the regions of: Dar (urban), Dodoma, Kagera, Kigoma, Lindi, Mara, Mtwara, Mwanza, Shinyanga & Tabora
(Data of the Water Master Plan Coordinating Unit, collected through interviews with the RWE and other staff in the regions, late 1981, early 1982).

CIVIL	54	ENGINEERS	0	2	11	19	8	78	119	47	98	0
MECHANICAL	2	PRINCIPAL TECHNICIANS	0	0	0	1	4	12	20	101	180	4
ELECTRICAL	4	SENIOR TECHNICIANS	0	0	0	0	3	6	14	3	23	0
SOIL MECHANIC	0	TECHNICIANS GRADE I	0	0	0	0	0	0	0	0	0	0
DRILLING	0	TECHNICIANS GRADE II	0	0	0	0	0	0	2	12	3	0
HYDROGEOLOG.	5	TECHNICIANS GRADE III	0	0	0	2	0	19	7	0	1	0
HYDROLOGY	10	TECHNICIANS GRADE IV	0	0	0	7	0	47	24	20	13	0
CHEMISTS	0	ASSISTANT TECHNICIANS	0	0	0	0	0	0	0	0	1	0
SOIL LAB	0	TECH. AUXIL. GRADE I	0	0	0	0	0	0	0	0	0	0
WATER LAB	0	TECH. AUXIL. GRADE II	0	0	0	0	0	0	2	0	2	0
PLUMBERS	0	OTHERS	0	0	0	3	0	4	24	132	160 ^x	21 ⁺
CARPENTERS	0		0	0	0	0	0	5	8	18	45	0
MASONS	0		0	0	0	0	2	6	20	52	53	4
DRAUGHTSMEN	0		0	0	0	0	8	3	20	23	33	2
PAINTERS	0		0	0	0	0	0	10	21	0	13	0
PLANT OPERATORS	0		0	0	0	0	2	0	0	34	0	0
SURVEYORS	0		0	0	0	0	0	6	24	5	19	0
GEOLOGISTS	1		0	0	0	0	0	1	16	0	0	0
TOTAL	76		0	2	11	23	39	206	301	447	644 ^x	31 ⁺

Notes: ^x, excluding Dar es Salaam which has 600 plumbers, technical auxiliaries Grade II.
⁺, excluding Dar es Salaam which has 700 plumbers, without grade.

In deriving projections for the numbers of different categories of personnel which may be needed in the water sector in Tanzania by 1991 the following sources were used:

- WHO guidelines on total required staff derived from detailed manpower assessments in other developing countries.
- A detailed recent analysis of the manpower needed in the water sector of Mozambique.
- A World Bank analysis of the mix of different personnel in the water sector of developing countries.

The WHO guidelines suggest that in a stable, well-developed rural water undertaking a ratio of one employee to 1,600 population can be expected. Assuming that 70 percent of the population of 25 million will be served in 1991, this implies a total water sector staff of 10,000 people. The World Bank presents data on the mix of personnel to be found in the water sector of rather more developed developing countries (Iran and Brazil). Adapting these data to the Tanzanian situation we suggest that a likely make-up of the water sector labor force may be:

Engineers	4%
Technicians	14%
Skilled Labor	28%
Admin. and Accounting	22%
Unskilled Labor	30%
Total	<u>100%</u>

These data suggest that by 1991 Tanzania will need about 400 engineers, 1,400 technicians, and 2,800 skilled laborers in the water sector.

In a detailed analysis of the manpower needs in Mozambique it was concluded that about one engineer will be needed for each 50,000 people served and about one technician for each 12,500 people served. These give slightly lower, but quite similar, figures to those derived from the WHO and World Bank data above. It may be concluded, therefore, that the projections made for Tanzania are valid estimates.

2.1.8 Present Production of Manpower

There are at present about 150 Tanzanian engineers working the regional water supply schemes. This number will increase to about 220 with the return of the 75 mechanical and electrical engineering students from India. (The imbalance between civil engineers, on the one hand, and mechanical and electrical engineers, on the other, which is seen in Table 5 will also be corrected with the return of these students.) Each year approximately 10 engineers who specialize in water engineering will graduate from the University of Dar es Salaam (of a total of 60 graduates in civil engineering). Similarly about five of the 20 diploma graduates from the Technical College may be expected to work in the water sector.

By the end of the decade, therefore, it may be expected that a total of about 355 engineers (220 + 9(15)) will enter the water sector. It is thus necessary to increase somewhat the production of water engineers from Tanzanian institutes.

Table 5 indicates that there are about 500 technicians at present in the water sector. By 1991 the WASH team estimates the requirement to be 1,400 technicians.

The MAJI Institute plans call for an annual production of 120 water sector technicians, or a production of 1,080 more technicians by 1991. Thus by 1991 a total of about 1,580 technicians will have graduated into service in the water sector. If the attrition rate from this cadre remains relatively low (about 12 percent overall) by 1991 the sector will have the required 1,400 technicians.

For each technician about two skilled workers will be required. That is, by 1991 about 2,800 skilled workers will be required in the sector by 1991. There are at present about 600 such workers in the sector, while each region plans to produce about 20 such workers per year. At this production rate, a total of about 4200 skilled workers will have entered the sector by 1991. This implies that even at an overall attrition rate of 30 percent there would be sufficient skilled workers if present training levels were maintained.

In summary, an analysis of the manpower needs in quantitative terms alone, suggests that present training programs are sufficient to meet the manpower needs for the Decade in the water supply sector.

2.2 Ministry of Lands, Housing, and Urban Development (ARDHI)

2.2.1 Role, Responsibilities and Interagency Relations

In 1974 the City and Town Councils were abolished. A severe reduction in the quality of services provided these urban areas was recognized in 1978 forcing the Government to re-establish the City and Town Councils. In 1978 the Sewage and Drainage Division was moved from MAJI to ARDHI to assist City and Town Councils in planning and implementing sewage, drainage and sanitation projects. The Sewage and Drainage Division was established within the Ministry of Lands, Housing and Urban Development (ARDHI). The Sewage and Drainage Division is responsible for the planning and development of sewerage and low cost sanitation systems in the urban areas. These sewerage systems include wastewater from domestic and industrial uses, storm waters, treatment works, and wastewater effluent outfalls. At the present time there are no urban centers in Tanzania in which significant portions of the populations are serviced by a collection and/or wastewater treatment system. Partial collection systems, though, are found in the following areas: Dar es Salaam, Tanga, Moshi, Mwanza, and Dodoma. ARDHI's responsibilities extend into 20 cities and towns which have been designated urban regions and are administered by a Town Council.

The Low Cost Sanitation Unit (LCSU) within the Sewage and Drainage Division is responsible for the development of appropriate least-cost excreta disposal systems. ARDHI, in close coordination with the Town Councils will assist with

the development of community awareness programs, design and siting considerations, self-help construction programs, design and implementation of sillage collection and disposal and development of fiscal and operational management plans.

ARDHI has undertaken several planning studies of combined sewerage and low-cost sanitation solutions to the urban sanitation problem in Tanzania. The Tanzanian Government through ARDHI has contracted the services of several international consultants to undertake sanitation studies in Dar es Salaam, Morogoro, Arusha, Moshi, and Mwanza. The term of references for these studies included the following phased elements of a sanitation Master Plan: planning study, design reports, detailed design stage and the preparation of the construction tender. Combined low-cost sanitation and sewerage systems were incorporated into the five Master Plans as specified by the terms of references to the consultants.

The low-cost sanitation alternatives proposed by the consultants for the urban centers will be an improvement of the pit latrine with design siting considerations to overcome odors and flies. Evaluation of these improved latrines will be an important aspect of these initial projects.

It is recognized by ARDHI that the success of implanting low cost sanitation in the urban areas will depend on the success of community mobilization programs and a significant self-reliance committment. An extension scheme is proposed through the Town Council to assist in fostering self-help and to serve as a vehicle for providing technical assistance in the construction, operation, and management of these low cost sanitation devices.

2.2.2 On-Going Sanitation Projects

Latrine construction programs in urban areas have been undertaken by the AFYA Health Officers and Health Assistants assigned to the Town Councils for many years. These programs though have not been national in scope but have been successful in certain localized urban areas. Composting toilets have been introduced through a Muhumbili Faculty of Medicine project in low- and medium-income housing areas of Dar es Salaam. A thorough study, country-wide, of the limitations and applicability of these types of systems has not been performed to date. For the most part these composting systems have not performed satisfactorily and are not being considered as alternatives in low cost sanitation projects. The Sewerage and Drainage Division of ARDHI has become the focus for the development of a national urban sewerage and sanitation strategy. The technical staff of the Division, with assistance from the UNDP Technical Advisory Group, has prepared terms of reference for engineering studies of combined sewerage and low-cost sanitation systems for Dar es Salaam, Morogoro, Arusha, Moshi, and Mwanza. Detailed master plans for these five urban areas have been presented to the Sewerage and Drainage Division by the consultants.

The Dar es Salaam Sewerage and Low-Cost Sanitation project has been tentatively approved for funding by the World Bank. The project has been accorded a high priority by the Tanzanian Government. Although the final agreement has yet to be negotiated, it seems likely that the project will begin within the year.

Funding appears to be highly unlikely for the implementation of the master Plans in the other four towns. The plans still will be useful since identifiable components of the low-cost sanitation schemes have been coupled with needs and problems areas within these respective urban areas.

A squatter-upgrading program has been initiated in Buguruni, a western suburb of Dar es Salaam, and includes a sanitation component. The first stage of the project includes access roads, drainage, public taps, and sanitation in a dense urban area of about 33,000 people. The sanitation component of the project will include the following items:

- A latrine promotion and health education program.
- The construction of about 100 demonstration improved latrines (VIP) and sullage disposal units.
- The production, distribution and sale of 500 kits for latrines and sullage units, comprising mass-produced slabs, trap vent pipes and substructure kits.
- The establishment of a revolving fund to allow the production and sale of more kits.
- Training of local 'fundis' and ARDHI staff to promote and construct improved latrines and sullage units.
- The provision of a satisfactory pit emptying service for Buguruni.
- The establishment of a permanent sanitation center, providing offices, pre-casting facilities, workshops, storage areas, demonstration latrines, and sullage units.

Since 1975 a considerable amount of design work and experimental construction has been undertaken in Dar es Salaam to develop latrine alternatives which will be appropriate in Tanzania. The policy of ARDHI is to promote the Ventilated Improved Pit Latrine (VIP Latrine). This is a permanent latrine with a vent pipe, which controls odors and reduces flies and mosquito breeding, and can be accessed for emptying. Approximately one hundred VIP latrines have been constructed by ARDHI throughout Dar es Salaam. Overall they have been successful but are too expensive for mass consumption. Cost reductions can be achieved by incorporating a cheaper substructure and by using local building materials for the super-structure.

Final designs to be used in Buguruni will be agreed on between ARDHI and the consultants. It appears that a selection of basically similar designs will be offered to accommodate differing abilities to pay and differing site conditions.

The manpower plan for the proposed sanitation scheme for Morogoro (Table 7) is shown in Figure 6. The sanitation system would have both a collection treatment component and an on-site disposal collection component. There would be a manager for the sewer collection system treatment-laboratory system and the on-site disposal system. The staffing guide for Arusha's proposed low cost sanitation and sewerage project is shown in Table 8.

Table 7

SUMMARY OF PROPOSED STAFF REQUIREMENT FOR MOROGORO'S SANITATION PROJECT

	Phase I	Phase II	Phase III
#VIP	1500	6500	13,500
Length of Sewers	9.6 km	12.0km	14.5km
Director	-	1	1
Section Managers	2	3	5
Administration Section	3	5	8
On Site Systems Section	16	20	50
Sewer Maintenance Section	17	17	17
Treatment Section	5	9	16
Stores and Workshop	1	3	11
TOTAL	44	58	108

Sources: ARDHI Ministry Official Papers and Reports

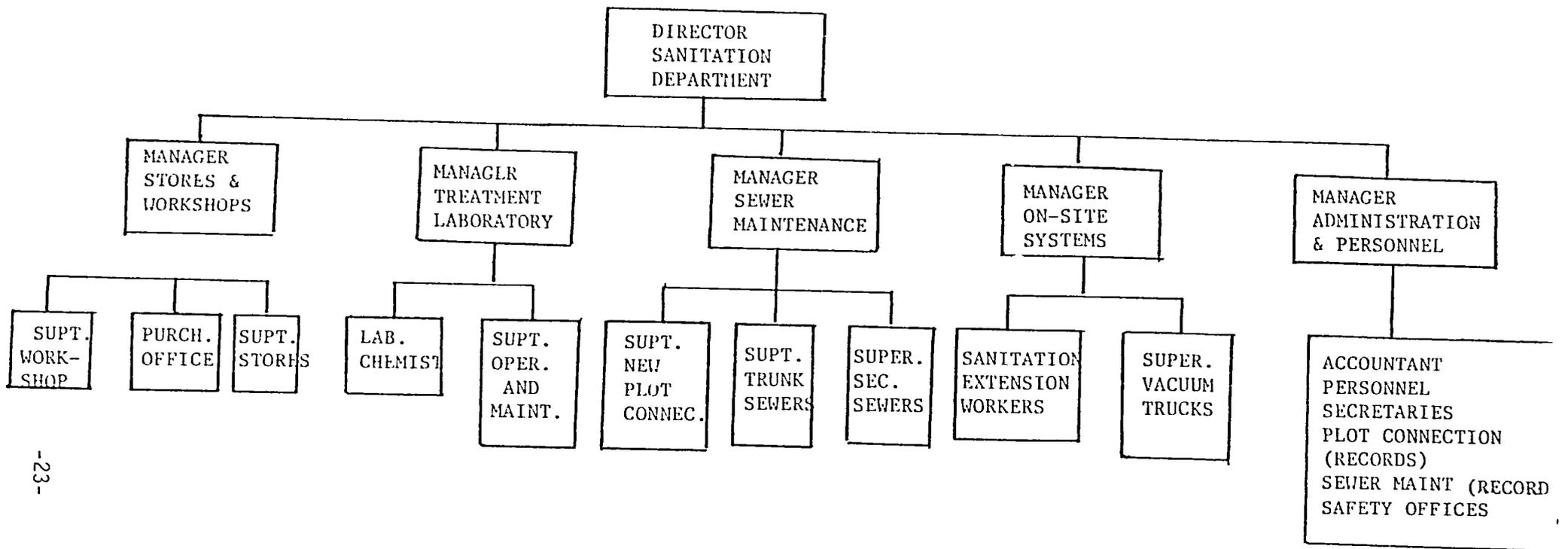


Figure 6: PROPOSED ORGANIZATION STRUCTURE AND STAFFING REQUIREMENTS FOR MOROGORO'S SANITATION AND SEWAGE COLLECTION AND TREATMENT SYSTEM.

Source: ARDHI Ministry Official Papers and Reports

Table 8

PROPOSED STAFFING GUIDE FOR ARUSHA'S LOW COST
SANITATION AND SEWERAGE PROJECT

	Headquarters	Maintenance	Winch Set Gang	Transport	Sewer Flushing
Superintendant	1				
Technicians	1				
Mechanic	1				
Storeroom	1				
Mechanic Assistant	2				
Foreman		2	1		
Plant Operators		2	2		
Labor		4	4		3
Drivers				3	1

Sources: ADRHI Ministry Official Papers and Reports

2.2.3 Occupational Categories and Job Description

The Sewerage and Drainage Division incorporates within it the Low Cost Sanitation Unit (LCSU) which is responsible for the planning, design and implementation of sewerage systems. The Division is also responsible for the development of appropriate least cost human excreta disposal systems.

Senior Principal Engineer or Principal Engineer

The Senior or Principal Engineer has the following responsibilities:

- Preparation of sewerage and low cost sanitation master plan for the principal urban towns of Tanzania.
- Preparation of least cost sewerage and low cost sanitation implementation programmes.
- Quantify benefits, direct and indirect, derived from sewerage and low cost sanitation projects.
- Undertake research study and recommend where appropriate cost recovery methods on investment.
- Cost minimization studies on sewerage projects.
- Keep the division up to date on current developments on waste water treatment and disposal.

Senior Executive Engineer

The Senior Executive Engineer has the following responsibilities:

- Feasibility studies for sewerage, low cost sanitation, and storm water drainage of all urban and suburban areas of Tanzania.
- Preparation of key plans showing reticulation system of the sewerable area of the town.
- Project appraisal.
- Development of appropriate design criteria and technology mix for the sewerable and non-sewerable areas.
- Design of pumping stations, inlet works, treatment plants, outfalls and all other ancillary structures.
- Statistical analysis of rainfall intensity.
- Frequent visits and inspection of operational works, conduct interviews with operatives, identify operational problems.
- Preparation of detailed working drawings in consultation with the construction engineer (Ministerial projects only).

- Train junior engineers in their respective fields to bring them to the professional level required for the proper execution of their duties.

Executive Engineer

The Executive Engineer has the following responsibilities:

- Supervision of Civil Works.
- Preparation of time schedule for projects.
- Preparation of quarterly physical progress report and quarterly financial statement of expenditure for projects.
- Develop and enforce safety construction procedures.
- Visits to completed civil works to inspect and check the soundness of structures.
- Design of concrete mixes to suite structural conditions.
- Control of quality and workmanship.

Senior Assistant Executive Engineer

The Senior Assistant Executive Engineer has the following responsibilities:

- Setting out works at construction sites.
- Computation and valuation of civil engineering quantities.
- Enforce safety procedures at work sites.
- Supervision of civil engineering works, control of quality and workmanship.
- Design of concrete mixes.

Senior Public Health Engineer

The Senior Public Health Engineer has the following responsibilities:

- Identification and location of areas in the urban areas which may not be sewerred within the next 10-20 years.
- Development of alternate sanitation options--taking into account ground-water table, geology, soil structure, climatival conditions, etc.
- Recommendation of suitable sanitation options basing on long-term observations.
- Supervision of construction of experimental low cost sanitation units.

- Preparation of bill of quantities. Advise on methods of cutting down costs using appropriate materials and techniques.
- Establish public mass media through the use of illustrated diagrams, radio, seminars, etc., for educating the people of the dangers of uncontrolled defecation and the advantages of good hygiene.
- Liaison with other bodies engaged in the manufacture of sanitary components.
- Organize training programs in urban centers and rural areas for the purpose of displaying appropriate technology.

Principal Technician for Survey

Principal Technician undertakes the following duties:

- Level and theodolite surveys, computation and reduction of data.
- Preparation of mosaics (from aerial photography) for areas under study where up to date maps are not available.
- Up-date township maps where such maps have not been produced by the Surveys and Mapping Division.
- Check sewer gradients during construction.
- Liaison Office between the survey section and the surveys and mapping division of ARDHI.

Senior Technician for Survey

- Level and theodolite surveys, computation and reduction of data.
- Route surveys and location (vertical and horizontal alignments).
- Identification and location of existing services--pipelines and telephone and power lines.
- Identification and location of existing structure which may have influence in sewer lines, pumping stations, etc.
- Monitor urban development and report deviations from the approved urban Master Plans which have significant effect on sewer design.
- Train junior technicians.

Senior Technician for Drafting

Technicians for drafting are responsible for production of drawings as may be directed by the Planning and Design Engineers. Their work is confined to the drawing office.

Technician I & II

The Senior Technicians I and II assist the Senior Technicians in the day to day duties.

2.2.4 Existing Manpower and Staffing Mix

The present staff for the Sewerage and Drainage Division of ARDHI is composed of eight engineers, three Health Officers, one technician and a sociologist (on educational leave to obtain a Master's Degree). A support staff of eight people assist the technical personnel. This staff includes two accountants, two secretaries, a typist, two messengers, and two drivers.

It is difficult at this time to assess the staffing mix as it relates to division function since ARDHI has not yet been involved in a full scale project. An initial assessment of the staffing mix indicates a lack of technical support for the engineers and health officers. As the Dar es Salaam project is implemented and other Town Councils request assistance in sewerage and sanitation projects it is envisioned that a need will exist for public health technicians, health assistants, and construction technicians.

In review of the proposed staffing guide for 1982-1983, Table 9 indicates a significant increase in the technician level. It also indicates an increase of two more engineers. It is proposed to increase the three health officers now assigned to ARDHI to four.

2.2.5 Manpower Projections

The Sewerage and Drainage Division, in a paper presented to the Arusha UNICEF water and sanitation workshop in 1980, estimated that one public health engineer would be needed for every 10,000 people in urban areas. Assuming that five public health technicians would be needed for each engineer, and that each town would require four health officers in the sewerage and sanitation sector and one health educator, the projected requirements of manpower in the towns is presented in Table 10.

2.3 Ministry of Health (AFYA)

2.3.1 Role, Responsibilities and Interagency Relationships

Since independence, the Government of Tanzania has stated as its health priorities:

- To improve the health of the people by decreasing infant mortality and increasing life expectancy through the control of communicable disease;
- To insure that health care is accessible to all people; and,
- To move toward Government self-sufficiency in providing health services and personal self-sufficiency in basic health management.

Table 9: SCHEDULE OF ARDHI STAFFING GUIDE - ANNUAL ESTIMATE
 1982/83 - ESTABLISHMENT AND STRENGTH FOR PERIOD
 ENDING JUNE 1983

Group	Item	Designation	ESTABLISHMENT	
			82/83	83/84
1		Designation	1	1
2		Senior Exec.Engr.	2	2
3		Exec. Engr.	2	3
4		Senior Asst.Exec.Engr.	3	4
5		Asst.Exec.Engr.	3	4
6		Senior Tech.	1	1
7		Tech. II/III	1	3
8		Tech. IV	3	4
9		Asst. Tech.	3	5
10		Health Officer I	2	3
11		Health Officer II/III	1	1
12		Health Officer IV	1	1
13		Sociologist II/III	1	2
14		Pers. Secty. II/III	1	1
15		Accts. Asst. I/II	2	2
16		Accts. Clerk	2	3
17		Registry Asst. I	1	1
18		Registry Asst. II	1	1
19		Registry Asst. III	1	1
20		Typist Grade 1	3	5
21		Office Attendant	1	2
22		Machine Operator	1	1
23		Drivers	6	7
24		Tech. (Draught)	1	2
25		Asst. Tech. (Draught)	1	2
26		Tech. Aux. I	1	2

Sources: ARDHI Ministry Official Papers and Reports

Table 10

PROJECTED NEED AND DISTRIBUTION OF PUBLIC HEALTH ENGINEERS
AND PUBLIC HEALTH TECHNICIAN

	1980	2004
Public Health Engineers (1/10000)	200	800
Public Health Technicians (5/PHE)	1000	4000
Health Officers 4/Town	80	320
ARDHI Ministry - Public Health Engineers	10	40
Health Educators 1/Town	20	80

In 1967 the Arusha Declaration mobilized the steady expansion of rural health infrastructure and the further development of services in environmental sanitation, maternal and child health, nutrition, and communicable disease control. The biannual Conference of the Party (TANU) in 1971 specifically directed that health services, basic education and adequate and wholesome water in rural areas should receive top priority in future national socio-economic development plans.

The main objectives of the Government's environmental health programs are to encourage people to build hygienic and permanent dwellings, to build and use appropriate and durable latrines, as well as to ensure the availability of safe water. AFYA has the specific responsibility for meeting the environmental health needs of Tanzania's rural population which accounts for 95 percent of the total population. ARDHI is responsible for sanitation needs in the urban areas. MAJI is responsible for rural and urban safe water supplies.

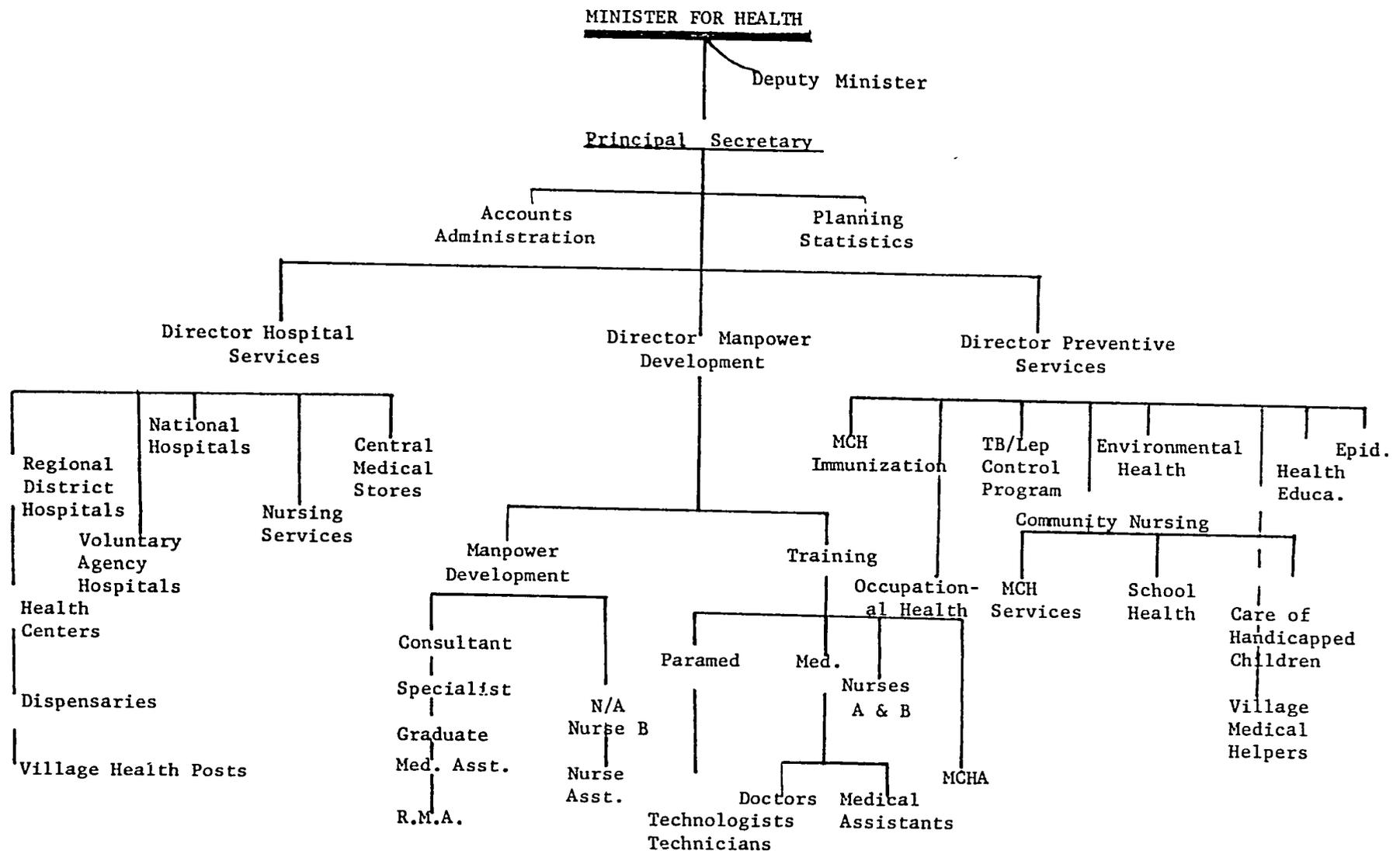
An evaluation of the health sector was conducted in 1979 by AFYA to assess the development of Tanzania's health care delivery system in the 1970's. Ninety-seven percent of the villagers interviewed identified the construction of pit latrines as the main environmental sanitation campaign measure. The disposal of refuse was indicated by 46 percent of those interviewed as a target problem. Eighty-six percent of the villagers said they had pit latrines and, of these, 80 percent made use of them. The combination of national educational campaigns, anti-cholera campaigns, and an expanded rural health infrastructure have awakened public awareness to the necessity of using pit latrines. However, there is still a need to assess the quality of these latrines and to broaden the range of measures possible to include safe water supply, refuse disposal, and housing. Lack of program preparation, training facilities, personnel, transportation, and funds have been cited as factors in inhibiting the full implementation of environmental health programs. A recommendation made by AFYA, as a result of their evaluation, was for the formation of an inter-ministerial committee. This committee, of which AFYA is a member, could coordinate the implementation of the International Drinking Water Supply and Sanitation Decade efforts in general environmental sanitation and water supply.

2.3.2 Organizational Structure and Budget

In 1973 AFYA was reorganized into three divisions: the Preventive Services Division, Manpower Development and Training division, and Hospital Services Division. The Environmental Health Unit falls under the Preventive Services Division as illustrated in the AFYA Organization Chart in Figure 7. In 1976 this unit was strengthened by increasing the number of staff from one to four. There are at present: one Principal Health Officer, one Senior Health Officer, and two Health Officers. They are responsible specifically for coordinating with MAJI and regional authorities to develop the rural sanitation component of the International Drinking Water Supply and Sanitation Decade activities.

Although since 1972 health and other development sectors have largely been decentralized to the country's 20 regions, the Ministry still retains important functions. Activities retained by AFYA include the development of

Figure 7. Organization Chart - Ministry of Health



-32-

Source: Tanzania Health Sector Strategy, AID, 1980.

policy and national plans, the allocation of resources, the training and deployment of manpower, collection and dissemination of information for program evaluation and biomedical research, contact with other sectors involved in primary health care, and coordination of all foreign donor inputs into the health sector. The planning process for the development of the health sector is illustrated by Table 11.

The Regional Health Function Heads are the Regional Medical Officers who are the physicians in charge of the Regional Hospitals. Although national health policy emphasizes preventive services to rural populations in particular, the expenditure of financial resources does not reflect this. Rural health centers and dispensaries are mainly financed by the regions with some financed through the national AFYA budget. For the health sector the following sub-votes are used: Curative Services, Preventive Services, and Health Centers. The 1979 evaluation of the health sector found that in some regions development costs for preventive environmental sanitation were not found under the health sector sub-vote but could be traced to other sub-votes.

In 1978-79, 705 million Tsh. were spent on health care, preventive services, and manpower training. This was 5.6 percent of the total government expenditures (national and regional) in all sectors. During the last 10 years the proportion used for health first increased from 5.2 percent in 1970-71 to 8.9 percent in 1973-74 and then steadily decreased to 5.5 percent in 1980-81. Tables 12 and 13, below, provide a more detailed breakdown of the development and recurrent expenditure in the health sector over time.

As can be seen preventive services and training have steadily increased their share of the health sector budget. However the absolute amount of funds is far from adequate for achieving health promotion and disease prevention in the rural areas.

2.3.3 On-Going Water and Sanitation Projects

The Tanzania School Health Project was funded for 1980-83 by USAID to extend the reach of the health system's preventive services to a large and important segment of the population without requiring any additional facilities and personnel. It responds to the objective of helping rural and underserved communities to understand through their school children the determinants of health and to undertake health activities such as the provision of safe water and the improvements of sanitation facilities.

This pilot project has been introduced in Dodoma and Singida, the two poorest regions of the country. Existing district health officers are being trained as school health officers to establish, develop, and monitor 80 pilot schools. They coordinate water and sanitation actions for these schools through the District Development Committees and supplement available resources when necessary with materials, equipment and transport. The health officers also train one teacher in each school to become the school health coordinator skilled in diagnosing and treating primary health care problems, latrine construction, operation and maintenance of low-cost water supply, and health education.

Table 11:

PLANNING PROCESS FOR HEALTH DEVELOPMENT

Levels

NATIONAL	Planning Commission	
	Ministry of Planning and Economic Affairs	Prime Minister's Office and Ministry of Health
INTERMEDIATE	Regional Development Committee	Regional Health Functional Manager
LOCAL	District Development Committee	District Health Functional Manager
	Divisional Development Committee	Medical Assistant
	Ward Development Committee	Rural Medical Aide
	Village Council	Village Health Worker

Source: Country Report on Tanzania Planning and Statistics Unit, Ministry of Health, January 1982.

Table 12:
DEVELOPMENT OF RURAL HEALTH CARE SERVICE PROVIDERS IN TANZANIA

Cadre	1972	1978	1980	Targeted
Medical Assistant	335	1,176	1,400	1,200
Rural Medical Aide	578	1,736	2,310	2,800
MCH Aide/Village Midwife	700	1,900	2,070	2,500
Health Assistant	290	545	630	1,800

Source: Country Report on Tanzania, Ministry of Health, Planning and Statistics, January 1982.

Table 13 :
TOTAL DEVELOPMENT EXPENDITURE IN HEALTH SECTOR

	1970/71 mill.shs	%	1973/74 mill.shs	%	1975/76 mill.shs	%	1978/79 mill.shs	%
Hospitals	5.5	34	7.4	27	12.9	20	26.5	32
Health Centres	0.8	5	11.1	40	16.0	24	19.5	23
Dispensaries	3.5	22	4.9	18	6.5	10	8.1	10
First Aid Boxes	-	-	-	-	1.2	2	0.6	1
Preventive Serv.	0.3	2	0.6	2	5.7	9	8.7	10
Training	5.1	32	3.8	14	18.9	29	12.4	15
Drugs/Vaccines	0.6	3	-	-	0.6	1	0.3	-
Other	0.2	1	-	-	3.7	5	7.6 ⁽¹⁾	9
TOTALS	16.0	100	27.9	100	65.6	100	83.6	100

1) 5.9 million shs. refers to recurrent and development expenditure for Tanzania food and Nutrition Centre (TFNC).

Source: Evaluation of the Health Sector, Planning Unit, Ministry of Health, October 1980.

The project is also helping to pre-test the new school health curriculum developed by the Ministry of National Education (ELIMU). A resource manual called the "Health Handbook" is being developed to accompany the curriculum. Enough copies will be printed for each of the country's 20,000 primary schools.

The overall purpose of the school health project is to establish the school as a community education center. Adults and children alike are encouraged to use the services of the school health coordinator. The latrines and shallow wells (where these can be constructed) at the schools serve as models of low-cost facilities appropriate for the village.

Wangingombe Rural Sanitation Project

In 1977 MAJI, with assistance from UNICEF in the provision of materials, started the Wangingombe North Water Supply Project in Iringa. In early 1982 the \$4.2 million first phase of the project was all but complete with the gravity-fed supply providing water to 80,000 villagers. The second phase of the project, which will include the filling of six large slow-sand filters and an extension of the distribution network, is about to begin.

Two major concerns remain with respect to the water supply project. The first is that the water is not treated despite an inadequately protected catchment, and the second is that 50 percent of the target population continues to use traditional water sources because the standposts are farther than these sources from their homes. For this reason, Phase 2, which will cost \$1.5 million and will involve making the already constructed (but unfilled) slow-sand filters operative and extending the distribution network to bring water closer to the villages, is to be undertaken.

As concern with the integration of water supply and sanitation in Tanzania and elsewhere has grown, so has concern about the limited health impact of projects in which water is supplied but no improvement in excreta disposal is made. With the assistance of the UNDP-TAG Project, UNICEF initiated a series of experiments to develop a design of a permanent, low-cost latrine suitable for use in the Wangingombe area. The experimental stage is now nearly over, with the technology of choice being a double-vault VIP latrine constructed with locally-produced bricks. UNICEF's formal contribution is limited to the provision of two bags of cement for the sub-structure, the provision of a pre-cast reinforce concrete squatting slab, a precast slab for the side which is not in use, and the vent pipe screen. The marginal cost to UNICEF is about \$25 per latrine while the average cost is about \$100 per latrine.

Four pilot villages have been chosen and latrine construction has started in all of these. By mid-February 1982, about 100 complete VIP latrines had been built, and a further 350 were under construction. The villagers make the 3000-odd bricks needed for each latrine (with UNICEF providing the transportation necessary for obtaining sufficient firewood). Each family digs the pit for their latrine, while local fundis volunteer their services for the construction of the latrines (apparently in return for a reduction in their other communal responsibilities).

The Wangingombe Project is seen by the Ministry of Health as a possible pilot project for a national rural sanitation construction project and therefore was of interest to the WASH team in terms of its replicability and institutional and manpower requirements.

The Wangingombe Rural Sanitation Project is an impressive demonstration of the progress which can be made in the construction of permanent improved latrines in a rural area. Its successes to date is a tribute to the dedication of the local party cadres (whose contribution in mobilizing the villagers has been great), the UNICEF staff, and the AFYA Health Officer and two Health Assistants who work on the project. Big question marks nevertheless remain over the chances for the overall success of the project and about the lessons which can be drawn from it in terms of a national program for rural sanitation.

In the short run the most obvious problem is that financing has yet to be secured for the \$1.5 million sanitation component. Assuming that external funding is obtained, there remain questions as to whether the project will indeed manage the planned 100 percent coverage in 15 villages per year for four years. The four pilot villages were chosen because they were among the most advanced villages (in terms of organization), and it may be that there will be more problems in the "less advanced" villages.

In terms of replicability, it should be noted that in all pilot projects certain inputs are made which could not be made in a national program. In particular the project is not based in an existing national institutional structure, but depends very heavily on the UNICEF presence for morale, construction, and , perhaps most important, flexibility. For instance, UNICEF was able to provide motorcycles to party members in return for their cooperation in motivating villagers to participate in the water supply construction. Similarly, UNICEF has the resources and flexibility to help overcome what would otherwise be a critical constraint, namely, the lack of transport for carrying firewood.

A very important concern about the project is the poor quality of the baseline behavioral data. According to the project:

- an average of 92 percent of the families have latrines; but 80 percent are not in use;
- new pits have to be dug every year;
- many of the pits collapsed during the rainy season;
- the villagers are anxious to construct permanent latrines.

An independent and more intensive survey subsequently carried out by DANIDA in the project area came to quite different conclusions:

- virtually all of the existing latrines were in use;
- there was no indication of indiscriminate defecation in or near villages;
- 60 percent of the latrines were re-built because the squatting plates collapsed, and 36 percent of the latrines were re-built because the latrine

had filled up, (collapse of the pit was seldom mentioned as a problem by villagers, despite the fact that it is very rare to find a lined latrine in the area);

- latrines had to be rebuilt on an average of once every three years;
- there seemed to be very little interest among the villagers in sanitary improvements.

In summary, the great hopes which have been raised for Wangingombe serving as a model for a national rural sanitation strategy are probably premature. In the opinion of the WASH team, the Government of Tanzania and any donors who may be involved in Wangingombe should:

- insist on a further detailed baseline survey which relies on both observations and questionnaires of defecation practices in the study area;
- insist that a modification of the much cheaper and simpler Zimbabwe "bush privy" be offered along with the existing "Wangingombe designs;"
- insist on an independent and intensive periodic analysis of the project itself to determine accurately all of the quantifiable and non-quantifiable inputs which are made into the project and to determine the possibilities of replicating such a project at a national level.

In conclusion, the WASH team feels it important to point out a couple of lessons which are clear from the Wangingombe experiment. Firstly that although the program is seen as a follow-up to the MAJI water supply project, MAJI is in no way involved in the sanitation project. Secondly, that despite frequent comments about the ineffectiveness of the AFYA program, great progress has been made by AFYA in conjunction with other structures (especially the party) in encouraging villagers to construct truly low-cost latrines and, if the DANIDA surveys in Iringa and Mbeya are accurate, in convincing villagers to use and maintain these latrines.

In collaboration with the Institute of Adult Education and ELIMU, AFYA has launched two very successful health campaigns. In 1973 "Health is Life" was developed and implemented as a mass health education program focusing on preventive health measures and the maintenance of newly-acquired reading skills for those participating in the national literacy campaign. One million copies of a booklet for participants and 75,000 copies of a manual for study group leaders were produced. Twelve weeks of 30-minute radio broadcasts on specific diseases and their prevention were done. Seminars, workshops, and conferences were held at all administrative levels to train and orient local service providers.

A second national campaign called "Food is Life" was broadcast in 1975. It was aimed at overcoming food taboos, preventing malnutrition, improving diets, encouraging breast-feeding and food preservation techniques. A third national campaign is planned focusing on environmental sanitation. It was originally scheduled for 1980 but was postponed. A target date has not yet been determined. The Health Education Unit in AFYA is the lead planner for the campaign.

2.3.4 Proposed Projects

To achieve health for all by the year 2000, AFYA will embark on a national program to train and support community level health workers who will serve the majority of Tanzanian villages which have no dispensaries. AFYA's Planning Unit and Division of Manpower Development and Training have designed the program and training plan. The Division of Preventive Services will be responsible for its implementation. Policy level decisions have yet to be finalized on this extensive primary health care program; however, AFYA is hoping to launch the program in 1982, particularly after having to postpone it in 1981 due to planning and funding difficulties.

The strategy is that by the end of five years, each of the 6,000 villages without a dispensary will have a male village health helper trained and responsible for environmental sanitation aspects of primary care and a female village helper trained and responsible for maternal and child health aspects of primary care. Twenty-five percent of their activities are to be curative with 75 percent being preventive services. The selection of these helpers would be left to the village council, but criteria would be suggested: standard 7 education, age 25-45, and married. The long-range plan is to train helpers who could eventually be upgraded after two or three years service to become health assistants of MCH aides, if they so desired. This scheme would offer additional incentives in career development along with the 300 Tsh. they would receive each month as an honorarium from the government through their village council. Moreover, if a dispensary is eventually established in their villages, the helpers would have the opportunity to be employed in their village as a Health Assistant or an MCH aide.

At this point in time, it has been planned for the regional level health personnel to conduct the training of village health helpers in the yet-to-be-established district training centers. The district health officers would be the overseers of training and eventually the overall supervisors of the helpers. However, the medical assistants and rural medical aides will be their direct supervisors. There is a potential for conflict in this supervision scheme in that medical assistants and rural medical aides are directly accountable to the district medical officer and not to the district health officer.

2.3.5 Occupational Categories and Job Description

The health facilities infrastructure is described in Table 14. The occupational categories for staffing these facilities are the following:

Medical Officers: Posted to consultant, regional and larger district hospital. They are expected to undertake general medical practice: pediatrics, surgery, obstetrics, preventive medicine and administration. They are responsible for all the various categories of health personnel working under their jurisdiction, for equipment and stores, for submitting detailed reports and statistics as required, and for dealing with financial matters. With such an overwhelming amount of responsibility, medical officers have very little time and training for the development of innovative programs in preventive services or for supporting the work of their staff trained in preventive services.

Table 14 :

DISTRIBUTION OF HEALTH FACILITIES IN TANZANIA MAINLAND IN 1979

Administrative Structure		Health Facilities		
Type	Actual Number	Type	Actual Number	Targeted Number
Zone	6	Consultant Hospital	5	6
Region	20	Regional Hospital	17	20
District	104	District Hospital	126	104
Division	360	Health Center	239	360*
Ward	1,963	Dispensary	2,600	2,300*
Village	8,300	Health Post	230	8,300

* 1 Health Center per 50,000 people

* 1 Dispensary per 8,000 people

Source: Country Report on Tanzania, Ministry of Health, Planning and Statistics, January 1982.

Assistant Medical Officers: Assistant medical officers are posted to hospitals to perform the duties of medical assistants in addition to performing surgery. They may be posted as district medical officers in which case they are also responsible for the staff falling under their jurisdiction and financial administration. This cadre also lacks the time and training for developing more effective preventive services.

Medical Assistants: Medical assistants are posted to rural health centers as the in-charge or act as clinical assistants to medical officers and assistant medical officers and assistant medical officers in hospitals.

Rural Medical Aides: Rural medical aides are posted to rural dispensaries as the in-charge or act as clinical assistants in rural health centers. Serious cases are referred to health centers or hospitals.

Nurses/Midwives Grades A or B: Nurses/midwives grades A and B are posted to health centers or hospitals to undertake general nursing duties including the administration of prescribed drugs and treatment.

Public Health Nurses: Public health nurses are posted to hospitals and provide general nursing supervision of MCH services and administer prescribed medicines and treatments.

Health Officers: Health officers are posted at the regional and district levels to be responsible for environmental health. They deal with specialized fields in public health education as well. However, they receive minimum supervision and support from their regional or district medical officers in developing more effective preventive services for environmental sanitation. See Appendix D for their scheme of service.

Health Assistants: Health assistants are posted at health centers and dispensaries to carry out environmental sanitation work in rural areas, trading centers and Ujamaa villages. However, due to a serious shortage of personnel at this level, they are often assigned other responsibilities of a more curative nature. See Appendix D for their scheme of service.

MCH Aides: MCH aides are posted at clinics attached to rural health centers or dispensaries to deliver basic MCH services. Higher risk cases are referred to health centers or hospitals.

The medical assistant, rural medical aide, health assistant and MCH aide comprise the cadre of rural health care providers for Tanzania. Table 12 above describes how they have increased in number. It can be seen that the number of health assistants has only doubled while the other categories of personnel have more than tripled. The actual number of health assistants is also the farthest away from reaching the government's target number.

2.3.6 Existing Manpower and Staffing Mix

An inventory of health facilities was conducted by the Planning Unit of AFYA in 1978 and 1979. Its findings revealed that the staffing pattern of health centers was very closely approaching the recommended targets. A total of 181 rural health centers had 169 medical assistants, 369 MCH aides or village

TABLE 15:

TOTAL RECURRENT EXPENDITURES IN HEALTH SECTOR

	1970/71 mill.shs	%	1973/74 mill.shs	%	1975/76 mill.shs	%	1978/79 mill.shs	%
Admin/General	5.0	4	3.2	1	2.7	1	4.7	1
Hosp.Services ⁽¹⁾	111.8 ⁽²⁾	82	222.7	67	236.1	65	391.0 ⁽³⁾	63
Health Centres	5.9	4	21.2	6	23.8	6	46.9	8
Dispensaries	- ⁽²⁾	-	38.3	11	41.2	11	62.5	10
Preventive Serv.	6.8	5	30.4	9	35.7	10	72.7	12
Training ⁽¹⁾	3.2	2	13.1	4	21.6	6	33.4	5
Other	3.0	2	5.0	1	4.1	1	10.3	2
TOTAL	135.8	100	333.8	100	365.2	100	621.5 ⁽³⁾	100

Source: Evaluation of the Health Sector, Planning Unit, Ministry of Health, October 1980.

midwives, 375 trained nurses/midwives, 169 health assistants, and 130 microscopists. Dispensaries, however, were far from reaching the recommended staffing of one rural medical aide, one MCH aide, one health assistant, and one nursing assistant per dispensary. Less than 45 percent of the government rural dispensaries had rural medical aides. Fifty-five percent had MCH aides. Only nine percent had health assistants.

In 1980 there were 306 health officers to cover 144 regional and district health facilities and 630 health assistants to cover 2,839 rural health centers and dispensaries. There is an obvious disparity in the rural health infrastructure between the rate of facilities being established and the rate of personnel being trained in environmental sanitation. The situation at the village level is worse with neither facilities nor manpower being developed.

2.3.7 Manpower Projections

As described above there is a serious manpower shortage at the dispensary level with special reference to the extremely small number of health assistants. There are at present 630 health assistants and 2,600 dispensaries. Each year 145 health assistants are graduated from the country's six schools. If the number of dispensaries remains the same over the next 15 years, Tanzania will be able to post one health assistant to every dispensary by the year 2000.

It is, however, unrealistic to expect the number of rural health facilities to remain static given the population projections to the year 2000 for Tanzania which has an annual population growth rate of 3.3 percent. The 1978 census showed a total of 17,057,080 people, and from this figure it has been projected that in the year 2000 there will be 34,571,000 of which 86 percent will be in the rural areas.

Given this population figure and the standard of one dispensary/8000 people and one health center/50,000, Tanzania will need approximately 5,100 health assistants by the year 2000. To achieve this number, AFYA will need to produce 285 health assistants per year.

The Environmental Sanitation Unit of AFYA has based manpower projection on the WHO ratio of one health assistant per 5000 people. Given this standard, Tanzania needs 4,340 health assistants in 1982 and will need 6,914 by the year 2000. To achieve this number, AFYA will need to produce 349 Health Assistants per year. For a more detailed analysis see Table 16.

Health Officers, however, appear to be closer to meeting the manpower need for 1980 in that twice as many are necessary as opposed to the need for nearly six times as many health assistants. The Environmental Sanitation Unit, again, uses the WHO ration of one health officer per 25,000 people for its manpower projection of 1382 health officers by the year 2000. To achieve this number, AFYA will need to produce 59 health officers per year which is 19 more than are being presently graduated per year. For a more detailed analysis of manpower projections, see Table 16.

Table 16

AFYA PROJECTED MANPOWER NEEDS IN THE SANITATION SECTOR

	Actual Number		Number Needed Per Population			Number Needed Per Facility		
	1980	Prod/Yr	1980	2000	To Be Prod/Yr	1980	2000	To Be Prod/Yr
Health Assistants	630	145	3674 (1/5000 pop)	6914	349	2839	5100	285
Health Officers	306	40	720 (1/25000 pop)	1382	59	720	1382	59

Sources: AFYA Ministry Official Papers and Reports

2.4 Other Ministries

2.4.1 Ministry of Manpower Development and Administration (UTUMISHI)

This Ministry was established in 1975. Prior to that it was known as "Central Establishment," a department within the President's Office. The Ministry is divided into six departments, with the following responsibilities:

1) Directorate of Civil Service Administration

Routine personnel administration such as confirming appointments, retirements and termination, transfers, and promotions.

2) Directorate of Personnel Policy

Responsible for staff welfare matters, examining policy options and problems, proposing policies, and interpreting policies to ministries and regions.

3) Directorate of Manpower Planning

Responsible for logical grouping of skills categories, leading to a more coordination in planning manpower development.

4) Directorate of Training and Manpower Allocation

Responsible for coordinating and providing central services and expert assistance to programs in training and recruitment so as to ensure that effective comprehensive and economic training programs are established and carried out, and also to ensure the efficient operation of the nation's recruitment (for both local and expatriates) and initial deployment programs.

5) Directorate of Management Services

Responsible for providing expert advice on organization, methods, and manpower utilization to ministries, regions and parastatals.

6) Directorate of Manpower Development and Administration

Responsible for carrying out the Ministry's internal services such as finance and office services and also providing central services to government: mail clearing center and publications section.

This Ministry is continually producing manpower need and availability predictions based upon information supplied by the various Ministries. Categorical requirements for professional, technician, skilled labor, and craftsman manpower for the various sectors was made available to the WASH team for use in this report and presented in Table 17. In general this manpower prediction is not necessarily based on program needs but rather extrapolated from historical staffing levels. This information is valuable, and, for defining the general patterns of manpower utilization it could serve as an extremely useful tool in the future with refined data collection and validation techniques.

Table 17: SELECTED MANPOWER PROJECTIONS - UTUMISHI 1981-1986

	<u>Existing</u>				<u>Needs</u>						
	Citizen	Non-Citizen	Total Employees	Vacancies	Private	Public	Construction	Others	Service	Utility	Total
Dumpman (A)	14			14	5	16					21
Water Pump	58		58						39		39
Civil Engr. (A)	353	127	480	243			267		372	113	752
Sanitary Engr. (A)				2			10		12	5	27
Water Engr. (A)	96	8	104	53	10				73		83
Microbiologist (A)	2		2						10		10
Lab. Technician (B)	910	3	913	202				112	205		519
Civil Engr. Tech. (B)	4896	8	4964	1111				143	1704		2071
Health Insp. (A)	976	9	985	251				19	433		452
Medical Lab. (B)	587	12	599	298				22	348		370
Medical Asst. (B)	1238		1238	456				74	629		703
Hydrologist (A)	71	1	72	30					73		73
Manpower Planning (A)	28		28	30					34		34

Category A - Professional

Category B - Technician

Sources: UTUMISHI Ministry Papers

The Training for Rural Development (TRD) Pilot Project is within the management services unit of UTIMISHI and is being funded by USAID. It has recently completed its first two years of Phase I and will continue Phase II over the next four years. The purpose of TRD is to increase agricultural productivity at the village level through competency-based management training. Before project implementation began, some 40 Tanzanian workers were identified and sent to the U.S. for long-term training in the various fields of planning, administration, adult education, economics, and agricultural technology. Approximately 20 more who have worked with TRD in Phase I will be sent for further training in the U.S. during Phase II.

Phase I was intended to be a piloting of TRD activities and methodology in pre-selected villages which were representative of the varying degrees of development and productivity in Iringa, Mbeya, Rukwa, and Ruvuma Regions. A team of 36 workers in the agriculture and community development sectors were sent to the U.S. for a six-week intensive training-of-trainers session. These trainers then conducted needs assessments in the villages to gather baseline data as well as to elicit priorities identified by the villagers themselves and to do a social analysis of leadership and decision making patterns. Village leaders are then asked to select 15 community members to be sent to the TRD training center in Iringa for a month to enhance their skills in community organization, management, and agricultural productivity. The content and methodology used by the trainers are based on adult learning techniques and the felt needs of the villagers.

Phase II of TRD is expected to train technicians at the district level from Community Development, KILIMO, and Natural Resources to be trainers. Training centers like the one in Iringa will be established in the other 3 regions. Arusha Region will be included in TRD. More village training will be conducted to reach 10 villages per region. Follow-up training will be continued with villages. Technicians from other sectors such as environmental sanitation and water would be brought into TRD activities according to the results of individual village needs assessments.

The long range plan is to institutionalize TRD strategies and capabilities within the Institute of Development and Management in Mzingo (Morogoro Region) and the National Institute and Productivity in Dar es Salaam. These two schools would eventually conduct all training of trainers efforts for increasing productivity and management capabilities of villagers.

2.4.2 Institute of Adult Education (IAE) of Ministry of National Education

The IAE is a parastatal body responsible to the Ministry of National Education (ELIMU) that develops new projects, innovative approaches, and research activities related to adult learning. The Institute has divisions of Andragogy, Correspondence Courses, Mass Media, Library, Research and Planning, Administration and Regional Centers Coordination. The IAE in Dar es Salaam has a staff of approximately 60. There are regional IAE Centers in each of the 20 regions and they are staffed by one or two trained people. Regional tutors posted at these 20 centers are responsible for all adult education activities

undertaken by the IAE. Their qualifications include a B.Sc. in teaching plus five years of experience at the district and ward levels. Adult education coordinators of literacy programs from ELIMU are used to implement IAE activities.

The Institute's activities cover a wide range including the coordination of mass-media campaigns in health education with AFYA, the training of 44,000 teachers for the Universal Primary Education program and the training of foresters in adult learning techniques. A small scale women's participation pilot project using a competency-based, non-formal education approach to community participation is another IAE program. The IAE also offers a two-year diploma course in adult education which prepares and qualifies approximately 40 adult education coordinators per year. The Institute feels that this number is inadequate for meeting the country's adult learning needs in terms of literacy programs, applying literacy skills to productivity efforts, and to train trainers of all sectors working in rural development.

The IAE's Women's Participation in Development Project is being piloted on a small scale in the Arusha Region and is funded by USAID. It is being closely monitored and evaluated by the Institute to assess the potential for combining adult learning methodology to productivity activities.

The project's approach is for female regional tutors to gain entry into five villages through the village council. Once there they explain their objective for identifying development needs specific to the women in the villages and then instruct them in planning, management, and leadership skills for meeting these needs. With the Council's sanction, they will begin talking to women in the village to identify resources which are available to them and to work with them to select 10 women leaders per village. These women leaders are then trained for a day in listening skills and on how to conduct a listening survey in teams of two. The object of the survey is to note through field observation all topics or issues which are talked about by women with great feeling and attention throughout the normal course of a day. The IAE project workers would then return at the end of two weeks to discuss the results of the listening survey and to work with the women in setting priorities for their village.

A second session is then held with the 10 women leaders on group discussion skills in which they learn how to pose the problem back to themselves and to other women by drawing pictures or acting out skits to more clearly analyze the problem. In two-week intervals the project workers would return to the villages to begin listing resources available to the women and identifying additional information they would need to gather as part of program planning to solve the problem. As the women begin implementing, the IAE staff begin pulling out to lessen dependency. Thus far, the five villages have selected the establishment of cooperative shops, gardening, sanitary water supply, and a village health post as the activities they will undertake.

The villages are divided into two groups: one which undergoes training at the regional IAE and the second group which undergoes training in their own villages. Comparisons will be done to assess the effectiveness of those two strategies.

In our assessment this is a project which shows great promise for an effective approach in community participation. Valuable lessons can be learned from this experience and can be applied to the environmental sanitation section. The objective of self-determination for improving the quality of life with minimum outside intervention is shared by the environmental sanitation sector.

2.4.3 Community Development Department of the Prime Minister's Office

This Department was created in early 1982. The following are the main duties of the Department:

- o To prepare a guiding policy on various development programs and self-help activities carried out in the villages;
- o To assist regions in securing the willing participation of the people in undertaking development programs which will ultimately benefit them;
- o To provide adequate technical and material aid to villagers so that they can advance in technical know-how and construction methods;
- o To help regions in the training of village executive committees so as to facilitate provision of basic leadership, elementary planning and project execution;
- o To cooperate with the adult education officers in endeavoring to eradicate illiteracy in the villages;
- o To assist other extension services, in particular with campaigns for increased agricultural productivity.

Chapter 3

EVALUATION OF MANPOWER UTILIZATION AND STAFF PERFORMANCE

3.1 MAJI

3.1.1 Organizational Level

Although a detailed assessment by the mission was not possible, the organizational structure of MAJI at national, regional and district levels appears to be sound. A substantial strengthening of the District Water Engineer offices, however, appears to be necessary.

A major organizational problem arises from the confusion which exists concerning the concept of "free water". In general villagers believe it to be the duty of MAJI to maintain and operate all water supply systems and consider any approach by MAJI concerning participation in the operation and maintenance as a breach of contract. This is an impossible task which MAJI cannot possibly fulfill. A clear policy statement from the highest level in the Government of Tanzania is needed concerning the responsibility of both MAJI and the community in the operation and maintenance of water supply systems.

At all levels MAJI staff complain of inefficient and unresponsive bureaucratic procedures as a major impediment to efficient operation. In this mission it was not possible to explore the roots of this problem in more detail.

3.1.2 Occupational Level

MAJI experiences difficulties due to the imbalance between different occupational categories. While there are sufficient well-trained civil engineers, there is a shortage of electrical and mechanical engineers. At the technician level there is a shortage of cadres who can execute a specified set of technical tasks with a high degree of expertise. At the level of skilled workers there is an absolute shortage of manpower and severe problems with the technical skills of this cadre.

Deficiencies in non-technical personnel have proved to be a major constraint at the regional and district level. Shortcomings in the field of financial accounting, cost accounting, and store-keeping are particularly important.

3.1.3 Individual Level

At the stage of project planning, design, and construction, the professional staff in MAJI appears to be well utilized and appropriately trained. A major part of an engineer's responsibility, however, is typically management and administration. MAJI engineers have generally had no training in either of these fields.

Although the fully certified technicians receive broad training in the basics of water engineering, they are seldom called upon to utilize this range of knowledge. Rather they are generally required to carry out more limited and specific tasks for which their training has ill prepared them.

Skilled laborers face great difficulties due to the ad hoc manner in which they have been trained.

In the construction sector the productivity of MAJI staff is low due to bureaucratic difficulties, transportation problems, shortages of materials, lack of managerial skills, and lack of adequate support staff.

The operation and maintenance of existing facilities, and particularly water treatment plants, is poor for several reasons. The design of these facilities is often inappropriate, with complicated equipment suitable to European conditions being used rather than more simple equipment suitable to Tanzanian conditions. The types of equipment often reflect the export imperatives of the donor countries rather than the needs of Tanzania for simplicity and standardization. Fuel and spare parts are often difficult to procure. Administrative procedures are poorly established, and supervision is poor. The technical training of operators has generally been perfunctory.

At the levels of technician and skilled laborer, morale is low. At the technician level this is in part because technicians have not been imbued with a sense of pride in being technicians--they often see their period of service as a technician as a necessary hurdle in the road to becoming a full-fledged engineer. The situation of skilled workers is still worse. From the quality and nature of their training and the subsequent support afforded them in performing their work (especially in the area of operation and maintenance) they rightly conclude that they are not highly-valued members of the water supply profession.

The present mission was not able to assess these factors in detail. It is the team's impression, however, that while both supervision and accountability during construction are reasonable, the norms for supervision of operation and maintenance work are poorly-established and accountability low. This absence of effective control appears to be particularly severe with respect to the operation of water treatment plants.

3.2 ARDHI

3.2.1 Organizational Level

The ARDHI Sewerage, Drainage, and Sanitation Division organization structure is designed to assist the City and Town Councils with planning, designing and construction of drainage, sewerage, and sanitation projects. The organization is designed to be a technical assistance coordination unit between donors and City and Town Councils. The ARDHI organization consists of several technical groups, low cost sanitation, sewerage and sullage collection and treatment. Since the Sewerage, Drainage and Sanitation Division is relatively young and small and has not had a full project to implement it is difficult to assess its true capabilities. It is safe to say at the time that the organization has not been fully tested but appears to be a reasonable structure for an initial effort. Training and training support functions appear to be deficient in the structure as ARDHI has not established their role in that area. Extension activities for community mobilization have a significant component in the

structure and it is assumed that training functions are presently included in these activities. It is proposed by the WASH team, though, that a training function be built into the organizational structure.

3.2.2 Occupational Level

The ARDHI staffing mix of occupations is innovative and appears to consist of the necessary occupational categories to assist in implementing their projects. There appear to be adequate numbers of engineers to assist the City and Town Councils in engineering and construction activity associated with sewerage and sanitation projects. There could be a deficiency, though, in the area of project planning and review of design if several of the Towns initiated projects simultaneously. This would require experienced sanitary engineers which are not at present available in Tanzania. It is important that a few sanitary engineers receive both training and experience in these areas as a need will occur for these skills at some point in the not so distant future.

The use of Health Officers in the low cost sanitation activities coupled with the sewerage project is an innovative combination of occupations and quite possibly a model which in itself is an important aspect of the ARDHI's proposed projects. Health officers are working closely with engineers on these projects with the health officer concentrating on the community mobilization aspects and the engineer focusing on the materials, design, and fabrication aspect. Since both are working on the same problem in close proximity to each other a significant transfer of skills, perspectives, and values might be expected. The use of a sociologist in assisting the City and Town Councils with community mobilization is also an innovative and significant occupational category to be included in a classically engineering oriented organization.

There appears to be a deficiency in technicians to assist the engineers and health officers in implementing the proposed projects. Generally the Division appears to be top heavy with professionals and to need technical support staff. This will be remedied if proposed staffing budgets are approved for next year.

3.2.3 Individual Level

The specific tasks for each occupational category have been identified and appear to be integrated into daily work activities by the members of the organization. There is a definite lack of work activity, though, within the Division as they are waiting for projects to be implemented.

An interview with members of the Division suggests a need to identify challenging work for them to do in this interim while awaiting the approval of the Dar projects. Generally speaking the staff appeared to be well trained and motivated for work in low-cost sanitation projects. Since this is not a typical engineering working environment nor a typical health officer working environment extra efforts might be needed to challenge and to motivate pro-

professionals in the division. Several activities associated with compiling literature on low cost sanitation projects in other countries and evaluation of Tanzanian sanitation projects and demonstration activities are to be included later in ARDHI activities.

3.3 AFYA

3.3.1 Organizational Level

At the ministerial level AFYA has been very successful in coordination efforts between the Environmental Sanitation Unit and the Health Education Unit to stimulate awareness and increase knowledge among the population of the health implications of environmental sanitation. The timing appears right for a concerted effort to design and implement strategies for community mobilization and action. However, after discussions with AFYA division and unit heads the focus is still on knowledge and attitudes with more seminars, conferences, and campaigns planned. While it is important for these educational activities to continue, it will be essential for these two units to begin developing action-oriented strategies for environmental sanitation at the village level through appropriate training and adequate support of the national village health worker program. There is great potential for broadening the scope of environmental sanitation to include refuse disposal, housing, and low-cost water supply as well as for sharpening the focus of the role of environmental sanitation workers.

3.3.2 Occupational Level

There is at present minimal attention being paid to redefining the role of health officers and health assistants so that they can become more effective. Preventive services which could be provided by this cadre are not accorded the priority they would seem to deserve, given the philosophy of the nation's health sector strategy. With the reality of very limited available resources in terms of finances and trained personnel, AFYA has placed itself in the position of choosing curative services rather than strengthening the cadre of workers at the dispensary level who are responsible for health promotion and disease prevention and control. Health Officers are concentrated in urban centers, and health assistants are only in 19 percent of the dispensaries due to their small number.

Medical and paramedical staff in supervisory positions have followed this pattern of emphasis on curative services. It is not only reflected in the regional and national budgets but also in the lack of support they offer to health officers and health assistants at all levels, who are usually low on the list for receiving equipment and transportation except during cholera epidemics. Health officers and health assistants receive very little supervision to help them establish a work schedule of activities other than inspection of food premises. In short, they are highly underutilized, given their potential for outreach, the skills they receive in training, and their responsibility for environmental sanitation.

In addition to this lack of support for preventive services in AFYA, is the nature of the training content and methodology for environmental sanitation workers which contributes to the lack of initiative and wherewithal for developing alternative solutions. This aspect is dealt with in greater detail in Section 4.3 below.

Another organizational weakness was found in the Environmental Sanitation Unit itself. It is severely understaffed and limited in resources for its responsibilities. Not only are they to develop and implement all environmental sanitation programs and produce the trained manpower needed, but they are also one of the key coordinators of the Decade. There is a great respect among AFYA health officers and health assistants for this unit. It has a lot of experience and knowledge to offer, and more importantly, this unit provides a focal point for common identity and mutual support among environmental sanitation workers who do not feel supported or valued by other AFYA cadres. This cadre has the greatest potential of any group of trained professionals for improving the sanitation and water supply conditions of rural sectors.

The Health Education Unit within AFYA is also severely understaffed given its major responsibility for planning and implementing all health education activities for the country and participating in the training of various AFYA personnel in health education. The unit has only six staff members who have received formal training in health education from Nigeria's School of Public Health. Given this constraint, the Unit has been obliged to go the route of mass education activities and campaigns to reach as many people as possible. They have the capacity to print materials, record radio messages, and conduct seminars. However, these means very much limit them to the knowledge aspect of health education. They are not able at present to develop and implement the inter-personal and action-oriented components which are essential for institutionalizing health-related behavior change at the community level. The Unit depends on health officers and health assistants to be its health educators in the field. However, the curriculum for these workers gives very little attention to practice in this skill area given its emphasis in their job descriptions.

3.3.3 Individual Level

In addition to the shortage of environmental sanitation workers at the divisional and ward level is the underutilization of health assistants as well as health officers for preventive services. A task analysis conducted by the team for this report revealed that health assistants spent 50 percent of their time inspecting food premises, 16 percent serving legal notices, 16 percent supervising latrine construction, 6 percent giving health education, 6 percent visiting schools, 6 percent attending meetings, and 6 percent in licensing public establishments during the previous month. They were not inspecting meat, protecting water supplies, inspecting buildings, controlling communicable diseases, immunizing or giving advice on vegetable gardening, etc. Only half of the health assistants had a prepared work schedule. The only tools they possessed were a lactometer, although they did have access to shovels, hoes, and drainage equipment from the district. Only one health assistant had access to reference books for his job.

When asked what was the most important part of their job, the control of communicable disease was the unanimous response. The most important disease they felt they were preventing was cholera.

This analysis is revealing in that health assistants are at present doing little more than monitoring environmental sanitation by inspecting food premises and responding to crisis situations such as a cholera epidemic. Health officers and health assistants alike when interviewed expressed frustration with the lack of materials and transport, the lack of support from their supervisors, and the lack of relevance between the emphasis given in training and the actual need on the job. Meat inspection, water supply, and building inspection, for example, had all been taken over by other sectors.

At the dispensary level, where there are few health assistants at present, they are performing duties other than or in addition to environmental sanitation to fill in the service delivery gap caused by manpower shortages. One health assistant, for example, was conducting MCH clinics twice a week.

The task analysis revealed that there appear to be three major reasons for these conditions. The first is that the job descriptions for health officers and health assistants are not specific enough in delineating their roles and responsibilities. In addition to their more curative oriented supervisors, they themselves are not clear on the range of activities in which they can and should engage. Several responsibilities which had been originally assigned to health officers and health assistants have subsequently been taken over by other sectors, such as meat inspection by veterinarians and water supply by water engineers. The upshot is that they are left with routine inspection of food premises and the occasional construction of latrines. They have no means of transportation for reaching out beyond their home base to serve underserved communities.

The second reason is that their pre-service training program does not respond to the environmental sanitation needs in the field. Health Officers and Health Assistants are no longer meant to be sanitation inspectors as they were before independence, yet the curriculum has not changed with the time. The content of the program does not prepare them to identify low-cost alternatives for solving environmental sanitation problems which would be accessible through community resources and linkage with outside expertise from other sectors. They receive no training in time management and resource allocation to more efficiently use their skills through advance planning and scheduling. The training methodology itself does not serve as a model for competency-based adult learning techniques which are essential for mobilizing community participation in decision making and program planning.

The third reasons for the inappropriate and inadequate utilization of health officers and health assistants is the lack of regular continuing education for up-grading their skills and knowledge in the areas of low cost sanitation and water supply as well as in community action strategies. Although the Continuing Education for Health Workers Project in Arusha is developing an in-service training plan, there is at present not enough input from the Environmental Sanitation Unit for in-service training needs with special reference to the Water and Sanitation Decade. The role of the health officer and health

assistant will be undergoing some major modification through the coordinating efforts of the Technical Sub-Committee of the National Action Committee for the Decade. Therefore, it is crucial for the Arusha pilot project to be well informed of continuing education needs.

Chapter 4

INVENTORY OF TRAINING RESOURCES AND ACTIVITIES

4.1 MAJI

MAJI does not train management staff where their parent ministry provides facilities. For example, the accountants assigned to MAJI are trained by the Ministry of Finance. The only formal training institute under the MAJI Ministry is the MAJI Institute in Ubungu, Dar es Salaam.

4.1.1 The MAJI Institute

The MAJI Institute was established in 1974. Students who pass the National Form IV Certificate with credits in mathematics, physics, chemistry and engineering subjects are eligible for entry.

The full-time MAJI Institute course (see Table 18) is based on the syllabus of the Full Technician Certificate (FTC) courses developed at Dar es Salaam Technical College. In the first two years all candidates follow the same course in basic engineering subjects. In the third year the students specialize in works, hydrology, hydrogeology or water quality.

While the basic instruction takes place in the classroom, on-the-job training is given considerable importance. All students spend 17 weeks in their second year in practical on-the-job training under the supervision of the regional water engineers. In the third year a period of four weeks is allotted for the students to work on practical project assignments, either individually or in small groups.

Upon graduation the graduates are absorbed as technicians into the regional MAJI offices. Those who have taken the works option are deployed to work on investigations, design, construction and operation and maintenance of water supply schemes. Those with the hydrology option work on hydrological problems as well as meteorological data observation, collection, compilation and analysis. Those who have taken the hydrogeology option work on exploration of groundwater and drilling and construction of wells, and those who take the water quality option are in charge of water quality testing at major water supply plants and manning the existing water laboratories.

The duration of the full-time course is three years, after which the successful candidates are awarded a Full Technician Certificate (FTC) in Water Resources Engineering. Since 1980 the Institute has graduated about 120 students annually. In 1980/81, 51 of the graduates specialized in water supply, 23 in hydrogeology, 25 in hydrology and 11 in laboratory water technology. The Institute has a professional staff of nine Tanzanian engineers, one Tanzanian chemist, and expatriate engineers. Six of the expatriates will terminate their contracts and leave in June 1982. Since there is no plan for replacing them (despite the apparent interest of GTZ of West Germany), the MAJI Institute will face a staff crisis in the middle of the coming year.

Table 18:
 Technical Training of the MAJI Institute : Curriculum

	Hours/week					
	Term					
	1	2	3	4	5	6
Mathematics	3	3	3	3	3	3
Physics and Chemistry	2	3	0	0	0	0
English and General Studies	2	2	2	2	2	2
Industrial Orientation	1	0	0	0	0	0
Political Education	2	2	2	2	2	2
Construction Management	0	0	2	2	2	2
Architectural Drawing	6	6	0	0	0	0
Building Construction	2	3	6	6	0	0
Properties of Materials (Theory & Lab)	1+3	1+2	1+2	1+2	0	0
Mechanics (Theory & Lab)	2+2	2+2	0	0	0	0
Surveying (Theory & Practice)	1+3	1+3	1+3	1+3	0	0
Workshop Technology (Theory & Practice)	3+3	3+3	3+3	3+3	0	0
Structures	0	0	4	4	0	0
Quantity Surveying	0	0	4	4	0	0
	36	36	36	36	10	10

Water Resources Option:

Hydraulics (Theory & Lab)	3+3	3+3
Surveying	2	2
Geology	2	2
	10	10

Works Option:

Irrigation (Theory & Lab)	2+2	2+2
Civil Engineering Quantities	4	4
Water Supply (Theory & Lab)	3+2	3+2
	10	10

Hydrology Option:

Hydrology (Theory & Practice)	6+2	6+2
Meteorology	2	2
Statistics	3	3
	13	13

Source: MAJI Ministry Papers and Reports

In addition to conducting the full-time FTC course, the MAJI Institute has other responsibilities. These are:

a) In-service and upgrading courses:

The Institute runs a few in-service courses for craftsmen. Such courses include draftsmanship, surveying, pump and motor mechanics, building construction, and drilling and well construction. The courses are held in the period when the FTC students are on practical training. The Institute at present has four of these courses running.

b) Review and verification of regional training:

The MAJI Institute acts as the examining body for courses conducted for Standard 7 Leavers by the regional water engineers throughout the country. Table 19 indicates the specialities in which the 400 trainees certified during the last year specialized.

4.1.2 Assessment and Evaluation

When the MAJI Institute was founded in 1974, the water sector in Tanzania faced a critical shortage of engineers. The principal training activity of the MAJI Institute, namely the training of FTC technicians, was designed to produce cadres who could fill the gap until Tanzania had sufficient engineers.

In the last few years the situation with regard to MAJI engineering capability has dramatically changed. There is now no shortage of civil engineers trained in planning, design, and construction in the water sector.

In principle the MAJI Institute functions in close liaison with the Manpower and Training Division of the MAJI Ministry. In fact, the Institute functions without much direction from the Ministry and with little feedback from the field. The result is that the training programs in the Institute have not changed in response to the changed manpower needs in the sector. In particular there is no longer any need for a cadre of "medium level engineers", which is what the FTC technicians are. What the Regional District Water Engineers need in terms of support staff is technicians who are highly skilled in a much more limited range of practical skills, not people who have similar training to their own but at a lower level.

While the program of the MAJI Institute stresses the importance of practical work, the facilities for teaching practical skills are poor. Until quite recently the only practicals for FTC students were in surveying. Recently hydraulics and soils practicals have been introduced.

The focus of the FTC course is on training the students in the elements necessary for the planning and design of water supply systems. As the water sector has matured in Tanzania, the need has shifted from FTC technicians who could do such design work to technicians who are skilled in the practice of operation and maintenance.

Table 19: MINISTRY OF WATER ENERGY AND MINERALS

NUMBER OF STUDENTS ATTENDING
REGIONAL TRAINING 1981/1982

REGION	Motor Mech	Pump Mech	Surveying	Draughting	Cartography	Construct	Mason	Plumber	Carpenter	Drilling	Electrical	Welding	Hydro	Water Lab	Fitting & Turn	Plant Oper	B/Smithery	Water Supply	TOTAL
ARUSHA	3	3					2	5			2								15
COAST	1	3		3			1	3	2								1		14
DAR REGION	5		4	1			4		3		3								20
DAR H. O.																			
DODOMA	4	7	2			6					1								20
E.G. DODOMA	10			14															24
MADINI DODOMA																			
IRINGA	6		4	3		3			2										18
IGOMA	1	6					7								6				20
KILIMANJARO	1					6		3											10
LINDI	12	5					3												20
MARA	5	4	2	4		4					3								22
MOROGORO		4	4			2		4	2		2		2						20
MWANZA	3	3		2				3	3										14
MTWARA	6	5					1	5	3				1						21
MBEYA			3	2				11	3				1						20
RUKWA	5		4			5			1									5	20
RUVUMA	2	3	4			3		2	2										20
SINGIDA	2	8	3	2											3				18
SHINYANGA	4		2	4					4		2					4			20
TABORA	5	5		1		2		3	4										20
TANGA	4	2		1			3		2		3				5				20
W. LAKE		4		4				4					3						19
TOTAL	80	60	56	44		31	21	43	31		16		7		14	4	1	5	395

Source: MAJI Ministry Official Papers and Reports

The legacy of the focus of the Institute FTC course on an engineering type of curriculum is that the graduates of the Institute frequently see the course as a stepping stone on the road to becoming full-fledged engineers. Thus there are numerous applications from graduates of the MAJI Institute for the engineering courses at the University, Dar es Salaam Technical College, and the ARDHI Institute. While avenues of advance for gifted students should never be blocked, it is a serious error to instill in the FTC technicians a sense that they are "second-rate engineers", rather than "expert technicians". This leads to frustration on the part of these graduates who, increasingly, will not be able to advance to the level of engineer. And it leads to a denigration of the vital and proud role of the technician.

The staff of the MAJI Institute reflects the bias towards an engineering-type education. Serious consideration should be given to having good technicians trained in teaching methodology as the backbone of the Institute staff rather than engineers.

Due to the great demands on the limited resources of the MAJI Institute, there has been little time to devote systematic attention to the various extension functions which the MAJI Institute could, and should, fulfill. As is detailed in the Summary Report the WASH team believe that a major responsibility of the MAJI Institute should go towards giving strong support, in the form of training of trainers courses, curricula, and teaching materials, to the vital skilled worker training programs carried out by the Regional Water Engineers' offices. The team further believes that the MAJI Institute should have a major role in the continuing education of both technicians and skilled workers. This would involve the Institute in the organization of regular workshops and short courses for technicians and skilled workers and would involve the publication of newsletters disseminating information to these vital cadres. The objective is to create a competent and dedicated cadre of technicians and skilled workers, rather than a poorly trained, disgruntled, and neglected cadre as exists at present.

4.2 ARDHI

4.2.1 The ARDHI Institute

The ARDHI Institute is a parastatal organization within the Ministry of Lands, Housing and Urban Development. The ARDHI Institute trains personnel for implementing various development projects. Professional and sub-professional manpower needs associated with rural and urban planning, surveying, building materials, public health engineering, etc., are met with programs within ARDHI Institute. The Institute is involved in sub-professional training programs for Form IV leavers in-service short courses, and three year diploma courses for Form VI (A Level) leavers in land surveying, estate management and evaluation, urban and rural planning, building design, building economics, and public health engineering. The ARDHI Institute is governed by a council made up of the principal Secretaries of ARDHI, Ministry of Works, Ministry of Manpower Development, Ministry of Finance and Planning, Ministry of National Education, Ministry of Water, Energy and Minerals, and staff representatives from ARDHI.

The entry requirements for the diploma program in public health engineering are the same as the entry requirement to the University of Dar es Salaam. Those students accepted at ARDHI Institute, though, are unsuccessful applicants to the University of Dar es Salaam. Those candidates, for example, would have successfully passed the national Form VI or equivalent with principal level passes in any of the two of the following subjects: pure mathematics, applied mathematics, physics, or chemistry. Each of the six departments accept 25 students annually out of approximately 250 applicants. The diploma received by the ARDHI Institute graduates is accepted by the Government of Tanzania as being equivalent to the B.S. in engineering offered by the University of Dar es Salaam. Several graduates from the ARDHI Institute have gone abroad and have received post-graduate education in their respective field.

The public health engineering program was initiated in the fall of 1981 with assistance from the Netherlands. The statement of need for the public health engineering courses is to assist in satisfying the professional manpower requirements in the water supply and sanitation sector in Tanzania. This assistance was in the form of curriculum development and instructional support for the first year of operation. The present staff consists of two non-Tanzanian instructors and seven Tanzanian instructors.

4.2.2 Assessment and Evaluation

The ARDHI public health engineering program is nearing completion of its first year of operation. Graduates from this program will be available in two years for work in the various Ministries. Starting next year the instructional and administrative load increases as a new first year class is added and subsequently two years from now all three classes will be operating during the academic year.

With some minor changes and addition of material within courses, the program appears to be designed to produce the desired graduate. The major problem facing implementation of the program is the lack of laboratory space, equipment, and supplies. At the present time only demonstration type water chemistry and microbiological laboratories are included in the program. There are limited hands-on activities performed by the students in the laboratories. At the present time the public health engineering trainees utilize the AFYA Central laboratory at Muhimbili for their activities. Laboratories involving pumps and mechanical equipment are not planned at present but would be a significant addition to the training.

One of the more interesting aspects of the ARDHI public health engineering curriculum is the strong planning element and project management component (see Table 20). This represents a unique and innovative infusion of real world needs into the diploma program and should afford graduates an excellent background for working with the Town Councils and within various ministries. The summer fieldwork experience between the first and second year and second and third year provides an excellent opportunity to observe working conditions and to incorporate them into practice.

Table 20: PUBLIC HEALTH ENGINEERING CURRICULUM

<u>First Year</u>	<u>Lec.</u>	<u>Studio</u>
Intro to Public Health Engineering I	40	80
Public Health Engineering	80	80
Applied Chemistry	60	
Applied Mechanics	60	60
Applied Geology & Soil Mechanics	60	
Mathematics & Statistics	60	
Surveying	60	80
Building Material	60	
Engineering Drawing	10	20
Fieldwork	-	-
	<hr/>	<hr/>
TOTAL	490	240
<u>Second Year</u>		
Public Health Engineering II	120	
PHE Design & Construction	30	240
Applied Chemistry II	60	60
Microbiology	60	60
Applied Mechanics II	60	60
Hydraulics	60	60
Hydrology	60	
Human Settlement & Physical Infrastructure Planning	60	
Introduction to Project Management	40	
Fieldwork	-	-
	<hr/>	<hr/>
TOTAL	550	480
<u>Third Year</u>		
Public Health Engineering III	120	
PHE Design and Construction II	30	240
Epidemiology	40	
Pumps and Mechanical Equipment	60	
Project Management and Operations	40	
Estimating and Price Analyses	40	
Selected Subjects in PHE	40	
Diploma Project	-	180
	<hr/>	<hr/>
TOTAL	410	420

Source: ARDHI Officials Papers and Reports

The greatest area of need in the PHE program is for laboratory space, equipment, and supplies for water chemistry and microbiology. Laboratory elements within the first year of the curriculum were implemented by demonstration exercises at other facilities. This is an area where MAJI, AFYA, and ARDHI training functions can be combined and strengthened by sharing space and instructors. Initial discussions with representatives from the health officers schools at Muhimbili Institute and ARDHI Institute indicated a willingness to develop common laboratory capability. There still needs to be a mechanism, though, to supply expendable chemicals and supplies to be used in these instructional laboratories. This request should be built into the operating budget of the three institutions and could be supplied on interim basis through a bi-lateral or multi-lateral assistance program.

4.3 AFYA

4.3.1 Training Schools

There are presently two schools for health officers, the School of Hygiene at Muhimbili Medical Center and the School of Environmental Health at the Tanga Regional Hospital. The school at Muhimbili is for Form IV Leavers, the training is three years, and the annual intake capacity is 30 students. The school at Tanga offers a two year up-grading training course for health assistants with three years of experience. Its annual intake capacity is 20 students. For an outline of the health officer's training curriculum see Table 21.

The cadre of health assistants used to be called health auxiliaries, but training was increased from 18 months to two years and a new name was given. There are at present six schools in operation in Tanga, Iringa, Ngudu (Mwanza Region), Mpwapwa (Dodoma Region), Mpanda (Rukwa Region), and Newala (Mtwara Region). The combined intake capacity of these schools is 189 per year. For an outline of the health assistant's training curriculum, see Table 22. Application requirements are a minimum Standard 7 education.

The faculty for these schools are called Resident Tutors who are health officers or health assistants who rotate through the schools from the field. There is one resident tutor in each of the schools who is responsible for teaching health education. The two health education resident tutors at the health officers schools received an advanced diploma in health education from the school of public health in Ibadan, Nigeria. The 6 health education resident tutors at the health assistants schools receive two to three weeks of training per year from the staff at the AFYA health education unit. Resident tutors for all other subjects receive no training on educational methodology.

The curriculum for health officers was originally developed for producing health inspectors before independence. It was revised in 1979 to increase the number of hours for health education from 120 hours to 354 hours. This meant reducing the number of hours originally allotted for port health, inspection and reporting and integrated urban and rural development. Otherwise the content has virtually remained the same.

Table 21: HEALTH OFFICERS

<u>First Year</u>	<u>Subject Code</u>	<u>Hours</u>
Building Construction	1	100
Collection, Treatment and Disposal of Waste	2	80
Communicable Diseases	3	130
Food Technology	4	80
Integrated Rural and Urban Development	5	20/80
Inspection and Report	6	100
Water Supply	7	100
Insect and Vermin Control	8	50
Behavioral Science	13	50
Community Health	14	60
Human Anatomy & Physiology	15	60
Physics & Chemistry (Public Health)	19	40
Field Work		<u>120</u>
		1080
 <u>Second Year</u>		
Building Construction	1	60
Collection, Treatment and Disposal of Waste	2	60
Communicable Disease	3	70
Food Technology	4	80
Integrated Rural and Urban Development	3	20/70
Inspection and Report	6	50/70
Water Supply	7	50
Insect and Vermin Control	8	60
Health Education	9	197/80
Public Health Legislation	11	40
Public Health and Practical Admin.	12	30
Post (?) Health	16	46
Environmental Pollution	17	60
Occupational Health	18	60
Field Work		<u>230</u>
		1080
 <u>Third Year</u>		
Building Construction	1	50
Collection, Treatment and Disposal of Waste	2	70
Communicable Diseases	3	60
Food Technology	4	90
Integrated Rural and Urban Development	5	70/50
Inspection and Report	6	80/100
Water Supply	7	50
Health Education	9	157/40
Food and Nutrition	10	100
Public Health Legislation	11	40
Public Health and Practical Admin.	12	70
Field Work		<u>360</u>
		1080

Source: AFYA Official Papers and Reports

Table 22:
ENVIRONMENTAL HEALTH ASSISTANT CURRICULUM

<u>First Year</u>	<u>Hours</u>	
English	20	
Arithmetic	40	20 weeks teaching
Siasa	20	1 " exams
Intro. to Public Health	40	2 " Ujamaa vil
Mapping Demo. & Statistics	60	2 " Short leave
Microbiology, Parasit. & Disinfec.	20	<u>25</u>
Entomology & Vermin Course	80	
Field Visits	120	18 weeks teaching
Practicals	20	1 " exams
Building and Housing	72	8 " H.O.
Water	72	
Excreta	54	
Refuse	36	
Foco Sanitation	59	
Practicals	80	
Field Visits	320	
<u>Second Year</u>		
Communicable Diseases	72	4 week leave
TB/Leprosy	18	18 teaching time
Immunization	18	1 limit exam
Nutrition and Agriculture	54	4 dispensary
Health Education Process	36	<u>27</u>
Practicals		
Field Visits	160	2 short leave
Service and Reports	40	20 teaching time
Structure of Government & Health Service	20	1 revision
Public Health and Disposal of the Dead	40	<u>2</u> final exam
Inspection of Premise and Port Health (?)	100	<u>25</u>
Practicals		

Sources: AFYA Ministry Official Papers and Reports

The curriculum for health assistants was revised when the position was up-graded from 18 months to two years of training. Health education is only given 36 hours in the total curriculum. All other subjects are the same as those taught to health officers but less in-depth.

The training methodology used for both health officer and health assistant students appears to be quite didactic and classroom-oriented. Only 20 percent of health officer training is spent in field work while only 13 percent of health assistant training is spent in practicums. The major criteria for assessing student performance is marks on written examinations. There appears to be approximately a 10 percent attrition rate among students who successfully complete training.

Health officers and health assistants are bonded to five years of service to the government.

The salary structure for health officers is shown in Table 23 below.

Table 23: Salary Structure for Health Officer

Principal Health Officer	4,141 TSh. per month
Senior Health Officer	3,786-4,044 per month
Grade I	3,210-3,732 per month
Grade II	2,652-3,126 per month
Grade III	1,704-2,040 per month
Grade IV	1,242-1,578 per month

Entry salary for health assistants begins at 600 TSh. per month and increases to 1000 TSh. per month.

4.3.2 Continuing Education

- 1) The Continuing Education of Health Workers Project was funded by USAID for 1981-83. It is being piloted in the Arusha Region to test continuing education methodology and materials for developing a national program which would ensure one week of in-service training per year for all paramedical workers which includes health officers and health assistants. The Rural Medical Aide School in Arusha will be converted to become the national continuing education center for AFYA.

Regional and district level health personnel are trained to conduct a baseline survey of all levels of the rural health cadre to assess their effectiveness in providing service. These findings are used to identify weaknesses and gaps which would then define the necessary content for a

five-day in-service training program. Participants are divided by their job category and undergo in-service training separately in their respective districts. The Arusha Rural Medical Aides School will be transformed into the National Center of Continuing Education for Health Workers. The Continuing Education Unit, which was recently established under the Division of Manpower Development and Training within AFYA, is directly involved in the coordination and administration of this pilot project.

- 2) The Environmental Health Unit in AFYA has been conducting zonal seminars on low-cost sanitation. They have at present completed seven of the seven zones. A team of nine trainers composed of local and ministerial representatives conduct both theoretical and practical sessions on the status of sanitation in the country, cultures and customs, water supply, village planning, village house construction, food and nutrition, biostatistics, community participation and low-cost sanitation technology. A total of 24 demonstration latrines (VIP and composting) have been constructed at local villages in six zones with the participation of the villagers.

Two hundred and fifty six participants are drawn from the politicians, technicians and administrators of all levels from AFYA, MAJI, ELIMU, KILIMO, and UTUMISHI. They stay for three days at a central location and attend two days of training in theory followed by three days of practice. The overall purpose of these zonal seminars is to launch the International Drinking Water Supply and Sanitation Decade.

4.4 Ministry of Education (ELIMU)

4.4.1 University of Dar es Salaam, Department of Civil Engineering

The Department of Civil Engineering offers a four-year B.Sc. Degree, with a graduating class of 55-60 students. There are 28 teaching members in civil engineering who average 30 contact hours per week. Almost all of the engineering faculty are expatriates.

The civil engineering program follows a general curriculum with no specialization during the first two years. All students spend a good part of their first year receiving hands-on training in carpentry, masonry, electricity and a welding workshop. In their second year all civil engineering students take a course in engineering Hydraulics and a course in hydrology for engineers. During their third and fourth years those students electing the water option take the following courses:

<u>Third Year:</u>	<u>Hours Per Week for One Term</u>
Engineering Hydraulics	10
Dams and Barrages	1
River and Reservoir Engineering	2
Hydrology for Engineer	3
Hydraulic Machinery	1
Irrigation and Drainage	3
Rural Water Supplies	4
Public health I	2

Fourth Year:

Dams and Barrages	4
Hydropower Plants	3
Water Resources Planning	2
Water Supply Engineering	4
Public Health Engineering	3

The Department is about to embark on a program of graduate study in the fields of hydrology, groundwater and water supply beginning in July of 1982. They already have a total of six faculty who will teach courses, three of whom are Tanzanians with Masters degrees from European Universities. The full complement of new staff is expected to be nine.

In addition to the regular graduate courses, the Department anticipates initiating a regular series of short courses in the same specialty areas during the months of April-June.

4.4.2 Dar es Salaam Technical College

The Dar es Salaam Technical College offers programs leading to a Full Technician Certificate (FTC) and Diploma in Engineering in the areas of civil, mechanical, and electrical engineering, and electronics and communications. The FTC is a three-year program with Form IV as the entry requirement. The diploma in engineering is also a three-year program, but has a Form VI entry requirement. The FTC is considered to be equivalent to that offered by the MAJI Institute, while the Diploma is considered to be equivalent to both the diploma of the ARDHI Institute and the B.Sc. degree from the University of Dar es Salaam. At present the output of the Civil Engineering Department is approximately 75 FTC holders per year and 20 diploma holders per year.

4.4.3 Post-primary Technical Education Schools

Two hundred and ninety-two schools have been recently set up under the Division of Technical Training, ELIMU, with the aid of DANIDA funding. There are still severe problems with inexperienced teachers and an overly academic approach, but it is likely that these schools will provide a substantial number of semi-skilled workers, such as plumbers, to the water sector.

4.5 Other Training Institutions

There is a bewildering number of independent training institutions in Tanzania. A 1977 survey indicated 132 such institutions. Today the number is much higher. It is virtually certain, therefore, that the team did not learn of all the institutions offering training which is, or may be, relevant to the environmental sanitation sector. The following institutions are those which were pointed out as being significant.

4.5.1 National Vocational Training Schools

There are three such schools, one in Dar es Salaam, one in Tanga, and one in Mwanza. The schools are run by the Ministry of Labor and Social Welfare.

The mission did not obtain current information on these schools, but has information from 1977 on the Dar School.

The school's main full-time course was a one-year basic training course leading to a Grade II Trade-Test Certificate in motor vehicle maintenance, electrical installation and maintenance, welding, fitting/turning, plumbing/pipe fitting, carpentry, masonry, painting, shoemaking, tailoring, and sheet metal. Candidates must have completed at least primary school. Entry is normally through the National Service. However, civilians are also admitted after the needs of National Service candidates have been met.

In 1977 there were 480 students (48 percent full-time and 52 percent part-time) in the Dar school. The school also offers part time courses (two evenings a week for a year) in a similar variety of skills and a variety of short courses.

4.5.2 Institute of Development Management, Morogoro

This Institute is run by the Ministry of Manpower and Development and Administration. In 1977 (the most recent information available) it had a full time teaching staff of 140 and about 1,200 student places. The Institute offers Diploma courses to candidates who have passed Form VI and have had two years of relevant work experience, or who have passed Form IV and had a minimum of four years' relevant work experience. The three-year Diploma courses are offered in the areas of public administration, accountancy, business studies, community development and economic planning. The Institute also offers shorter duration courses in management, law, and administration.

4.5.3 The National Institute of Productivity

This Institute, established in 1977, primarily provides consultancy and training services for industry in the fields of production management, industrial engineering, manpower development, supervisory methods, organization and methods, workers' education, management accounting, marketing and distribution, general management, and management research and development. The National Institute of Productivity (NIP) has an enrollment of only about 100 students. Its specialty is in offering short, in-service courses normally lasting from two to three weeks in the fields listed above. The parent ministry for the institute is the Ministry of Labor and Social Welfare.

Chapter 5

RECOMMENDATIONS FOR MANPOWER DEVELOPMENT AND TRAINING

5.1 MAJI

Due to the foresight of MAJI planners, there should be no severe bottlenecks in the water sector during the Decade as a result of an absolute shortage of professional, technical, and skilled manpower. There will have to be fundamental changes in training policies, however, if the quality of manpower produced is to be adequate. Some of the more important elements of such policies are outlined below:

5.1.1 Professional Continuing Education

A critical need is, and will continue to be, the training of a professional cadre in managerial techniques specifically designed for their management problems. While a small amount of such training may be in the form of overseas degree courses, of much greater importance will be one- to two-month in-country courses tailored specifically to the management needs of MAJI personnel. Such courses would initially train the regional water engineers and their assistants, as well as key administrative personnel in the Ministry. In such training there is likely to be a role for both domestic and overseas management institutes.

MAJI has initiated discussions with the Swedish International Development Agency (SIDA) on funding such training. This should be accorded high priority by both the Government of Tanzania and the donor agencies.

Conducting continuing technical education for the professional cadre is also of great importance both to keep morale high and to give Tanzania the necessary in-house expertise to deal with the full variety of its water problems. It is foreseen that the majority of such training will be in-country training in short courses and at the Master's level at the University of Dar es Salaam.

5.1.2 Training and Continuing Education of Technicians

Over the past seven years the MAJI Institute has played an invaluable role in producing technicians who could perform many tasks traditionally entrusted only to engineers. In the past few years, however, there has been an enormous change in the availability of engineers in the water sector. At the same time there has been an increasing recognition that MAJI is not as adept at operating and maintaining water supply systems as it is in designing and building these systems. The upshot of these changes is that the needs of the water sector are no longer served by technicians who receive a comprehensive engineering training of the sort normally given to engineers (albeit at a lower level), whose training focuses on the planning and design of water supply systems rather than the operation and maintenance of these systems, and who aspire to become full-fledged engineers rather than expert technicians. A fundamental re-thinking of the traditional career structure and training of the technicians produced by the MAJI institute should thus be given immediate and high priority.

In terms of the full-time courses there would be several major changes. The curriculum would be completely altered to become a curriculum oriented toward technicians rather than engineers. Changes would also need to be made in the recruitment of teaching staff: the staff would change from a staff of engineers to a staff predominantly of expert technicians who could provide the type of training needed by the students and who could serve as role models for the students.

If this perspective were accepted by the MAJI Ministry, the MAJI Institute would not only radically alter the full-time courses offered, but would turn a great deal more of its attention to continuing education activities for both technicians and skilled workers.

The establishment of a continuing education unit at the MAJI Institute should be given high priority. Not only does continuing education improve the knowledge and skills of technicians and skilled workers, but, equally important, it demonstrates to the staff that they are important and worthy, or MAJI would not be expending effort on their improvement. Continuing education thus confers a vital sense of "mission" on the staff.

The continuing education unit at the MAJI institute would be responsible for organizing periodic regional workshops and courses for technicians and skilled workers and for organizing other means (such as the publication of periodic newsletters and the organization of technicians' societies) for stimulating and motivating technicians and skilled workers.

An important reward for higher level technical staff in Tanzania is the possibility of being sent for overseas training. It is suggested that serious thought be given to making such possibilities open to technicians and skilled workers too. This may be in the form of short study tours to other developing countries (such as Zimbabwe or India) which have more-developed infrastructures and training systems. While the possibility of any individual technician being chosen for such training would be small, it would make an important contribution to developing a sense of pride in being a technician and therefore is worth consideration.

A particular and serious short-run problem is that the MAJI Institute will experience a major shortage of staff beginning June 1982. There are 25 teaching positions, 19 of which are filled at present. However, six of the expatriate teachers will leave in June and no serious effort is being made to replace them, despite interest shown by the West German aid agency (GTZ) in assisting.

A particular aspect of the MAJI Institute which merits the careful consideration of the (proposed) Training Task Force of the National Action Committee concerns coordination with the ARDHI Institute. In light of the high degree of overlap of skills required for urban sanitation and water supply technicians, in light of the imminent establishment of the National Urban Water and Sanitation Authority, and in light of the fact that ARDHI's requirements (20 per year) are small relative to those of MAJI (200 per year), it is proposed that the training and continuing education of Public Health Technicians be undertaken by the MAJI Institute rather than the ARDHI Institute (as is currently planned).

A critical problem faced by both the public health engineering course at ARDHI and the MAJI Institute is the lack of laboratory facilities and supplies. Both Institutes have prepared proposals for the funding of new laboratories. It is proposed that only one laboratory be constructed (at the MAJI Institute) for use by both MAJI and ARDHI Institute students. The (proposed) Training Task Force should combine the existing proposals for the construction of laboratories at the ARDHI and MAJI Institutes into a single joint proposal.

5.1.3 Training and Continuing Education of Skilled Workers

While a great deal of attention has been given to the training of engineers and technicians in the water sector in Tanzania, the training of skilled workers has tended to be ad hoc and even perfunctory.

The team strongly supports the existing MAJI Ministry policy of conducting most skilled worker training at a regional level and strongly supports the proposals developed by the MAJI Ministry for improving the training of the trainers of these skilled workers, for updating the present system for testing skilled workers, and for establishing a special wing at the MAJI Institute which will be responsible solely for the supervision and monitoring of the regional training programs for these workers. To this list should be added the development of a systematic system of continuing education for skilled workers. As in the case of technicians, the MAJI Ministry and the ARDHI Ministry should agree to all skilled workers training being carried out under the aegis of the MAJI Institute.

In summary, both the Government of Tanzania and the donor agencies should give high priority to the following MAJI Ministry programs for skilled workers:

1. The proposal submitted to the International Labor Organization for updating the regional training centers and the support structure for the MAJI Institute (total estimated cost of \$2,300,000 and TSh. 10,000,000); and
2. Continuing education programs for MAJI and ARDHI craftsmen.

5.1.4 Training and Community Participation

MAJI at present has responsibility for the maintenance and operation of most urban and rural water supply schemes and is having severe difficulties in meeting this responsibility. Experience in other developing countries has shown that the effectiveness of operating and maintaining water supplies in rural areas can be greatly improved by delegating routine tasks to trained village caretakers, leaving the more complex operation and maintenance tasks to district-level technical teams.

As part of the MAJI Institute's (proposed) support program for the Regional Training Programs, it is proposed that a component be developed for assisting the Regional Water Engineers in setting up a unit for training of village water supply caretakers, and for training the trainers. It is proposed that the MAJI Institute seek the collaboration of the Institute of Adult Education in developing the content and methodology of such training programs.

With respect to community participation in the planning, design, and construction of water supply schemes, as a technical ministry MAJI does not appear to be the appropriate structure through which such participation should be organized. The Dutch-funded International Reference Centre (IRC) project for developing and testing a community education and participation component for rural water supply schemes was moved out of MAJI and into the Community Development Department of the Prime Minister's office. MAJI Ministry and the MAJI Institute should provide all the technical support considered necessary by the Community Development Department for the training of their cadres in water supply technology.

5.2 ARDHI

ARDHI should contract the Institute of Adult Education to work with ARDHI in designing, preparing, and implementing workshops for health officers, health assistants and other town council staff in methods for implementing low-cost sanitation projects. These in-service training programs would include components on latrine technology, construction methods, and community participation methodology. The implementation workshop would be carried out with the assistance of the construction methods and community participation methodology. This would include instruction on the design, preparation, and utilization of instruction media such as posters, booklets, drawings, and cassette tapes. The implementation workshop to be carried out with the assistance of the USAID-funded Environmental Training and Management in Africa (ETMA) project at the ARDHI Institute is a step towards developing this concept.

ARDHI should establish an annual short course and seminar on low-cost sanitation. Town administrators, health officers, health assistants, public health engineers, and public health technicians should be the target participants. The objective of the annual workshop would be to share information on problems encountered and solutions which have proved viable.

The WASH team suggested that the function of training Public Health Technicians be assumed by the MAJI Institute. This would require expanding the annual production of technicians from the 200 necessary in the water sector to the 220 necessary for water and urban sanitation sector. This proposal met with the approval of officials within both ministries and the principals of both the ARDHI and MAJI Institutes.

Relative to the content of the public health engineer diploma program at ARDHI Institute, the curriculum (which is currently being revised) should put more emphasis on low-cost sanitation. Specifically, material should be presented on planning, construction and management, and on selection criteria for technology based on socio-economic factors, availability of materials, and soil and hydrological considerations.

The ARDHI Institute staff should continue to work closely with the ARDHI Low-Cost Sanitation Unit (LCSU) in identifying and responding to field problems in developing instructional material.

The ARDHI Institute should involve LCSU staff and AFYA and MAJI instruction staff as guest lecturers and as resource staff in the area of sewerage low-cost sanitation.

The ARDHI Institute should emphasize the operation and maintenance of water treatment and wastewater treatment systems in their curriculum to develop an awareness, and consideration, of these factors in design and management of these systems.

The ARDHI Institute should work closely with ARDHI Ministry in identifying and implementing continuing education programs for public health engineers, public health technicians, and skilled workers in the environmental sanitation sector for the urban areas.

A need exists for trained technicians to operate and maintain the proposed Dar es Salaam wastewater treatment plants. It is recommended that a cadre of existing trained personnel be identified by the Town Council for short-term up-grading programs in Dar es Salaam and on-the-job experience. It is envisioned that subsequent wastewater treatment systems in other urban areas would use the Dar es Salaam project as a base for further training.

5.3 AFYA

5.3.1 Manpower Availability and Training

Given the financial constraints which prevail, it would be unrealistic to expect that enough health assistant schools could be established to meet AFYA's manpower projections. What could be done is to convert some paramedical training schools, since they are producing 570 rural medical aides per year which is twice the number needed for reaching the goal of one per 8,000 people in the year 2000. Therefore, some rural medical aides schools could be converted to health assistant schools.

It is recommended that the village health worker (VHW) program being elaborated by AFYA include health officers and health assistants not only as trainers of VHWs, but also in the scheme for providing supervision and support to the VHW. Being at the dispensary level, the health assistant would have greater capability than any other health worker for meeting the support needs of the VHW responsible for environmental health aspects of primary health care. In view of the proposed incentive scheme for eventually upgrading VHWs to the level of health assistant, it would follow that VHWs should work most closely with health assistants already in the health care delivery system. In terms of long-range development of the rural health infrastructure in which more dispensaries will be established in villages, an upgraded VHW desiring to stay in his village could become employed as the dispensary's health assistant.

An additional consideration would be to include MAJI and ARDHI in the training of VHWs. They can provide skills and knowledge in the construction, operation, and maintenance of low-cost sanitation and water supply facilities. The establishment of a relationship during training would facilitate sharing of resources and skills once the VHWs return to their villages.

5.3.2 Manpower Utilization and Training

Health assistants by virtue of working closer to the village level than any other water and sanitation worker, can assist in the outreach efforts of other ministries working with environmental sanitation.

To effectively accomplish the task of inter-sectoral linking and resource sharing at the sub-district level the content of the health officer and health assistant training programs should include:

- a. More knowledge of the skills, responsibilities and available resources of other workers providing water- and sanitation-related services to increase the coordination of efforts and avoid the duplication of services.
- b. More skills in the selection, construction, and maintenance of low-cost appropriate technology for rural water supplies at the ward and village level to reduce the prevailing logistical problems of outreach for regional and district-level MAJI workers.
- c. More field practice skills in the range of community organization techniques, social diagnosis techniques, and needs assessment techniques which are appropriate for rural settings to increase community participation not only for implementing environmental sanitation interventions but more importantly for planning and maintaining them.
- d. More skills in time management and logistical planning to increase efficiency in the coordination of equipment, materials and manpower needed for the construction, operation and maintenance of rural water supply and sanitation facilities.
- e. More skills in competency-based, non-formal education techniques to increase knowledge and skill levels of village craftsmen and village health workers in the operation and maintenance of rural water and sanitation facilities.

To make room in the existing health officer and health assistant training program, it is recommended that there be less emphasis on meat inspection, building inspection, and other activities which duplicate responsibilities of personnel from other sectors.

To more efficiently and effectively reach the villages from the dispensary and health center in addition to linking with district and regional environmental sanitation resources, health officers and health assistants will need to be more mobile than they are presently. It is, therefore, recommended that health officers and health assistants each be considered for an interest free loan to purchase a motorcycle such as a Honda Trail 100 cc (approximately 15,000 TSh.) and be reimbursed by the government for job-related mileage to cover maintenance and repairs. Through personal ownership, there would be greater vested interest in keeping the motorcycle in running condition, as well as eliminating the problem of using a government vehicle for personal use. Given the prevailing scarcity of spare parts and the high cost of petrol, motorcycles appear to be a more realistic and viable choice than any four-wheeled vehicle such as a Landrover for covering the long distances between villages and towns in Tanzania.

With the refocusing of the role of health officers and health assistants on coordinating AFYA, MAJI and ARDHI water and sanitation outreach efforts to rural villages, they will need strong support and supervision from persons in charge of health facilities at all levels. It is, therefore, recommended that all continuing education efforts and pre-service training include a significant component on staff development and support for the team approach to primary health care, with special reference to environmental sanitation. The ministerial division among hospital services, preventive service, and manpower development and training is effective for planning and administration purposes. However, at the implementation level in the field, health personnel need to work together as a multi-disciplinary team promoting health and preventing disease.

It is recommended that faculty members from the MAJI and ARDHI Institutes actively participate in the supervision of health officer students during their field assignments, and that the MAJI and ARDHI engineers working in the regions where health assistant schools are located participate in the supervision of those students' field assignments. By integrating MAJI and ARDHI involvement during pre-service training in the practicum aspects, the objective of coordinating water and sanitation outreach activities would become more achievable for health officers and health assistants. At the sub-district level health officers and health assistants working with rural communities who have identified water and sanitation needs as a priority would be able to advise on appropriate interventions in terms of cost and maintenance. If the intervention is beyond the technical capabilities of the health assistant/health officer and local craftsmen then coordination with district and regional resources would be initiated.

5.3.3 Continuing Education

Continuing education for health officers and health assistants will eventually be conducted by the Continuing Education for Health Workers' Center presently being developed in Arusha. Until this center is fully developed on a national scale, it is recommended that the regional function heads in the other 19 regions for water, sanitation, and health receive training from the Regional Institutes of Adult Education to develop and conduct continuing education workshops at the district and sub-district levels. The objectives for these workshops would come from the recommendations made by the proposed Task Force for Training to be constituted by the National Action Committee.

It is important that the documentation and proceedings of these workshops be communicated to the Arusha Center through the Continuing Education Unit at AFYA, so that the lessons learned can be integrated into the Center's diffusion plan.

The Training for Rural Development Project (TRD) is willing to include health officers and health assistants serving TRD villages which have identified environmental sanitation as a priority need in the project's in-service training program for rural development workers.

5.3.4 Community Participation and Training

Health education is the key for strengthening health-promoting behaviors and for reducing health-damaging ones, whether they are specific to food sanitation, communicable disease, housing, or environmental sanitation. It is, therefore, recommended that the health education field practicums for health officers and health assistants not be conducted in separate blocks but be specifically integrated into all application aspects of their pre-service training, thus extending the time allocated by combining practice hours. It is important for students to apply community education and action principles of health education in each of the various environmental sanitation responsibilities they will hold as health officers and health assistants.

The combination of basic rural environmental sanitation technical expertise with skills in community mobilization and service coordination warrants the application of competency-based training techniques. The use of these techniques would more fully integrate the theoretical and practical aspects of the educational programs for health officers and health assistants. Competency-based training techniques focus on the learner rather than the teacher, and the emphasis is on problem-solving as opposed to the absorption of knowledge for passing a standardized norm such as an examination. Assuming that the degree of water and sanitation needs will vary from village to village, health officers and health assistants will have to be more adaptable and resourceful as they develop appropriate interventions with the village community. To accomplish this task, health officers and health assistants themselves will need to use competency-based training techniques with villagers as they progress from planning, to construction, and to operation and maintenance of environmental sanitation facilities.

It is therefore recommended that the Institute of Adult Education design and conduct a comprehensive training of trainers program for the resident tutors of all health officers and health assistant training institutions. The Institute has the experience and the capacity to train trainers from all sectors in the Paulo Freire approach to competency-based adult learning. The Institute can provide continuing education services to any training institutions at the regional level on a short-term, regular basis. Resident tutors would not only need to understand the training techniques to teach them to their health officer and health assistant students, but would also use these adult learning techniques inside the classroom as well as during the practicums.

5.3.5 Coordination and Training

It is recommended that each year the Training Task Force meet with a graduating student from each of the AFYA, MAJI, and ARDHI training institutions, as well as with a faculty member from the ARDHI, MAJI and Adult Education Institutes. The tasks of the group would be to:

- a. Receive a progress report from representatives of each ministry on the activities in the field, with special reference to coordination efforts;

- b. Receive a progress report from each of the training institutions on classroom and field practicum experiences;
- c. Assess the relevance of water and sanitation programs along with the quality of pre-service training in terms of content and methodology;
- d. Identify specific in-service training activities for institute faculty, and continuing education activities for field staff.

Chapter 6

CONCLUSIONS

About 42 percent of Tanzanians have access to a protected water source within 400 meters of their homes. About 70 percent of villagers have constructed latrines from locally-available materials and almost all of these latrines are in use. These are tremendous achievements of which the people of Tanzania and the responsible Ministries (MAJI and AFYA) can rightly be proud. In spite of these efforts, there remain serious challenges to ensure the continuing expansion of the number served by new protected water sources and to secure the continued functioning of existing protected supplies. In the excreta disposal sector there remain serious problems with respect to the siting, construction, and maintenance of latrines in both urban and rural settings.

6.1 The Determination of Targets

In developing a manpower strategy it is necessary to determine realistic targets for both water supply and sanitation. In the opinion of the WASH team, the target of providing water for all by 1991 is not realistic for Tanzania. The team considers a target of 70 percent to be realistic and so has used this figure in determining manpower needs.

In the sanitation sector a similar Decade goal of every household having access to a latrine has been set, but no national strategy has been defined for either urban or rural areas. This lack of definition by the Government of Tanzania makes any planning exercise in the sector difficult.

6.2 The Integration of Water Supply and Sanitation

Three years ago the Government of Tanzania made a formal commitment to the principles of the International Drinking Water Supply and Sanitation Decade. One of the cornerstones of the Decade approach is the integration of programs in the water supply and sanitation sectors. Tanzania has yet to formulate an integrated approach to water supply and sanitation problems.

The consequences of this lack of definition are serious. Confusion has already begun to arise as donors attempt to draw up integrated regional water supply and sanitation plans in the absence of clear national guidelines. The lesson to be drawn from the experience of drawing up a national water master plan is that such national strategies should precede rather than follow the drawing up of regional, district, or village plans.

An integrated approach to rural sanitation would require no re-definition of existing responsibilities, only a focusing of responsibilities and a commitment of resources. That is, MAJI would continue to be responsible for water supply and AFYA would continue to be responsible for sanitation. AFYA's health officers and health assistants would become the coordinators of the rural water supply and sanitation interventions by linking the technical resources available at the regional and district level to the rural communities. However, there should be close and active coordination with the AFYA-led sanita-

tion programs capitalizing on the impetus created by successful rural water supply programs. The technical capacity of the sanitation unit at AFYA needs to be reinforced, and the priority given to the work of the unit within the AFYA Ministry should be increased.

The WASH team verified that most donors are committed to the principle of an integrated approach to water supply and sanitation. If the Government of Tanzania were to formulate an integrated strategy, it seems likely that the funds available for both water supply and sanitation would increase.

For the above reasons the WASH team considers it imperative that AFYA, ARDHI, and MAJI Ministries formulate an overall strategy for an integrated approach to water supply and sanitation as soon as possible. The Prime Minister's office and the Ministry of Manpower, too, should be actively involved in the development stages of this strategy to assure coordination and continuity in implementation. The WASH team believes that the Technical Sub-Committee of the National Action Committee to be the appropriate forum for the development of such a strategy.

6.3 Implementation Constraints

Many of the problems which limit progress in the water supply and sanitation sector have nothing to do with the absence of trained manpower and were not assessed by the WASH team. Bureaucratic procedures, lack of coordination within and between ministries, the absence of policy guidelines, and the shortage of equipment and materials are particularly important. An institutional problem which could be a serious constraint to implementation is the lack of delineation of responsibility for environmental sanitation in the urban periphery outside the areas subject to the jurisdiction of the town councils. This assessment focuses the shortcomings related to training.

6.4 The Coordination of Training Programs

A specific manifestation of the general lack of coordination in the environmental sanitation sector is the lack of coordination among the training institutes of the various ministries involved in the sector. The result is that the physical and human resources available for environmental sanitation training are not used effectively.

The WASH team strongly recommends that the National Action Committee for the International Drinking Water Supply and Sanitation Decade appoint a Task Force on Training for Water Supply and Sanitation. It is proposed that the members of the Task Force should be:

-- the Directors of Manpower Development and Training from MAJI, AFYA and ARDHI Ministries;

-- the Director of the Directorate of Higher Education, ELIMU;

-- representatives of each of the relevant training institutions, such as the principals of the MAJI Institute, the ARDHI Institute, and the AFYA School of Hygiene;

-- the Principal Academic Officer of the Institute of Adult Education.

An initial activity for the Task Force would be to assess the current plans for the training of skilled workers and technicians. The WASH team suggests that the Task Force consider advising the ARDHI Institute not to set up a public health technician training course. Rather, such a course should be set up as part of the MAJI Institute program. Furthermore, the MAJI Institute mandate should be expanded to include the supervision of the regional training of skilled workers in urban sanitation as well as in water. The MAJI Institute should receive the necessary support in terms of budget, staff, and facilities which would enable it to carry out this expanded mandate.

With respect to the AFYA School of Hygiene, the WASH team believes that a closer relationship with the MAJI and ARDHI Institutes, especially with regard to field practice, staff exchange and instructional media development, would have large payoffs in terms of more effective training and cooperation in future environmental sanitation activities.

6.5 Training of Trainer Programs

In all of the institutes responsible for environmental sanitation training the staffs require instruction in competency-based training methodology. The WASH team suggests that the the Institute of Adult Education be contracted to assess the needs for training of trainers programs, and to design and conduct the necessary training.

6.6 Training for Community Participation

In all of the institutes responsible for environmental sanitation training, training in promotion and community participation methodology is inadequate. The WASH team recommends that the specific needs of each training course with respect to community participation be identified, and that the institutes contract the necessary expertise to help them with curriculum development and staff training. The Training for Rural Development Project in Iringa was identified as a possible source for such assistance.

6.7 Improvement in Management and Administration

The effectiveness of existing environmental sanitation manpower could be substantially increased if the management and administration of environmental sanitation programs at the national, regional, district, and village levels were improved. The WASH team suggests that specific attention be given to developing in-service training programs for staff who have administrative and management responsibilities without having had the requisite training. The required training would be in the form of short courses, probably by both international management consultants, and local management consultants (such as the Institute for Development Management in Morogoro and the Eastern and Southern Africa Management Institute in Arusha).

6.8 Development of a Balanced Technical Labor Force

In all three ministries concerned with environmental sanitation, undue emphasis is placed on the training of high-level technical manpower (engineers and doctors) at the expense of the vital medium-level (technicians and health officers) and lower level (skilled workers and health assistants) manpower. The detailed recommendations of the WASH team suggested activities which could correct this imbalance.

6.9 The Formulation of Continuing Education Programs

In all three ministries concerned with environmental sanitation, the WASH team found too much emphasis on pre-service training at the expense of continuing education. The WASH team has recommended that emphasis be placed on activities, such as continuing education and the formation of professional, technical and craft associations, which improve both the esprit de corps and the technical capability of existing trained manpower.

6.10 Training for Design and Construction Versus Training for Operation and Maintenance

In both the MAJI and ARDHI training programs, the WASH team found an undue emphasis on instruction in skills necessary for planning, designing, and constructing water supply and sanitation facilities, at the expense of training in the skills necessary for the operation and maintenance of these facilities. In each particular case the WASH team has recommended steps which might be taken to correct this imbalance.

6.11 The Numbers of Cadres to be Trained

Present training programs are expected to be sufficient to meet the requirements of MAJI for personnel in the water sector. With a slight expansion in the mandate of the MAJI Institute, there should be sufficient numbers of technicians and skilled workers trained for the urban sanitation sector. It is foreseen, too, that the ARDHI Institute will produce a sufficient number of public health engineers.

It is in AFYA that the WASH team detected a large discrepancy between the needs for health officers and health assistants on the one hand and the capacity of existing institutions to train these workers on the other. Suggestions are made for expanding the existing health officers' training programs and for converting rural medical aide training facilities into schools for training health assistants. Schemes are also discussed for upgrading village health workers to become health assistants.

Chapter 7

DONOR INTEREST IN TRAINING IN THE ENVIRONMENTAL SANITATION SECTOR

At the request of ARDHI, AFYA and MAJI ministries, the WASH team contacted most of the donor agencies interested in the sector (see 7.8 below). The agencies and individuals were informed of the findings of the team and were asked about ways in which they might be interested in assisting with the training needs which were identified.

Many of the donors have invested large sums of money in water supplies in Tanzania and are acutely aware of the training-related difficulties which have prevented these investments from becoming fully productive. Most donors, too, are anxious to integrate sanitation components into their traditional concern with the water supply sector. The response to recommendations which addressed these concerns was enthusiastic. It is the firm impression of the WASH team that the possibilities of obtaining external funding for most of the activities identified by the WASH team are good, providing the necessary proposals are well prepared and submitted to the donors by the Government of Tanzania.

In this section we outline the possible sources of funding for the major recommendations made by the WASH team.

7.1 Management Training

SIDA indicated a strong interest in working with the relevant agencies, namely the MAJI Ministry, ARDHI Ministry, and the town councils, in developing managerial capability among technical staff who have managerial responsibilities.

A viable process would appear to be to contract a foreign management institute with the necessary expertise and have this institute work with a Tanzanian institute and ARDHI, MAJI and the town councils in developing short courses which would focus on: (1) the needs of the regional and district water engineers; and (2) the needs of the engineers who will have managerial positions within the (proposed) National Urban Water and Sanitation Authority. The foreign consultants would be involved in the first few short courses, with responsibility gradually being handed over to the Tanzanian management institute. It is envisioned that the Tanzanian management institute would annually offer a one-month management course for perhaps 20 engineers in the water and sanitation sector.

7.2 The ARDHI Institute Public Health Engineering Course

The ARDHI Institute submitted a proposal for TSh. 60 million to the European Economic Community (EEC), most of which was earmarked for the public health course. The proposal was considered excessive by the Treasury and not made part of the Lome II package for the EEC for Tanzania.

The UNDP has approved \$800,000 plus nine associate expert positions for the ARDHI Institute over the next three years. Included is a small component for curriculum development of the public health engineering course, and an associate expert starting in June of 1982 for the public health engineering course.

In January of 1982 the Embassy of the German Federal Republic recommended that a non-governmental organization which is a subsidiary of GTZ (the technical aid organization of the German Federal Republic) provide the topping-up money for two or three teachers for the public health engineering course of the ARDHI Institute. The response from Bonn to such recommendations is usually positive.

The Australian Government is enthusiastic in general about staff assistance programs and have significant resources which could be committed to such assistance in Tanzania. Given the fact that the Australian Government has previously shown an interest in training Tanzanians in short public health courses in Australia and given the positive appraisal by the WASH team of the start which has been made to the ARDHI public health engineering course, the possibilities of Australian staffing assistance to the course appear to be very good. Such a staff assistance program would include the training of Tanzanians to fill instructional positions in the course.

7.3 Training of Technicians at the MAJI Institute

The MAJI Institute has previously been supported by a number of donor agencies, with the Scandanavian countries providing the bulk of this support. None of the donors contacted by the WASH team was interested in continuing to support the MAJI Institute in its present form.

In 1981 the UNDP drew up a proposal for continued staff assistance for the MAJI Institute. The proposal was not approved. There is no possibility of further funding from UNDP for the Institute until at least 1984.

Several donor countries expressed strong interest in supporting the MAJI Institute if the MAJI Ministry indicated a clear commitment to the changes in the MAJI Institute recommended by the WASH team. Especially important in the eyes of the donors is the necessity for changing the technician produced by the MAJI Institute from a low-level engineer to a technician who receives specialized practical training in a much more limited subject area (as is done in developed country technician training). The donors uniformly endorsed the idea that a revamped MAJI Institute would be responsible for the training of public health technicians, too, and felt that it would be easier to obtain resources for technician training if such an integration were to take place.

It was generally agreed that no donor could make any commitment to the MAJI Institute before a detailed proposal for the restructuring of the Institute had been developed. Several donors indicated that they would support a proposal asking for technical assistance to the MAJI Institute by an expert in technician training. The terms of reference of this expert would be to work with the MAJI Ministry, ARDHI Ministry, and the MAJI Institute in redefining entrance requirements, curricula, training methodology, length of training,

continuing education programs, and staff recruitment procedures. In particular the following donors indicated that they would be willing to provide the expert in technician training upon request from the MAJI Ministry:

- 1) The Overseas Development Administration of the British Government has a definite possibility of providing a technical training expert to work with MAJI for two years, and would initiate a search for such an expert upon receiving a request from MAJI.
- 2) The Canadian High Commission expressed interest in possibly providing such an expert through the Canadian Executive Service Overseas Program. This would be for a period of up to three months and, again, would need a formal request from MAJI to activate the search.

Several other donors expressed a strong interest in a long-term staff assistance program with a MAJI Institute which revised its concept and method of technicians' training along the general lines recommended by the WASH team.

- 1) The Australian Development Assistance Program, as outlined earlier, is enthusiastic about the possibility of substantial staff assistance in the water and sanitation sector. They have expressed a strong interest in providing the expert assistance necessary for developing detailed proposal for a longer Australian commitment to the training of water and sanitation technicians at the MAJI Institute.
- 2) The Tanzanian mission of the German Federal Republic expressed a strong interest in possible future collaboration with the MAJI Institute if the changes recommended by the WASH team were to be developed into a concrete proposal.
- 3) The European Economic Community (EEC) has committed all of its funds for Lome II for Tanzania. The Lome II program includes nearly \$22 million for the urban water supplies of Mtwara, Mwanza, and Mbeya. The EEC mission in Dar es Salaam regards it as regrettable that no training component was included in the projects for these water supplies and is sensitive to the way in which these investments may be compromised for lack of trained technicians and craftsmen to operate and maintain the facilities. The EEC therefore expressed an interest in the MAJI training programs for both technicians and craftsmen. Furthermore, having considered the proposal for funding of the PHE course at the ARDHI institute, the EEC is sensitive to the needs for training public health technicians. The EEC is trying to increase the \$500,000 available in the Lome II program for "general training" and is interested in the possibility of contributing to a revised MAJI technicians' course which would include the training of the ARDHI technicians.

7.4 Training of Craftsman

All donors who have worked in the water sector are acutely aware of the need for a much more vigorous craftsmen training program. Those countries (particularly the Scandinavian ones) which are heavily involved in the implementa-

tion of regional water supplies are committed to setting up (as in the case of SIDA in Kagera Region) or continuing (as in the case of FINNIDA in Mtwara and Lindi) regional water craftsmen training programs.

The donors involved in the regional programs, and especially those who have developed curricula, materials and training methods (such as FINNIDA) are interested in providing the assistance necessary to feed their regional experience back into a national program if and when such a program should be formulated.

There are two proposals for national water craftsmen training which the WASH team discussed with the donors:

- 1) The International Reference Centre (IRC) Dutch-funded project for the development of a national training delivery system includes assistance in assessing training needs, training of training staff, and development of curricula and training materials. Although 270,000 Dutch guilders are held in reserve for this project, the Dutch Government mission in Tanzania is not satisfied with the formulation of the project by the IRC and is unlikely to release the funds for the project in its present form. The WASH team stressed the importance of the general area to be covered by the IRC project and urged the Tanzanian mission of the Dutch Government to continue to press the IRC to come up with a satisfactory formulation of the project.
- 2) The MAJI Ministry submitted a proposal to the International Labour Organization (ILO) for updating the regional water craftsmen training centers and the support structures of the MAJI Institute two years ago. The \$2.3 million project has recently been approved by the ILO in Tanzania. The ILO informed the WASH team that a slight update of the proposal was necessary due to the two years which have passed since the preparation of the original proposal, but that aside from that the ILO awaits only the formal request from the Government of Tanzania for the project. The WASH team urged the ILO to have the revised proposal include the small amendments which would be necessary for the regional training centers and the MAJI Institute structure to make provision for the training of the ARDHI Public Health Technicians.

7.5 Support for the Low Cost Sanitation Unit, ARDHI Ministry

USAID has expressed interest in arranging for short-term overseas training of four staff members of the Low-Cost Sanitation Unit (LCSU) staff through the Environmental Training and Management in Africa program. The objective is to send two LCSU members to work for two months on urban low-cost sanitation projects in India, and to send the other two candidates to work with the low-cost sanitation project in Zimbabwe. Confirmation of the offers is awaited by the Environmental Training and Management in Africa Program.

The USAID mission in Tanzania has agreed to investigate the possibility of providing a consultant to work with the LCSU for six months on drawing up standards for the design of urban sewerage and low-cost sanitation schemes in Tanzania.

The USAID mission in Tanzania has agreed to consider short-term technical assistance to develop the software necessary for the implementation of low-cost sanitation projects. ARDHI will request such assistance once they are preparing an actual implementation program and can use such technical assistance efficiently.

7.6 Support for AFYA

Several donors (including UNICEF, SIDA, and DANIDA), expressed their interest in helping to reinforce the technical capacity of the Sanitation Unit at AFYA and their frustration with the apparent low priority accorded to this unit in AFYA.

DANIDA funded the construction of the health assistant schools and feels that the investment which it has made has not yielded the expected benefits in part because of the critical shortage of appropriate training materials in Swahili for these schools. It appears that DANIDA would be responsive to an AFYA request for support to these schools in terms of teacher training and the provision of training materials.

SIDA expressed a strong interest in giving the small amount of assistance which would be needed for further training of the health officers responsible for the water supply and sanitation programs of the health officers' training schools and for the provision of good teaching materials for these parts of the health officers' curriculum. The WASH team expected to find a similar interest on the part of the World Health Organization (WHO), but was unable to pursue the matter with WHO due to the temporary absence of the Resident Representative to Tanzania.

7.7 Manpower Planning and Training

The World Health Organization has shown considerable interest in assisting in the development of manpower training plans for the sector. The proposed timetable for this technical assistance would start in late 1982. This team envisions this particular effort as an initial step to more comprehensive and detailed environmental sanitation manpower planning and training efforts.

7.8 Donor Agencies Contacted by the WASH Team

UNDP: Mr. Reynolds, Deputy Resident Representative
Mr. Jacobsen, Program Officer for Water
Ms. Vos, Administrative Officer

UNICEF: Mr. L. Wadstein, Program Officer for Water and Health

NORAD: Ms. M. Beckman, Program Officer for Water

USAID: Mr. P. Ehmer, Program Officer for Health

ODA, UK: Mr. G. Williams, First Secretary of the High Commission

DANIDA: Mr. Schmidt-Hansen, Program Officer for Water and Health
Canadian High Commission: Mr. R. Snyder, First Secretary
European Economic Community:
 Mr. P. Hughes, Attache for Administrative and Financial Affairs
Dutch Embassy: Mr. F. de Zwaan, Development Program Officer
FINNIDA: Ms. Honkanen, Program Officer for Water
SIDA: Mr. R. Andersen, Program Officer for Water
Australian High Commission:
 Mr. A. McKay, Development Assistance Officer
German Federal Republic Embassy:
 Mr. S. Keller, First Secretary
International Labour Organization: Mr. H. Telahun, Director

WATER AND SANITATION FOR HEALTH (WASH) PROJECT
ORDER OF TECHNICAL DIRECTION (OTD) NUMBER 75

DEC 23 1981

December 23, 1981

TO: Dennis Warner, Ph.D., P.E.
WASH Project Director

FROM: S&T/HEA/CWSS, Victor W.R. Wehman, Jr., P.E., R.S.
AID WASH Project Manager

SUBJECT: Provision of Technical Assistance to USAID/Dar es Salaam

for VWRW
JH. [Signature]

REFS: ✓1. DAR ES SALAAM 02747
2. OTD Number 26 ✓
3. WASH Field Trip Report, 22 Feb-13 Mar 81, A National ✓
Environmental Sanitation Education Master Plan
✓4. DAR ES SALAAM 06294 - 25 Sept 81
✓5. STATE 291525

1. You are requested to provide technical assistance to USAID/Tanzania as outlined below.
2. Obtain copies of all relevant documents (as noted in Para. 6 in DAR ES SALAAM 06294) as soon as possible.
3. Prepare detailed list of information needs, indicating information desired, possible sources of information, level of detail needed. See STATE 291525 for some of items to be included in request.
4. As soon as possible, obtain as much information as possible on ongoing or proposed Tanzanian projects in the water and sanitation sector being sponsored by AID, PVO's, bilateral donors, UN Agencies, or the private sector.
5. Develop a work plan based on recommendations of section 6 of WASH Field report for the mission based on the above reference (3) and the reply to STATE 291525, for review by S&T/HEA.
6. WASH contractor authorized to expend up to 170 person days of effort over a six month period to accomplish this effort.
7. Contractor to provide draft progress reports to mission before leaving mission after each consultancy. Draft report including plan should be provided mission before consultants leave mission on last day of consultancy. Consultant should debrief mission and discuss report and follow-up action on each progress report.
8. Contractor to coordinate directly with Paul Ehmer in USAID/Dar es Salaam on all project matters dealing with master plan. Inform AFR/DR/ENGR, AFR/DR/HN and Tanzania desk and project officers of all coordination involving progress, including ETA's and country clearance of consultants.

*will be
IDRC*

9. Make sure individuals in (8) above receive copies of the OTD and (work plan) in (5) above.

10. Contractor authorized local travel and miscellaneous incurred expenses NTE \$3,000 US without approval from AID WASH project manager.

11. Contractor authorized to expend up to 125 international per diem days.

12. Contractor, authorized to allow 7 round trips in and out of Tanzania, as necessary over the next six months from consultant's home base, through Washington, D.C. to Tanzania and return to his/her home base through Washington, D.C. as appropriate during the effort. Consultants should return to Washington for debriefings with Africa Bureau and S&T/HEA.

13. Contractor authorized to obtain secretarial, graphics or reproduction services in Tanzania as necessary NTE \$1,000 to accomplish mission. These services are in addition to the level of effort specified in para. 6, para. 10 and para. 11 above.

14. Contractor authorized to provide for vehicle rental if necessary to facilitate effort. Mission is encouraged to provide mission vehicles to support this effort if available.

15. Mission should be contacted as soon as Paul Ehmer returns to the mission (about 4 Jan 1982) and assistance initiated as soon as convenient to USAID/Dar es Salaam.

VWV:ja:12/23/81

ACTION COPY

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INCOMING TELEGRAM

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AID/W FOR AFR/EA VANDEN ROSS, DS/HEA

E.O.: 12065: N/A

SUBJ: WASH PARTICIPATION IN PREPARATION OF SANITATION EDUCATION MASTER PLAN

REF : KLINE/EHNER LETTER OF 31 MARCH

1. MISSION HAS RECEIVED COPIES OF PRELIMINARY REPORT AND HAS NOW DISTRIBUTED COPIES TO ALL MINISTRIES AND INSTITUTIONS INVOLVED. DUE TO DELAY IN RECEIPT OF COPIES AND FAILURE OF MISSION REPRODUCTION FACILITY TO COMPLETE COPIES WHILE EHNER WAS AWAY, MEETING TO DISCUSS REPORT BETWEEN MINISTRIES OF HEALTH, MANPOWER AND ARDHI TOOK PLACE 22 APRIL. MINISTRY OF HEALTH HAS REQUESTED MORE TIME TO REVIEW AND COMMENT ON PRELIMINARY REPORT. HOWEVER, CONSENSUS OF GROUP WAS THAT THERE IS A DEFINITE NEED FOR A SANITATION EDUCATION MASTER PLAN FOR TANZANIA.

2. THE FOLLOWING ISSUES WERE DISCUSSED:

(A) FINANCING IMPLEMENTATION OF PLAN - IT WAS MADE CLEAR THAT MISSION WOULD HAVE NO FUNDING AVAILABLE FOR IMPLEMENTATION OF THE PLAN DUE TO PROJECTED LEVELS OF FUNDING THAT WOULD ONLY PERMIT ONGOING HEALTH ACTIVITIES TO CONTINUE FOR THE NEXT TWO YEARS. GOVERNMENT OFFICIALS SAW NO PROBLEM WITH AN AID-FINANCED PLAN BEING IMPLEMENTED THROUGH OTHER SOURCES OF FUNDING. IT WAS AGREED THAT THE FINAL PLAN, ONCE PRODUCED, WILL BE A GOVERNMENT OF TANZANIA ENDORSED AND ACCEPTED DOCUMENT, WHICH THEN WILL BE THE BASIS OF FUTURE GOT BUDGET ALLOCATIONS AND/OR REQUESTS FOR ASSISTANCE FROM DONORS FOR IMPLEMENTATION. THE PLAN IS NECESSARY TO RATIONALLY COORDINATE AND PLAN FOR MEETING THE PROJECTED NEEDS OF VARIOUS MINISTRIES FOR ENVIRONMENTAL HEALTH PERSONNEL. WITHOUT SUCH A COORDINATED PLAN EACH MINISTRY WOULD BE OPERATING TO FULFILL ITS OWN NEEDS, THUS POSSIBLY DUPLICATING EFFORTS.

(B) ISSUE OF COORDINATING MINISTRY - IT WAS AGREED THAT ARDHI WOULD CONTINUE TO ACT AS THE GOVERNMENT AGENCY RESPONSIBLE FOR COORDINATION AND LAYING THE GROUNDWORK FOR FUTURE EFFORTS.

(C) ISSUE OF PREVIOUS LACK OF MINISTRY OF HEALTH INVOLVEMENT - THE MINISTRY OF HEALTH, THROUGH THE DIRECTOR OF PREVENTIVE SERVICES AND THE DIRECTOR OF MANPOWER AND TRAINING IS NOW INVOLVED IN THE PROCESS AND SUPPORTS THE IDEA OF A COORDINATED PLAN.

(D) ISSUE OF FUNDING FOR PLAN DEVELOPMENT - MISSION DOES NOT HAVE AVAILABLE FUNDS FOR THIS ACTIVITY AND WOULD EXPECT WASH PROJECT FUNDS BE MADE AVAILABLE TO CARRY OUT THE WORK.

(E) ISSUE OF TIMING OF NEXT STEPS - MAY/JUNE PERIOD IS NOT FEASIBLE DUE TO ABSENCE OF MOH PERSONNEL FOR WORLD HEALTH ASSEMBLY IN MAY AND GOT PARLIAMENTARY SESSIONS IN JUNE. THEREFORE EARLIEST TIME PERIOD TEAM COULD FEASIBLY WORK IN TANZANIA WOULD BE JULY.

3. FOLLOWING COMPLETION OF REVIEW OF DRAFT REPORT, IF DECISION TO GO AHEAD IS MADE, FORMAL REQUEST FROM GOT TO MISSION FOR FURTHER ASSISTANCE WILL BE PREPARED. THIS REQUEST WILL BE FOREWARDED BY MISSION TO DS/HEA FOR ACTION BY WASH. AT THIS TIME GOT DECISION REGARDING RECOMMENDATIONS OF DRAFT REPORT WILL BE FOREWARDED AND TERMS OF REFERENCE FOR TEAM WILL BE PROVIDED.

4. ON BASIS OF ABOVE DISCUSSION, IS IT LIKELY THAT DS/HEA WOULD AUTHORIZE WASH TO CONTINUE WITH PLAN DEVELOPMENT IF GOT REQUEST IS FORTHCOMING. VIETS

Action Office Dar Es Salaam
Date Received 4/23
Date Action Due 4/29
Date Action Taken A'G 1!

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Department of State

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DRAFTED BY AID/ST/HEA: J. AUSTIN: JA
APPROVED BY AID/ST/HEA: C. A. PEASE
AID/ST/HEA: F. E. MCJUNKIN
AID/AFR/CR/HN: J. SHEPPHERD (INFO)
AID/AFR/CR/ENGR: J. SNEAD (INFO)
AID/AFR/D7/ENGR: M. GOULD (INFO)
AID/AFR/EA: J. VAN DEN BOS (INFO)

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FM SECSTATE WASHDC
TO AMEMBASSY DAR ES SALAAM

UNCLAS STATE 291525

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E.O. 12855- N/A

TAGS:

SUBJECT: WASH PARTICIPATION IN PREPARATION OF SANITATION
EDUCATION MASTER PLAN
REFS: DAR ES SALAAM 2747, 6254

1. ST/HEA APPRECIATES FURTHER INQUIRY FROM MISSION.
2. SUGGESTED CHANGES IN WASH REPORT ARE NOTED. THERE ARE
NO PLANS TO ISSUE ANOTHER DRAFT AT THIS TIME.

3. WHAT ROLE WILL ROBERT OWEN, DIRECTOR MANPOWER
DEVELOPMENT, MINISTRY OF WATER AND ENERGY HAVE IN WASH
TEAM ACTIVITIES?

4. IN PARA 6 YOU RECOMMEND THAT TEAM REVIEW ALL RELEVANT
DOCUMENTS PRIOR TO ARRIVAL. PLEASE FURNISH MATERIAL ASAP.
WE HAVE NOT RECEIVED ANY SINCE TEAM VISIT IN MARCH 1981.

5. IN REF TO DAR ES SALAAM 2747 PARA:

- 2 (A) SEND LIST OF POTENTIAL DONORS WHO MIGHT FINANCE
PROPOSED PLAN, THEIR PROPOSALS FOR ACTIVITY, THEIR
POTENTIAL FINANCIAL INTEREST, AND WHEN THIS MIGHT BE

FORTHCOMING; TEAM WOULD WANT TO SCHEDULE MEETINGS WITH
THEM, PRIOR TO OR DURING VISIT, AND POSSIBLY USE A
STAFF MEMBER OF A POTENTIAL DONOR TO WORK WITH TEAM.

- 2 (B) SEND NAMES, TITLES, RESUMES AND ANTICIPATED
ROLE OF ARDHI STAFF WHO WOULD WORK WITH TEAM. THIS
WILL BE NECESSARY IN ORDER TO DETERMINE QUALIFICATION
NEEDED IN TEAM TO SUPPLEMENT GOT EXPERTISE TO BE MADE
AVAILABLE. WASH TEAM WILL GUIDE ARDHI STAFF IN
DEVELOPMENT, MOST OF WORK TO BE DONE BY ARDHI. THIS
WILL NECESSITATE THE AVAILABILITY OF SUBSTANTIAL BLOCKS
OF TIME BY ARDHI STAFF.

- 2 (C) SAME AS 2 (B) BUT FOR AFYA (MOH) PERSONNEL.

- 2 (D) WASH WILL BE ABLE TO FUND TEAM EXPENSES AND
NECESSARY LOCAL EXPENSES (SUCH AS TAXIS, CAR RENTAL,
SECRETARIAL AND INTERPRETER ASSISTANCE, SUPPLIES) IF
NECESSARY - HOWEVER, ASSISTANCE FROM THE MISSION AND

- 2 (E) EARLIEST POSSIBLE ARRIVAL (ASSUMING INFORMATION
YOU SUPPLY SO DICTATED) IS MID-FEBRUARY 1982, DATE WILL
NOT BE SET UNTIL WE RECEIVE AND REVIEW ALL PERTINENT
INFORMATION (PARA 4 ABOVE) AS WELL AS INFORMATION ON
GOT STAFF COMPETENCE ASSIGNED TO WORK WITH TEAM.

6. IF OTHER GOT MINISTRIES/ORGANIZATIONS/INSTITUTIONS
WILL BE PARTICIPATING (SUCH AS UTMISHI, DAR ES SALAAM
TECH COL, IHH LAB AND SOC WELFARE, ELIMU, HALI, AND
MANPOWER DEVEL. ADM.), PLEASE SEND INFORMATION REQUESTED
IN 2 (B) ABOVE;

7. WHO HAS HAD DISCUSSIONS WITH GOT ON TRAINING
RESULTS OF THESE MEETINGS AND REPORTS AND PLANS MADE
SHOULD BE FORWARDED IMMEDIATELY.

8. GTZ THROUGH WHO HAS TRAINING ACTIVITIES WITH GOT
PLEASE SUPPLY INFO ON THIS. ALSO, SAME FOR SIDA.

9. RECOMMENDATIONS AS STATED IN WASH REPORT (PAGES 26-
29) APPEAR TO BE STILL VALID. WE NEED INFORMATION
REQUESTED ABOVE IN ORDER TO DEFINE PERSONNEL NEED
(ITEM 3, PAGES 26) GOT PERSONNEL SHOULD BE USED
AS MUCH AS POSSIBLE, WITH WASH SUPPLYING MISSING SKILLS.
ANY GOT ON OCHOP EFFORT ON ITEM 4 (PAGES 26-27) SHOULD
BE FORWARDED IMMEDIATELY.

10. ANY FURTHER WASH ASSISTANCE ON SANITATION
EDUCATION MASTER PLAN WOULD BE CONTINGENT UPON
FAVORABLE FEASIBILITY THAT USAID, OTHER DONORS, OR
GOT WOULD FUND PROGRAM TO IMPLEMENT THE PLAN. THIS
ISSUE SHOULD BE ADDRESSED IN REPLY.

11. THANK YOU FOR ALL YOUR ASSISTANCE. KAIG

UNCLASSIFIED

APPENDIX B

Itinerary

- 2/22/82 Briefing with USAID and WASH Officials - Washington, D.C.
John Briscoe and Bob Gearheart travel to London
- 2/23/82 Briefing with Instructional/Technical Services; Clive Chapman;
International Water Pollution Research Association, Tony Milburn,
London.
- 2/24/82 Gearheart - Briefing with USAID Tanzania, Paul Ehmer - Dar es Salaam
- 2/25/82 Gearheart - Meeting with Environmental Sanitation Master Plan Ad Hoc
Committee - Dr. Simbeye Chairman
- 2/26/82 Gearheart - Meeting with ARDHI Officials - Robert Boydell
- 2/27/82 Gearheart - Meeting with AFYA Officials - Dr. Simbeye, Jean
Putabunzibwa, Dr. Dhalla
- 3/1/82 Gearheart and Briscoe - Meeting with MAJI - Mr. Schonberg
- 3/2/82 Gearheart - ARDHI Manpower, Mr. Rutachuh Zibwa, MAJI - Mr. Bransieag
- 3/3/82 All Team Members - Ad Hoc Committee Meeting, Dr. Dhalla AFYA
- 3/4/82 Gearheart - ARDHI and MAJI Personnel
- 3/5/82 Gearheart - MAJI - Schonberg
- 3/6/82 Gearheart - UTIMISHI - Mr. Kadula; ARDHI, Robert Boydell
- 3/8/82 Gearheart - MAJI - Thabit, USAID Paul Ehmer
- 3/9/82 Gearheart - ARDHI Institute - Dick Van Ginhoven
- 3/10/82 Gearheart to Morogoro - District Medical Officer District Health
Officer, Rural Medical Aides, Morogoro
- 5/11/82 Gearheart - Field trip to Megeta - Village Dispensary - Health
Officers, Health Assistants
- 3/12/82 Gearheart - ARDHI Officials - School of Hygiene
- 3/13/82 Gearheart - USAID Officials
- 3/15/82 All Team Members - Ad Hoc Committee Meeting
- 3/16/82 All Team Members - Joint Meeting - ARDHI Institute, School of
Hygiene, and MAJI Institute

3/17/82 All Team Members - Ad Hoc Committee Meeting Dr. Simbeye
3/18/82 All Team Members USAID Debriefing Mission, Director, Assistant
Mission Director, and HPN Project Officer
3/19/82 Gearheart Travel to U.S.
3/19/82 Eng - Travel to U.S.
3/22/82 Briscoe - Coordination with Donors

APPENDIX C

Officials Interviewed

Ministry of Water (MAJI) (Dar es Salaam)

Dr. Kivugo, Principal, MAJI Institute
Mr. J. Smet, Sanitary Engineer, MAJI Institute
Mr. Swere, Director of Manpower and Training, MAJI
Ms. H. Aussi, Planning Officer, Director of Manpower and Training
Mr. Thabit, Training Officer, MAJI
Mr. Msimbira, Assistant Chief Engineer, MAJI
Mr. G. Maheri, Deputy Regional Water Engineer, Mwanza
Mr. Kuluswa, Exec. Engineer, Iringa
Dr. R. Schonborg, Coordinator, Water Master Planning Coordinating Unit (WMPCU)
Mr. P. Brandstrom, Social Anthropologist, WMPCU
Mr. L.E. Lorum, Hydrologist, WMPCU
Mr. Shekue, Planning Officer, WMPCU
Mr. D.N. Shirima, Social Economist, WMPCU

National Institute of Medical Research (Dar es Salaam)

Dr. W. Kilima, Director

University of Dar es Salaam (Dar es Salaam)

Dr. N. Parker, Head of Department of Civil Engineering

Small Industries Development Organization

Mr. P. Mgemba, Senior Planning Officer

Ministry of Livestock (KILIMO)

Mr. W. Mallinga, Assistant Director for Veterinary Services

Regional Medical Office - AFYA (Iringa)

Mr. C. Surye, Health Officer in Wangingombe
Mr. W.M. Mntenga, Health Officer

Chama Cha Mapundizi (Iringa)

Mr. C. Ngweje, Divisional Secretary in Wangingombe

Ministry of Lands, Housing and Urban Development - ARDHI (Dar es Salaam)

Mr. F. Njau, Director, Sewerage and Drainage
Mr. C.K. Sikri, Project Manager, Dar es Salaam Sewerage and San. Project
Mr. Y.T. Mbetzo, Manpower Planning
Mr. Rutachunzibwa, Training Officer
Mr. D. Makerere, Health Officer
Mr. C. Kuhenga, Health Officer

Mr. A. Mgaya, Technician
Mr. Q. Rukoijo, Engineer
Mr. D.J. Mwabulambo, Director of Planning
Mr. D. Kiagwalu, Engineer
Mr. J. Musaim, Engineer
Mr. R. Boydell, UNDP/TAG Engineer of Low Cost Sanitation Unit (LCSU)
Mr. J. Bilizozi, Engineer of LCSU
Mr. A. Mbogolume, Health Officer of LCSU
Mr. R. Mutatemwa, Assistant Executive Engineer of LCSU
Dr. Mosh, Director of ARDHI Institute
Mr. D. Van Ginhoven, Engineer of ARDHI Institute

Regional Medical Office - AFYA (Morogoro)

Dr. Uledi, Regional Medical Officer
M. Masuki, Regional Health Officer
Dr. Temba, District Medical Officer
Mr. Chausi, District Nursing Officer
Mr. Mkondo, Hospital Secretary
Ms. L. Lima, Nurse, MCH Training Center
Mr. M. Joseph, Rural Medical Assistant, Mgeta Dispensary
Mr. Kmrkibele, Health Assistant, Mgeta Dispensary
Mr. M. Msimbe, Health Orderly, Tchenzema
Mr. O.A. Kikomi, Health Orderly, Msongozi

Ministry of Manpower Development and Administration (UTUMISHI) (Dar es Salaam)

Mr. B.C. Murruka, Director of Manpower Planning
Mr. Rugunyanhito, Director of Manpower Allocation
Mr. J.D. Kadula, Senior Planning Officer

Ministry of Health - AFYA (P.O. Box 9083, Dar es Salaam, Tel. 20261)

Dr. K. Mtera, Director of Preventive Services
Dr. Amri, Deputy Director of Training
Dr. Dhalla, Senior Planner
Dr. Shoo, Head of Continuing Education Unit
Mr. I.V. Mbagu, Head of Health Education Unit
Mr. E.K. Simbeye, Head of Environmental Sanitation Unit
Mr. J. Malika, Senior Health Officer
Mrs. J. Rutabunzibwa, Medical Demographer
Mr. W.M. Mntenga, Health Officer

Institute of Adult Education (Dar es Salaam)

Mr. Lawuo, Principle Academic Officer
Mr. E.F. Kilinda, Academic Tutor
Mr. J. Mutangi, Academic Tutor

School Health project - Prime Ministers Office

Dr. Ian Berger, Project Advisor

Muhimbili Medical Center

Dr. M. Mandara, Head of Community Medicine Department
Dr. K. Hagenhogen, Medical Anthropologist

USAID Mission (Dar es Salaam)

Mr. P. Ehmer, health Project Officer
Mr. C. Bonner, Training Project Officer

School of Hygiene (Dar es Salaam)

Mr. N.J. Mwakipake, Health Officer in charge of Water Course
Mr. M. Milla, Health Officer

Continuing Education for Health Workers Project - AFYA (Arusha)

Dr. Bhachu, Chief of Project

Regional Medical Office - AFYA (Arusha)

Dr. Moshi, Regional Medical Officer
Mr. Gwaha, Assistant Regional Health Officer

Municipal Medical Office - AFYA (Arusha)

Dr. Mzava, Municipal Medical Officer
Mr. Maungu, Chief Municipal Health Officer
Mr. Mwakyusa, Health Assistant

Women's Participation in Development Project - IAE (Arusha)

Ms. Lundeed, Project Advisor

Massai Rural Health Project - Lutheran Church (Arusha)

Dr. E. Nangawa, Project Director

Arusha Appropriate Technology Project - Ministry of Industries

Mr. I. Lembuya, Director of Communications
Mr. K. Nnko, Technical Coordinator

Arusha Planning and Village Development Project - PMO
(Arusha Regional Development Office)

Mr. Johnston, Community Development Coordinator
Mr. J. Gadek, Water Engineer
Mr. J. Wheeler, Rural Development Specialist

Training for Rural Development Project - PMO (Iringa)

Dr. J. Poley, Project Advisor

Mr. J. Okuyo, Principal of Training for Rural Development School

Mr. S. Mbuyo, vice Principal of Training for Rural Development School

APPENDIX D

Schemes of Service

Salary Scale:

<u>Rank</u>	<u>Salary (Tsh per month)</u>
OS1	600
MU1	650
MS1	840
MS2	1320
MS3	1704
MS4	2241
MS5	3210
MS6	3666
MS7	4140
MS8	4230
MS9	4320
MS10	4446
MS11	4590
MS12	4734
MS13	4860
MS14	5040

SCHEME OF SERVICE FOR PROFESSIONAL ENGINEERS

Methods of Entry and Advancements:

Assistant Executive Engineer - MS.4

(a) Direct Entry Qualifications:

Candidates must have obtained a degree or diploma in any of the Engineering, Architecture, Quantity Surveying or Land Surveying. Town Planning or Valuation from the University of East Africa or its equivalent recognized by the respective Registration Board.

(b) Duties:

Under the supervision of Registered Engineer, Quantity Surveyor, Land Surveyor, Town Planning or Valuer to undertake assignments geared to give a candidate practical training to meet the registration requirements of the respective Registration Boards.

Senior Assistant Executive Engineer - MS.5

(a) In-Service Structure:

By promotion on merit of officers in the Assistant grade who have satisfactorily served for a minimum of three years in that grade subject to availability of vacancies in this grade. Promotion will not, however, be automatic and is not a matter of right to be demanded.

(b) Duties:

As for officers in the above grade but with added supervisory responsibilities.

Executive Engineer - MS.6

(a) In-Service Structure:

By promotion on merit of Senior Assistant Officers who must have obtained full registration with the appropriate Registration Board and have had a minimum of three years satisfactory service on that grade, subject to availability of vacancies. Promotion is not, however, automatic or a matter of right to be demanded.

(b) Duties:

May be posted to take charge of a District, or of a Section of a Region, or of a Unit of a Ministry.

Senior Executive Engineer - MS.7-9

- (a) By promotion on merit of officers in the above grade who have completed a minimum of three years satisfactory service in that grade subject to availability of vacancies

in this grade. Promotion is not, however, automatic or a matter of right to be demanded.

(b) Duties:

May be posted to take charge of a Region, or to Head a Section of a Ministry.

Principal Executive Engineer - MS.10-11

(a) In-Service Structure:

By promotion on merit of officers in the service at the Senior's Grade who have completed a minimum of three years satisfactory service, subject to availability of vacancies in this grade. Promotion is not, however, automatic or a matter of right to be demanded.

(b) Duties:

To take charge of a Division of a Ministry.

Senior Principal Executive Engineer - MS.12-13

(a) In-Service Structure:

By promotion on merit of officers in the Principal's Grade who have had a minimum of three years satisfactory service subject to availability of vacancies in this grade. Promotion will not, however, be automatic and is not a matter of right to be demanded.

(b) Duties:

To take charge of a large Division of a Ministry.

SCHEME OF SERVICE FOR TECHNICIANS AND SKILLED WORKERS

Technical Auxiliary Grade II - OS.1

(a) Direct Entry:

Completion of Primary School Education and success in a Ministerial interview or an aptitude test.

(b) Duties:

To perform specified technical tasks under supervision of Senior staff.

Technical Auxiliary Grade I - MU.1

(a) Direct Entry:

- (i) Completion of National Form IV or its equivalent or
- (ii) Completion of Primary School Education plus one year pre-service training in relevant craft or
- (iii) Completion of Primary School Education plus two years pre-service training in relevant craft.

(b) In-Service Structure:

By promotion on merit of Technican Auxiliary Grade II in possession of Trade Test Grade III and who have had not less than 3 years Satisfactory Experience in that grade or in cases where Trade Tests are not awarded those who have completed three years in that grade have passed a Ministerial promotional Examination.

Assistant Technician - MS.1

(a) Direct Entry:

- (i) Completion of National Form VI or its equivalent with principal passes in science subjects.
- (ii) National Form IV School Leavers or its equivalent who have successfully completed a one year pre-service training in relevant field.
- (iii) National Form IV School or its equivalent who have successfully completed a two year pre-service training in relevant field.
- (iv) Possession of Trade Test Grade II plus evidence or previous work experience of not less than 3 years in a craft demanding possession of Trade Test Grade III.

(b) In-Service Structure:

By promotion of Technical Auxiliary Grade I in possession of Trade Test Grade II and who have not less than 3 years Satisfactory Experience in that grade or in cases where Trade Tests are not awarded those who have completed three years in that grade and have passed a Ministerial Promotion Examination.

(c) Duties:

To perform routine technical tasks under the supervision of qualified Technicians.

Technician Grade IV - MS.2

(a) Direct Entry:

- (i) National Form VI School leavers or its equivalent who have successfully completed a two years Technician Certificate/Diploma Course in a recognized Institution - or
- (ii) National Form IV School leavers or its equivalent who have successfully completed a three years Technician Certificate/Diploma course from a recognized Institution - or
- (iii) Possession of Trade Test Grade I plus evidence of previous work experience of not less than 3 years in a craft demanding possession of Trade Test Grade II.

(b) In-Service Structure:

By promotion on merit of Assistant Technicians in possession of Trade Test Grade I who have successfully completed not less than three years satisfactory service in that grade or in cases where Trade Tests are not awarded those who have completed three years in that grade and have passed a Ministerial Promotion Exam.

(c) Duties:

To perform specified routine tasks requiring skill and knowledge which require precision with a minimum of supervision and generally to assist professionals in their relevant field.

Technician Grade III - MS.3

(a) Direct Entry:

- (i) By appointment of Form VI leavers who have completed three years Diploma courses in relevant field from a recognized Institution or its equivalent - or
- (ii) By appointment of holders of Intermediate Certificate in Land Surveying from the East African Land Survey Examinations Board or its equivalent.

(b) In-Service Structure:

By promotion on merit of Technicians Grade IV who have successfully completed three years satisfactory service in that group.

(c) Duties:

To carry out specific tasks which require application of more advanced technical knowledge and skills, assist professionals in relevant fields of operation, to carry out general supervisory work including on-the-job training of junior staff.

Technician Grade II - MS.4

(a) In-Service Structure:

By promotion on merit of Technicians Grade III who have completed at least three years satisfactory service in that grade.

(b) Duties:

To carry out independently specified tasks which demand a higher degree of technical knowledge and skills. May take charge of a small station or project and train junior staff.

Technician Grade I - MS.5

(a) In-Service Structure:

By promotion on merit of Technicians Grade II who have completed at least three years satisfactory service in that grade.

(b) Duties:

As for Technicians Grade II but with added responsibilities including those of administrative and financial control.

Senior Technician - MS.6

(a) In-Service Structure:

By promotion on merit of Technicians Grade I with a minimum of three years satisfactory service in that grade.

(b) Duties:

To carry out special duties which require a higher degree of competence and technical experience. May take charge of a large project or of a Regional or Division Unit or of a central workshop.

Principal Technician - MS.7-9

(a) In-Service Structure:

By promotion on merit if Senior Technicians with at least three years satisfactory service in that grade who have demonstrated administrative and Technical ability in that field of specialization.

(b) Duties:

Overall incharge of a Technical Division in the Ministry or may be posted to take charge of a Region. To provide Technical expertise to hsi staff in his field of specialization.

ESTABLISHMENT CIRCULAR LETTER No. 6 OF 1975

SCHEME OF SERVICE FOR NON-PROFESSIONAL/TECHNICAL CADRES MINISTRY OF HEALTH

General

The current Schemes of Services for Non-professional/Technical Cadres in the Ministry of Health published in Establishment Circular Letter No. 13 of 1972 have now been reviewed with special regard to comparability and equity in the service, in so far as has been possible, in the light of Staff Circular Nos. 2, 3 and 4 of 1974, as well as other developments which have taken place since that time. The results of the reviews are here shown in new Schemes of Service as Appendices I to XIII as follows:

- Appendix I—For Rural Medical Aids and Medical Assistants.
- Appendix II—For Physiotherapists.
- Appendix III—For Nurses.
- Appendix IV—For Dental Auxiliaries and Dental Assistants.
- Appendix V—For Dental Technicians.
- Appendix VI—For Vaccine and Pharmaceutical Production Staff.
- Appendix VII—For Dispensing and Pharmaceutical Staff.
- Appendix VIII—For Chemical Laboratory Technicians.
- Appendix IX—For Laboratory Technicians.
- Appendix X—For Radiographers.
- Appendix XI—For Health Officers.
- Appendix XII—For Health Administrative Assistant and Health Secretaries.
- Appendix XIII—For Medical Records Staff.

Qualifications requirements and Promotions

2. The qualification requirements listed for appointments and promotions in these Schemes are minimum requirements normally to be met with for a candidate to be considered eligible for appointment or promotion. Their acquisition will not automatically lead to appointment/promotions. In all instances, in addition to those qualifications being met with, appointments and promotions depend on availability of vacancies in the appropriate grades and on the Appropriate Authority being satisfied, in the case of promotions, that an officer's potential, judging by the standard and quality of performance over a period of three years in the grade held at the time of being considered for promotion in every way show him to be suitable for advancement to a higher grade. Thus, as is the case throughout the service, promotions are not automatic and cannot be demanded as a matter of right.

Control and Discipline

3. The Principal Secretary of the Ministry of Health will exercise control over and be responsible for the general administration and development, including training, of the employees covered under these Schemes of Service in accordance with the provisions of the Civil Service Regulations and Standing Orders.

4. Regional Development Directors will administer employees in the employment covered under these Schemes in accordance with guidelines and instructions issued by the Principal Secretary, Ministry of Health. They are to submit to him an up-to-date Seniority List of all employees in their regions, by cadre and grade, as at end of 30th June and 31st December, of each year within a fortnight of the month following.

Implementing the Schemes

5. Designations will change as follows from those applying under authority of Establishment Circular Letter No. 13 of 1972 and may appear in approved Schedules of Personal Emoluments Estimates 1974/75.

<i>Designation used in E.C.L. 13/1972 and in Estimates</i>	<i>Salary Scale in E.C.L. 13/1972</i>	<i>...</i>	<i>Designation under New Scheme</i>	<i>Salary Scale</i>
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B APPENDIX I

Rural Medical Aid	TO.1	Rural Medical Aid	NT.A
Senior Rural Medical Aid	TO.1A	Senior Rural Medical Aid	NT.B
Medical Assistant... ..	TO.2	Medical Assistant	MS.2
Assistant Medical Officer Grade II	TO.3-4	Assistant Medical Officer Grade III	MS.3
Assistant Medical Officer Grade I	TO.5-6	Assistant Medical Officer Grade II	MS.4
Senior Assistant Medical Officer...	TO.7	Assistant Medical Officer Grade I	MS.5
Chief Assistant Medical Officer ...	AP.4	Senior Assistant Medical Officer...	MS.6
		Principal Assistant Medical Officer	MS.7
		Senior Principal Assistant Medical Officer	MS.10

President's Office,
 Central Establishment Division,
 P.O. Box 2483,
 Dar es Salaam,
 10th July, 1975

Ref. No. EB. 3/41/033

- (a) *In-Service Structure:*
By promotion on merit from Radiographic Auxiliaries who have completed at least three years' satisfactory service in that grade and have in addition passed the Radiographic Assistant, Grade II Examination.
- (b) *Duties:*
As for Radiographic Auxiliary but with increased responsibilities.
4. Radiographer, Grade IV (MS.2) Entry Point Shs. 945/- p.m.
- (a) *Direct Entry Qualifications:*
Possession of a recognized certificate in radiography.
- (b) *In-Service Structure:*
Possession of a recognized certificate in radiography.
- (c) *Duties:*
As for Radiographic Assistant, Grade II but with added responsibilities.
5. Radiographer, Grade III (MS.3)
- (a) *In-Service Structure:*
By promotion of Radiographers, Grade IV who have completed a minimum period of three years satisfactory service in that grade.
- (b) To undertake all radio diagnostic procedures on patients, to take care of equipment and contract medy, teaching of radiographic auxiliaries. May be required to be in-charge of X-Ray Units with large sophisticated equipment.
6. Radiographer, Grade II (MS.4)
- (a) *In-Service Structure:*
By promotion on merit of Radiographers, Grade III who have completed at least three years satisfactory service in that grade.
- (b) *Duties:*
As for Radiographer, Grade III with additional responsibilities. May be overall in-charge of X-Ray Units and Radiographic Staff of large Consultant teaching Hospital.
7. Radiographer, Grade I (MS.5)
- (a) *In-Service Structure*
By promotion of Radiographers, Grade II who have served for at least three years in that grade.
- (b) *Duties:*
As for Radiographer, Grade II but with added responsibilities.
8. Senior Radiographer (MS.6)
- (a) *In-Service Structure:*
By promotion on merit of capable Senior Radiographers, Grade I who have completed at least three years satisfactory service in that grade.
- (b) *Duties:*
As for Radiographer, Grade I but with added administrative and supervisory responsibilities in a Consultant Hospital.
9. Principal Radiographer (MS.7)
- (a) *In-Service Structure:*
By promotion on merit of capable Senior Radiographers with a record of satisfactory service in that grade.
- (b) *Duties:*
As for Senior Radiographer but with added administrative and supervisory responsibilities which include assisting the Radiologist in the overall co-ordination of X-Ray service for the whole country.

APPENDIX XI

SCHEME OF SERVICE FOR HEALTH AUXILIARIES AND HEALTH OFFICERS
METHODS OF ENTRY AND ADVANCEMENT

1. Health Orderly (OS.1)
- (a) *Direct Entry Qualifications:*
Completion of Primary School Education.
- (b) *Duties:*
To carry out general environment sanitation work in rural areas, trading centres and Ujamae Villages.
2. Health Auxiliary (MU.1)
- (a) *Direct Entry Qualifications:*
Successful completion of a 1½ year Pre-Service training Course for Health Auxiliaries in an approved medical institution.
- (b) *In-Service Structure:*
By promotion on merit of Health orderlies who have completed at least three years of satisfactory service in that grade and have successfully completed a 1½ year training course.
- (b) *Duties:*
As for Health Orderlies with added responsibilities.
3. Health Assistant (NT.A)
- (a) *In-Service Structure:*
By promotion on merit of Health Auxiliaries who have completed at least three years service in that grade.
- (c) *Duties:*
As for Health Auxiliary but with added responsibilities.
4. Health Officer, Grade IV (MS.2)
- (a) *Direct Entry Qualifications:*
Successful completion of three years course in environmental health science in an approved institution.
- (b) *In-Service Structure:*
By promotion of Health Assistants with three years satisfactory service in that grade and who will have completed the three years in service course.

- (c) *Duties:*
 Environmental Health control based at Rural Health Centre training centre, working in more specialized fields of public health education; designing, preparing and production of educational teaching materials such as posters flannel graphs, pamphlets, booklets, etc. and preparation of suitable materials for public health for the Radio, press, etc. to undertake specific health education projects within recognized fields such as Community charge of a district.
5. Health Officers, Grade III (MS.3)
- (a) *In-Service Structure:*
 By promotion on merit of Health Officers, Grade IV who have completed at least three years satisfactory service in that Grade.
- (b) *Duties:*
 As for Health Officers, Grade IV but with added responsibilities. May be responsible for the proper running of environmental sanitation work and for the proper management of health work in sub-district. May carry out teaching duties in a medical training centre.
6. Health Officer, Grade II (MS.4)
- (a) *In-Service Structure:*
 By promotion of Health Officers, Grade III who have completed at least three years of satisfactory service in that grade.
- (b) *Duties:*
 Responsible for general environmental health duties of district. Will be required to supervise the work of health officers in a district.
7. Health Officer, Grade I (MS.5)
- (a) *In-Service Structure:*
 By promotion of Health Officers, Grade II who have completed at least three years with satisfactory service in that grade.
- (b) *Duties:*
 As for Health Officers, Grade II but with added responsibilities. In-charge of large Urban districts.
8. Senior Health Officer (MS.6)
- (a) *In-Service Structure:*
 By promotion of Health Officers, Grade I who have completed at least three years satisfactory service in that grade.
- (b) *Duties:*
 Responsible for regional environmental sanitation work including supervision of health staff. Responsible for drawing up training programmes (seminars workshops) for health personnel in the region. May be assigned teaching duties and as head of the specialized institutions.
9. Principal Health Officer (MS.7)
- (a) *In-Service Structure:*
 By promotion on merit of Senior Health Officers who have completed at least three years satisfactory service in that grade.
- (b) *Duties:*
 Responsible for country-wide (national) environmental sanitation work including supervision of staff. Responsible for drawing up training programmes for health personnel in the Ministry.

APPENDIX XII

SCHEME OF SERVICE FOR HEALTH ADMINISTRATION ASSISTANTS AND HEALTH SECRETARIES

1. Health Administrative Assistant, Grade II (MS.1 E.P. Shs. 650/- p.m.)
- (a) *Direct Entry Qualifications:*
 Holders of the National Form IV Certificate of Education who have completed a two years Pre-service course in Health Administration.
- (b) *In-Service Structure:*
 Promotion on transfer of Clerical and Higher Clerical Officers who have passed a special examination after being short listed for this appointment.
- (c) *Duties:*
 To assist District Medical Officers, Regional Medical Officers and Medical Superintendents of hospitals in the management of health service and institutions, especially in the business and non-technical aspects of medical administration.
2. Health Administrative Assistant, Grade I (MS.2 E.P. 1,035/- p.m.)
- (a) *Direct Entry Qualifications:*
 Holders of the National Form VI Certificate of Education or its equivalent who have successfully completed the two years diploma course in Health/hospital administration.
- (b) *In-Service Structure:*
 By promotion of Health Administrative Assistant, Grade II who have completed at least three years satisfactory service and who hold a diploma in health/hospital Administration, or non diploma holders who have completed at least five years satisfactory service in that grade.
- (c) *Duties:*
 As for those of health Administrative Assistants, Grade II but usually posted to regional health institutions at this level.
3. Health Secretary, Grade III (MS.3)
- (a) *In-Service Structure:*

Anwani ya Simu: "Ujuzi wa Mafundi", D.S.N.
Simu Nambari: 20781
Unapojibu tafadhali Taja:
Kumb. EB. 3/41/034/175.

Wizara ya Maendeleo ya Utumishi
S. L. P. 2483,
Dar es Salaam,
11, Agosti, 1978.

WARAKA WA MAENDELEO YA UTUMISHI Na. 2 WA 1979

MUUNDO WA UTUMISHI WA MAFUNDI

Utangulizi:

Muundo wa Utumishi wa Mafundi ulitolewa katika Establishment Circular Letter No. 9 of 1975 ukiitwa Scheme of Service for Civil Service Technicians. Muundo huo sasa umefanyiwa mabadiliko kama inavyoonyeshwa katika Nyongeza "A" ya Waraka huu.

Ujuzi na Utaratibu Unaotakiwa Katika Kupandishwa Vyeo:

2. Ujuzi unaotakikana ambao umeelezwa katika Muundo huu ili kumuwezesha mtumishi kuteuliwa katika utumishi au kupandishwa cheo kutoka ngazi moja hadi nyingine ni wa kiwango cha chini kabisa ambacho kitamlazimu kila mtumishi akipate ili aweze kuajiriwa au kupandishwa cheo katika muundo huu. Hii haina maana kwamba mara mtumishi akifanikiwa kupata viwango hivyo vya ujuzi kazini atajiriwa au kupandishwa cheo.

Vyeo na Ngazi za Mishahara:

3. Kutokana na kutolewa kwa Muundo huu, vyeo na ngazi za mishahara zita-kuwa kama ifuatavyo:—

(i) Technical Auxiliary, Grade II	...	...	...	OS.	1
(ii) Technical Auxiliary, Grade I	...	...	...	MU.	1
(iii) Assistant Technician	...	...	...	MS.	1
(iv) Technician, Grade IV	...	...	...	MS.	2
(v) Technician, Grade III	...	...	...	MS.	3
(vi) Technician, Grade II	...	...	...	MS.	4
(vii) Technician, Grade I	...	...	...	MS.	5
(viii) Senior Technician	...	...	...	MS.	6
(ix) Principal Technician	...	...	...	MS.	7—9

Matunzo:

4. Ili kuongeza ujuzi na ufanisi wa kazi, mafundi watapatiwa mafunzo katika vyuo vya Ujenzi au vyuo vinginevyo vinavyotambuliwa na Serikali hapa nchini au nchi za nje.

Utekelezaji:

5. Muundo huu wa Mafundi utatumiwa na kada zote za Kiufundi kama zilivyooonyeshwa katika Establishment Circular Letter No. 9 ya 1975 nazo ni:—

Building	...	...	...	...	Mechanics.
Catograph	...	...	...	...	Photogrametry.
Draughting	...	...	...	...	Photolithography.
Drilling	...	...	...	...	Roads.
Electrical	...	...	...	...	Survey.
Ferries...	...	...	...	...	Valuation.
Material	...	...	...	...	Water.
Laboratory	...	...	...	...	Works.

Orodha hii inaweza kuongezeka kwa kutolewa "amendment slips".

APPENDIX E

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