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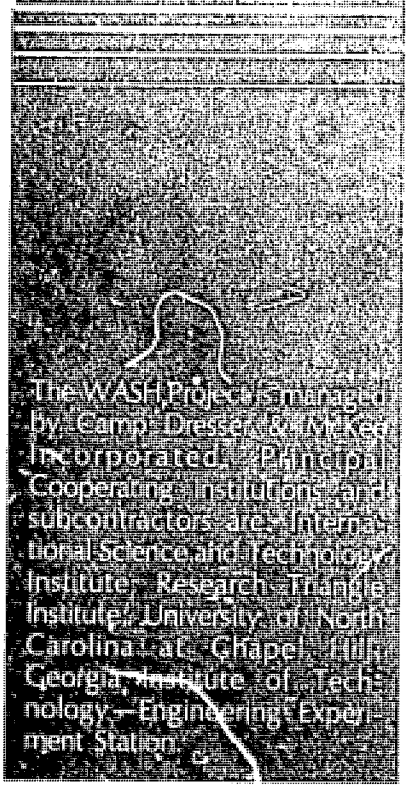

TANZANIA

HEALTH AND ENVIRONMENTAL MONITORING PROJECT (HEMP):

RECOMMENDATIONS FOR PROJECT PAPER DESIGN TEAM

WASH FIELD REPORT NO. 8

February 22-March 13, 1981

Order of Technical Direction No. 26
Prepared For: USAID, DS/HEA

Contract No. AID/DSPE-C-0080
Project No. 931-1178

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9 March 1981

Mr. Paul Ehmer
Public Health Advisor
U.S. Agency for International Development
Dar es Salaam, Tanzania

Dear Mr. Ehmer:

On behalf of the WASH Project, I am pleased to attach the original and one copy of a report on the Health and Environmental Monitoring Project (HEMP). This was a preliminary investigation by Dr. Kenneth Woolf and myself, and our recommendations are included in the report.

This assistance was requested by the Mission on 10 December 1980. The WASH Project was authorized to undertake the work by USAID/Washington, DS/HEA, in order of Technical Direction No. 26, dated 13 February 1981.

We look forward to your comments and will be pleased to discuss any questions you may have regarding the findings or recommendations contained in this report.

Sincerely,

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

DBW/jrm

TANZANIA

HEALTH AND ENVIRONMENTAL MONITORING PROJECT (HEMP):

RECOMMENDATIONS FOR PROJECT PAPER

DESIGN TEAM

A USAID/WASH PROJECT FIELD TEAM

REPORT

Submitted to:

Mr. Paul Ehmer
Public Health Advisor
USAID Mission
Dar es Salaam, Tanzania

Prepared by:

Dennis B. Warner, Ph.D., P.E.
and
Kenneth Woold, Ed.D., P.E.

March 9, 1981

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ACKNOWLEDGEMENTS

The writers wish to acknowledge the efforts of Mr. Paul Ehmer, Public Health Advisor at the USAID/Tanzania Mission. Without his professional and personal assistance, this investigation could not have been completed in the short period allotted for the study.

The enthusiastic support of Dr. Martin P. Mandara and his staff at Muhimbili Division of Community Medicine is equally responsible for the completion of this effort.

Finally, but by no means least important, the writers would like to acknowledge the cooperation and assistance provided throughout the assignment by members of the ARDHI staff, particularly Ms. Hilda Vanlankveld.

SECTION ONE

INTRODUCTION

1.1 Nature of the Request

On 13 February 1981, the WASH office received Order of Technical Direction (OTD) No. 26 from the USAID Office of Health (DS/HEA), as shown in Appendix 1. The OTD was issued in response to requests from the USAID Mission in Tanzania for assistance on two separate activities:

1. Preparation of a national sanitation education Master Plan.
2. Recommendations on the size, composition, and duration of the Project Paper design team for the Health and Environmental Monitoring Project (HEMP).

The report describes the second activity. The first activity is described in an accompanying report.

This report and Environmental Monitoring Project (HEMP) is described in the Project Identification Document (PID) dated 10 March 1980. The next step in the AID project approval process is the preparation of the Project Paper. This report describes the design team needed to develop the protocol systems and techniques which are to be employed in a five-year monitoring study of the World Bank-financed sewerage and sanitation project in Dar es Salaam. In addition, suggestion for a possible research methdology is included for consideration by the design team which is to consist of both Tanzanian and U.S. personnel.

On 5 September 1980 a request was made by the USAID Mission in Dar es Salaam asking that DS/HEA review the subject PID and "make specific recommendations regarding number and type of design specialists necessary and for what duration to do complete PP design."

1.2 Description of WASH Project Responses

Since it was necessary to send a WASH team to Tanzania in connection with another request, it was agreed and confirmed by the USAID Mission in Dar es Salaam on 27 January 1981 that the same team could also assist in the HEMP Project study.

From that point until 13 February 1981, the date of the official OTD, the WASH Task Manager conducted preliminary preparations for WASH assistance. These preparations included discussions with DS/HEA, Africa Bureau, and Mission personnel, formulation of possible WASH response, and review of likely WASH consultants. Upon receipt of the OTD, the WASH Project and DS/HEA jointly agreed to send a two-man team to Tanzania over the period 22 February - 8 March 1981 as requested by the Mission. The team consisted of Dr. Dennis B. Warner, the Associate Director of the WASH Project and Team Leader for the visit, and Dr. Kenneth Woolf, the Director of Training for Camp Dresser & McKee Inc., the prime contractor for the WASH project.

SECTION TWO

BACKGROUND TO THE PROJECT

Dar es Salaam has been the subject of a number of urban planning studies in recent years. An overall urban development plan for the city was prepared by Marshall Macklin Monaghan Ltd. (Canada) with SIDA financing in 1969. This plan formed the basis for a Dar es Salaam Sewerage and Sanitation Master Plan by the firm of Howard Humphreys and Partners (HHP) in 1979-80. The Master Plan was prepared as part of a multi-phase project for the Ministry of Lands, Housing and Urban Development (ARDHI), and was financed by IDA of the World Bank group.

Following completion of the Master Plan, ARDHI and HHP began the second phase consisting of a preliminary engineering design and a feasibility study of Stage I sewerage and sanitation work for Dar es Salaam. This study included sewerage design, sewerage treatment, low-cost sanitation proposals, cost estimates and institutional studies.[4*] A draft version of the study was completed in October 1980 and was still under review at the time of this report (March 1981). The World Bank intends to carry out a Project Appraisal in mid-1981 with the intention of signing a loan agreement with the Government of Tanzania (GOT) early in 1982. This initial stage of the project will be limited to the rehabilitation of the existing sewerage system, the provision of low-cost sanitation facilities and health education, and institutional strengthening of the City Council of Dar es Salaam.

*Reference numbers refer to documents listed in Appendix 4.

The Dar es Salaam project marks the first time that the World Bank has considered both sewered and non-sewered facilities as a planned continuum in municipal projects. There is no prior experience in the Bank with such an approach and, therefore, the developmental outcomes are unknown. The inclusion of low-cost sanitation in the project was suggested by the Technical Advisory Group (TAG) of UNDP Global Project GLO/78/06, which has made several visits to Tanzania since 1978 and has prepared a series of ten TAG reports on low-cost sanitation issues in the country.[2,3,6] The TAG group, led by Dr. Richard G. Feacham of the Ross Institute (London School of Hygiene and Tropical Medicine), has drawn heavily upon the results of a recent World Bank project involving the preparation, planning and design documents for appropriate sanitation alternatives in developing countries.[8,9] Recommendations to monitor the low-cost sanitation components of World Bank-financed projects were made by the TAG group starting in 1978.

Partly as a result of the TAG recommendations, a Low-Cost Sanitation Unit (LCSU), was established within the Sewerage and Drainage Division of ARDHI in 1980. The LCSU has carried out sanitation surveys in all major urban centers in Tanzania, has begun a demonstration program of constructing 110 ventilated, improved pit latrines (VIP) in Dar es Salaam, and is cooperating in monitoring water and sanitation projects in up-country areas of Tanzania. The survey carried out by the LCSU in Dar es Salaam was incorporated by HHP in their preliminary engineering design report of October 1980.[4]

In late 1979, USAID became interested in monitoring the low-cost sanitation aspects of the proposed Dar es Salaam project. Discussions were held with ARDHI, the TAG group, the Ministry of Health, and the Division of Community Medicine of the Muhimbili Medical Centre. From the USAID standpoint, a

complementary monitoring project would (1) directly benefit the residents of Dar es Salaam by facilitating the planning of appropriate excreta disposal methods, (2) indirectly benefit rural residents faced with the same sanitation problems, (3) strengthen the institutional capability of the Division of Community Medicine, and (4) provide fundamental answers to important questions regarding sanitation and health. A USAID team prepared a Project Identification Document, No. 621-0165, in March 1980 which proposed a four-phase monitoring and evaluation effort over a five-year period.[1] The estimated USAID cost of the project, including full-time personnel, consultants, technicians, student assistants, computer and laboratory equipment, vehicles and training, was $3,435,000. The necessary counterpart funds to be provided by Tanzania were estimated at $1,150,000.

The final details of the low-cost sanitation component in the Dar es Salaam project are still unknown. Available documents and discussions with GOT officials have indicated, however, that low-cost sanitation facilities probably will be developed in the residential areas of Ilala, Temeke, and Kinondoni. Three basic types of VIP latrines will be built:

(1) Standard latrine	- areas of intermediate soil permeability or low water table
(2) Built-up (mound) latrine	- areas of high soil permeability or high water table
(3) Twin pit latrine	- areas of high soil permeability or low water table

In addition, the following design variables will be considered:

(1) Type of slab	- normal pit or pour flush
(2) Number of pits	- single or double
(3) Elevation of slabs	- ground level or raised

An essential aspect of the low-cost sanitation component will be health education directed at the users of VIP latrines. It is anticipated that a variety of institutional mechanisms, including the Party, women's groups, health workers, school teachers, and city council employees will be used to promote health education in the project area.

SECTION THREE

MONITORING RESOURCES AVAILABLE IN TANZANIA

The primary Tanzanian resource for this monitoring project is the Division of Community Medicine (DCM) in the Muhimbili Medical Centre. Being both a teaching and research institution, the DCM has an experienced faculty, students capable of working under supervision, and a range of laboratory, computational, and other necessary facilities. Most importantly, the DCM is interested in the project and is willing to take on major responsibilities in carrying it out. For the immediate purposes of the Project Paper, however, the following discussion refers to the DCM resources likely to be available for project design.

Within the DCM, the following departments and their associated personnel were found to be most interested in working with the design team to be sent to Tanzania to develop the Project Paper:

Department of Epidemiology and Biostatistics:
- Dr. F.D.E. Mtango, Head of Department
- Dr. J.Z.J. Killewo, Lecturer
- Mr. Hans Remme, Bio-statistician
- Ms. Masuma Mamdani, Asst. Lecturer

Department of Behavioral Sciences:
- Prof. H.S. Takuliya
- Mr. Melkizedeck Leshabari

Department of Community Health:
- Mr. F. Magoma, Health Officer

In addition to the above, Dr. Martin P. Mandara, the Head of the DCM, has expressed his strong support for both the Project

Paper effort and the subsequent project. Furthermore, Dr. C.M. Kihamia, the Head of the Department of Parasitology and Entomology, has also indicated his willingness to work with the design team.

Although the above individuals have expressed a willingness to cooperate with and assist the Project Paper design team, it should be noted that the availability of specific individuals cannot be guaranteed and may be subject to competing professional demands during the preparation of the Project Paper. In the event of conflicting schedules, however, the respective department heads have provided assurances that alternative personnel will be made available from their departments.

During the discussions with the DCM staff, the writers stressed that the form of assistance required by the design team from the DCM included general policy insights, technical advice and consultation, and preparation of sections of the Project Paper in draft form. This assistance need not be full-time, but it must be provided to the design team if the project is to be properly formulated.

Although not within the DCM, the Parasitology Laboratory and the Microbiology Laboratory are two major resources within the Muhimbili Medical Centre that may be capable of carrying out the requisite laboratory analyses for the project.

The second important institutional resource is the Low-Cost Sanitation Unit (LCSU) in ARDHI. As described in the previous section, this unit was established to investigate problems of low-cost sanitation and has been closely involved with such issues in the Dar es Salaam project. The key individual in the LCSU is Ms. Hilda Vanlankveld, a sociologist who has

been involved in all of the ARDHI and LCSU studies to date. The LCSU also has several Health Officers on secondment from the Ministry of Health who may be available to assist on the project design.

Other personnel resources may be available from the City Council of Dar es Salaam and the Ministry of Health. Unfortunately, a meeting could not be arranged with the City Council during the writers' visit to Tanzania.

SECTION 4

CONSTRAINTS ON PROJECT DESIGN

There are a number of constraints that either limit the project design or will influence the operations of the design team. The first is the timing for the preparation of the Project Paper. Because of teaching requirements, the faculty and staff of the DCM have only limited periods in which they are available to work with the design team. It will be necessary, therefore, to schedule the Project Paper during an academic holiday. The best time for the DCM personnel is the entire month of May plus the first few days in June. During this five-week period, more staff will be available than at any other time of the year. Section 3 listed the DCM staff who will be available for at least part of this vacation period.

It is essential that baseline data collection begin before the onset of construction activities in the Dar es Salaam sewerage and sanitation project. Since the World Bank loan is expected to be approved early in 1982, baseline work must be initiated in 1981. According to the DCM staff, data collection should begin as soon as possible but, in any event, no later than November 1981.

Official authorization will be needed to carry out the proposed research investigations. A permit must be obtained from the City Council of Dar es Salaam to allow monitoring of the sewerage and sanitation project. Further authorization will be required from the Research and Publications Committee of The University of Dar es Salaam to allow the DCM to participate in the study. Authorization also may be needed from the National Scientific Research Council.

Existing computer facilities in Tanzania are inadequate to carry out this study. There is computer equipment within the DCM and in other Tanzanian institutions, but none is suitable for the HEMP. According to Mr. Hans Remme, biostatistician in the Department of Epidemiology and Biostatistics, the following computer package is the most appropriate system for the purposes of HEMP:

Computer

NCR 8271 microcomputer with dual floppy disc drives, two CRT screens, and a matrix printer. System must be serviceable in Tanzania.

Specifications

256K bytes memory. Multiprogramming operating system. One 10 millibyte disc. Battery back up. Two CRT terminals. One matrix printer (70 lines per minute).

As mentioned earlier, the writers were unable to arrange meetings with officials of the City Council of Dar es Salaam. Because this is the implementing institution in the Dar es Salaam project, it is essential that the HEMP be designed with the approval and cooperation of the City Council.

SECTION 5

RESEARCH METHODOLOGY

HEMP is a study of the effects of low-cost sanitation practices upon health. Because of the diffuse nature of linkages between such public facilities and their ultimate benefits, there are no direct cause and effect relationships that can be identified. A study addressing the health impacts of sanitation projects, therefore, must clearly identify these linkages and their relationships. By its very nature, such an investigation cannot be a simple data collection and analysis exercise. Its complexity, magnitude, and need for controls require that a rigorous methodology be developed, involving both clinical and social science techniques.

Research design is very much dependent upon the general areas of investigation. Discussions with USAID, DCM, and other GOT officials, as well as recommendations drawn from the TAG group, Howard Humphreys and Partners, and the general research literature, have emphasized the need to investigate a number of key areas in the HEMP project. These include (1) technical engineering factors, (2) environmental factors affecting health, (3) knowledge, attitudes, and practices of the users of the sanitation facilities, (4) the impact upon infectious diseases and (5) other socio-economic impacts. The linkages between these key areas form the relationships that the design must address.

In Figure 1, an example is presented of how the above factors can be conceptualized in an evaluation model. System operation is the immediate, or direct, consequence of project development. To the engineer or technician, the immediate concerns are with the phycials status and functioning of the sanitation facilities.

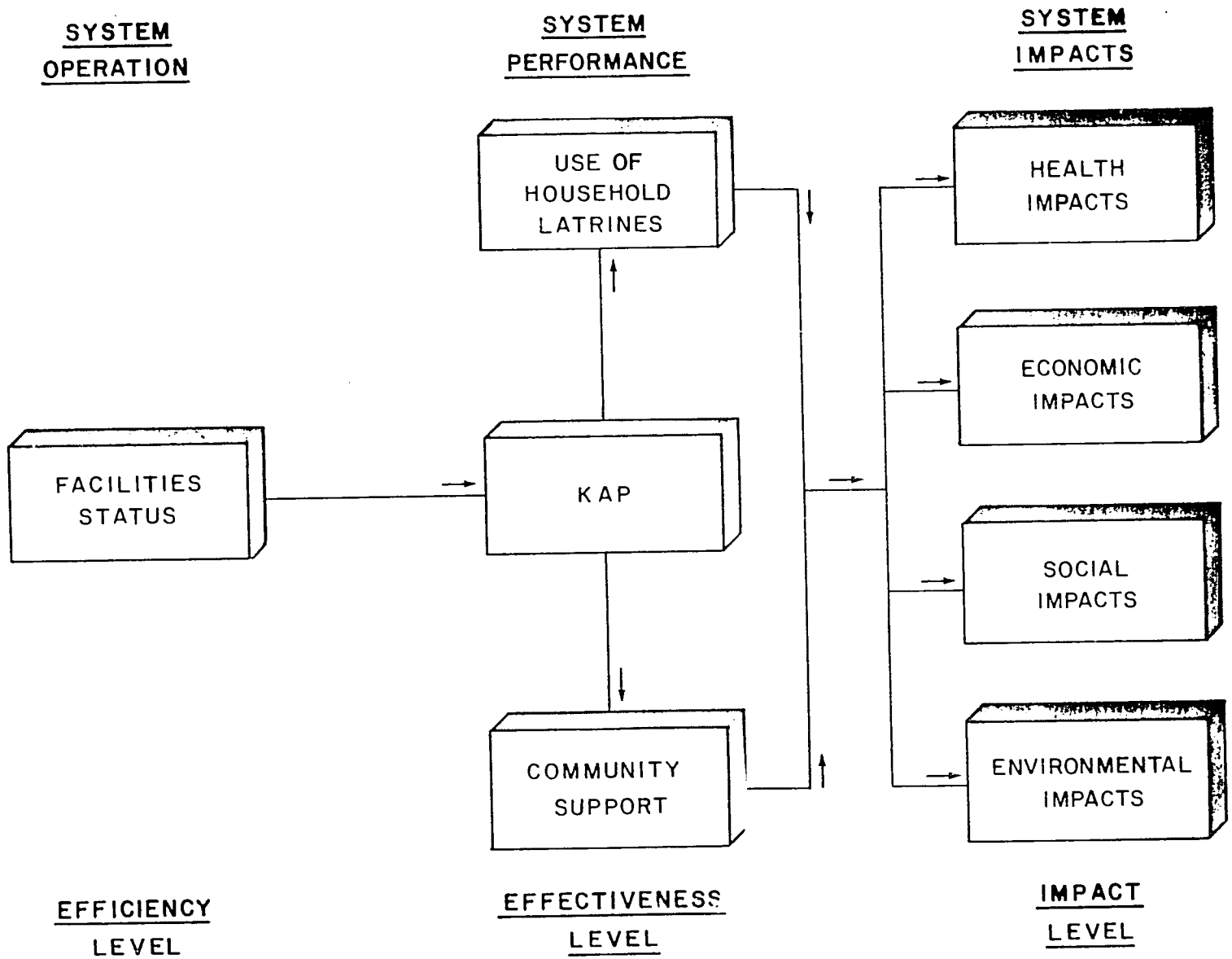

FIGURE 1

EVALUATION MODEL FOR HEMP PROJECT

System performance, however, is the more complex consequence of the use of the facilities. In this case, the health education inputs are interrelated with the household use of latrines and the community support for latrine improvements and maintenance. Thus system performance is a measure of behavioral and institutional changes. It is only at the system impacts stage that true project benefits are achieved. These involve the very indirect consequences, or impacts, of sanitation improvements, behavioral practices, and institutional changes upon the health, economic, social, and environmental spheres.

To link the ultimate impacts with the initial project interventions, all the intervening relationships must be established. The following factors are illustrative of the types of issues that must be addressed in each area:

Facilities Status

- water supply conditions
- refuse disposal facilities
- soil characteristics
- adherence to implementation schedule
- quality of construction
- technical effectiveness of different latrine designs

Knowledge, Attitudes, and Practices (KAP)

- local knowledge of sanitation practices
- willingness to learn new ways
- acceptability of different latrine designs
- extent of health education inputs required

Use of Household Latrines

- actual use of latrines by members of the family
- secondary uses of latrines (bathing, storage, trash disposal, etc.)
- cleanliness of latrines

Community Support

- institutional support for latrine program
- local inspection of latrine standards
- reliability of vacuum tanker service

Health Impacts

- baseline endemicity of infectious diseases:
  - fecal-oral diseases; cholera, typhoid, shigellous, ankylostomiasis, schistosomiasis, amoebiasis, giardiasis, hepatitis, general diarrheal disease
  - mosquito-borne diseases: malaria, filariasis
  - skin infections: tinea, scabies
- changing patterns of the above diseases over time
- correlations between type of latrine, health education, and disease indices

Economic Impacts

- costs of sanitation interventions
- changes in health care expenditures
- economic value of illness due to sanitation-related diseases

Social Impacts

- changes in perceived social status
- willingness to undertake other improvement projects

Environmental Impacts

- presence of raw sewage or human excreta around the houses
- presence of pools of stagnant water
- quality of the groundwater
- changing patterns of mosquito populations

The research design chosen for HEMP must incorporate a number of essential features. The study should be longitudinal in nature, that is, continual long-term data collection and monitoring should be carried out repeatedly in the same study

areas. Similarly, control areas should be identified and concurrently monitored. In this manner, the study will be able to measure both the "before-after" and "with-without" situations.

Data collection should include a wide variety of techniques Depending on the factors under investigation, the mix of techniques will vary. Direct observation probably is best for evaluation of facility status, while a combination of direct observation, participant observation, and questionnaire surveys will probably be appropriate for the assessment of KAP. Health impacts might be measured through clinical examinations, stool and blood samples, and other laboratory procedures. Similarly, combinations of direct observations, in-depth interviews, and questionnaire surveys could be used to assess the economic, social and environmental impacts.

All data collection should be designed ultimately to feed into a series of hypotheses that can be tested for acceptance or rejection. Wherever possible, data collection and measurement instruments should be as rigorous and precise as possible in order to allow proper statistical analyses.

Research design is also affected by the nature, extent, and availability of support facilities. For the HEMP project, the following issues must be considered:

1. The use of medical and public health students as data collectors.
2. The use of technicians from the schools of hygiene, the Ardhi Institute, and other training institutions.
3. The type, direction, and location of long-term training for new DCM staff who will participate in the HEMP project.

4. The adequacy and availability of laboratories.
5. The adequacy and availability of computer facilities.
6. The type, amount, and timing of manpower, equipment, and supplies required from the United States.
7. The degree of participation required and available from the DCM, ARDHI, City Council of Dar es Salaam, and the Ministry of Health.
8. The contractual arrangements needed between USAID and the DCM, other GOT institutions, and other contractors.

SECTION 6

RECOMMENDATIONS

It is recommended that the HEMP Project Paper be jointly prepared by a team composed of three USAID experts representing the fields of epidemiology, sanitary engineering, and health education/medical anthropology respectively, and representatives of the Muhimbili Division of Community Medicine, the Ministry of Lands, Housing and Urban Development, and other relevant GOT institutions. The USAID personnel should have the following qualifications:

Epidemiologist:

- Familiarity with the research literature concerning the relationships between sanitation interventions and improved health.
- Experienced in designing research investigations into the health consequences of water and sanitation improvements in tropical countries.
- Capable of outlining monitoring procedures for the prevalence, incidence, and intensity of sanitation-related infections, such as cholera, typhoid, shigellosis, ankylostomiasis, amoebiasis, giardiasis, tinea, scabies, malaria, filiasis, and hepatitis.
- Familiarity with laboratory procedures, clinical examinations, and other methods of diagnosing sanitation-related infections.
- Experienced in working in an inter-disciplinary context.

Sanitary Engineer:

- Experienced in the design, construction, and maintenance of low-cost sanitation facilities in tropical countries.

- Familiarity with field research designs for water and sanitation investigations.
- Capable of outlining monitoring procedures for groundwater investigations, water quality laboratory testing, household sanitation inspections, household economic surveys, and environmental assessments.
- Experienced in working in an inter-disciplinary context.

Health Educator/Medical Anthropologist:

- Experienced in the development of health education programs for both adults and children in tropical countries.
- Capable of outlining knowledge, attitudes and practices (KAP) monitoring procedures for sanitation interventions in developing countries.
- Familiarity with the construction and application of social indices.
- Experienced in working in an inter-disciplinary context.

The DCM personnel whould be drawn from the Departments of Epidemiology and Biostatistics, Community Health, and Behavioral Sciences. In addition, the Department of Parasitology and Entomology and the Health Education Unit of the Muhimbili Medical Centre should participate in the Project Paper. Personnel also should be drawn from the Low-Cost Sanitation Unit of ARDHI. Moreover, efforts should be made to include personnel from the Ministry of Health and the City Council of Dar es Salaam in the project. The main disciplines needed among participating GOT personnel are epidemiology, parasitology, environmental sanitation, biostatistics, behavioral sciences, and health education.

It is also recommended that the team develop a longitudinal, multi-variable research methodology to address the issues discussed in the PID and in Sections 3, 4 and 5 of this report. The evaluation model outlined in Section 5 and shown in Figure 1 should be considered by the team but should not be viewed as

a limitation or constraint on the development of a more appropriate model.

The duration of the field work in Tanzania should be approximately five weeks. It is recommended that this period begin approximately 3 May 1981 and end approximately 7 June 1981, the period most suitable for the participating staff of the DCM. All three USAID personnel should spend the full five weeks together in Tanzania. The individual having the most experience in research design on related projects should be chosen as the team leader. A draft report should be submitted to the USAID Mission by the team at the end of the fourth week, or approximately 31 May 1981. The final draft must be submitted to the Mission before the team departs from Tanzania. The field work schedule of the team is illustrated in Figure 2.

If, for some reason, the entire USAID team cannot be sent to Tanzania as a single unit, efforts should be made to ensure that the sanitary engineer is among those that do participate. This position on the USAID team is crucial for the preparation of the Project Paper. GOT personnel are available to supplement and, if necesary, replace the positions of epidemiologist and health educator/medical anthropologist on the recommended USAID team. However, there is no available sanitary engineer with relevant experience in Tanzania.

Secondly, if the recommended field schedule of 3 May to 7 June 1981 cannot be accommodated by the USAID team, the work should be carried out as soon as possible thereafter. It must be remembered, however, that any alternative scheduling would reduce the availability of DCM staff to participate in the Project Paper.

The total costs to USAID for the preparation of the Project Paper are estimated at $43,025. These costs are detailed in Table 1 in terms of professional fees, per diem, international travel, local support and report preparation.

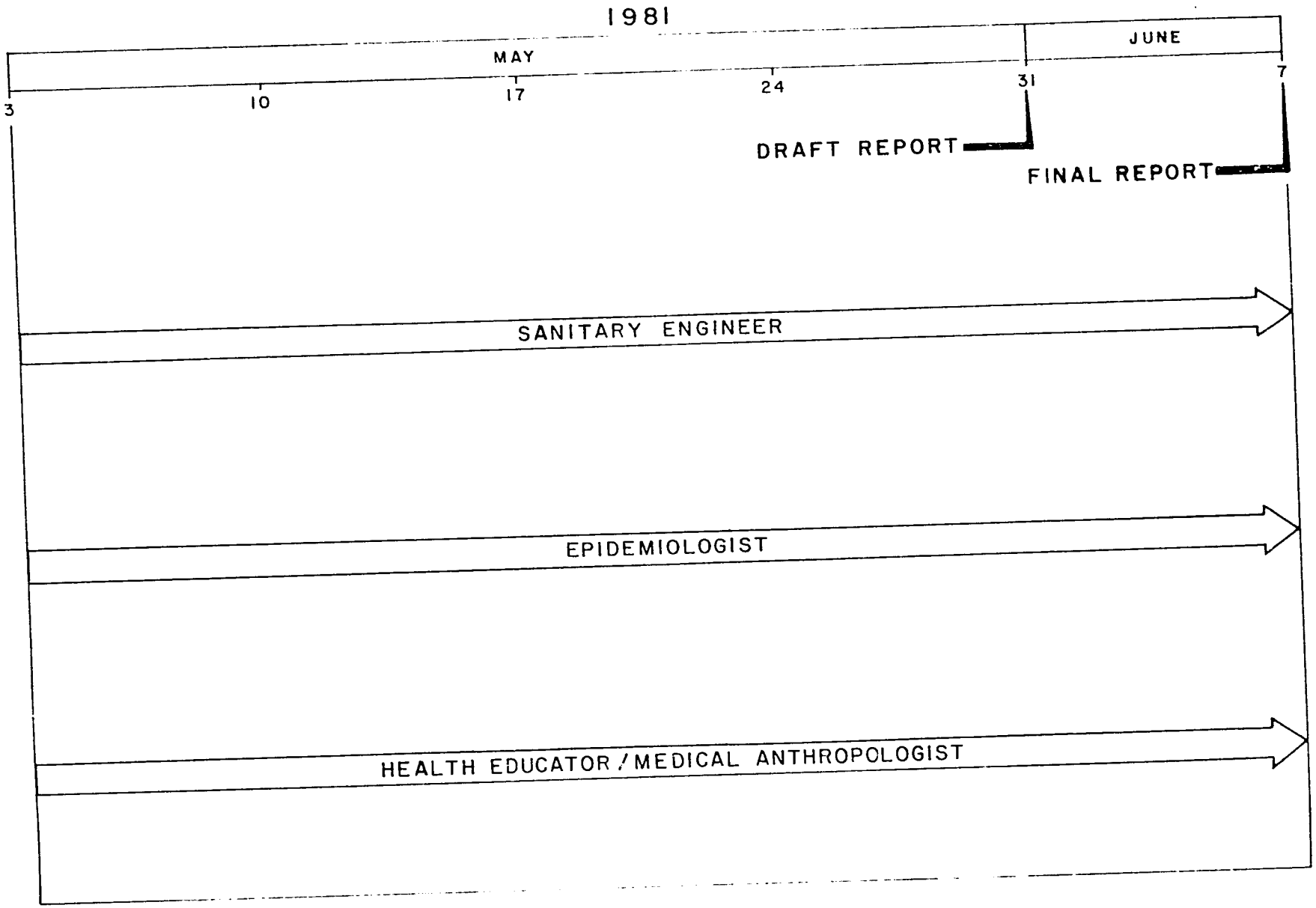

FIGURE 2
SCHEDULE FOR HEMP EXPERTS

TABLE 1

ILLUSTRATIVE BUDGET

Consultant Fees:		
Epidemiologist		
5 wks. x 6 days/wk. x $192.74/day	= $ 5,800	
Sanitary Engineer		
5 wks. x 6 days/wk. x $192.74/day	= 5,800	
Health Educator/Medical Anthropologist		
5 wks. x 6 days/wk. x $175.00/day	= 5,250	
Team Leader Briefing in Washington, DC		
2 days at $192.74/day	= 385	
Team Debriefing in Washington, DC		
3 days x 2 members x $192.74/day	= 1,555	
3 days x 1 members x $175.00/day	= 525	
	$18,915	$18,915
Travel Expenses:		
Air Fare RT Washington, DC-Dar es Salaam		
3 trips x $3,000/trip*	= $ 9,000	
Team Leader Briefing in Washington, DC		
1 trip x $300/trip*	= 300	
Team Debriefing in Washington, DC		
3 trips x $300/trip*	= 900	
Local Transportation		
15 wks. x 6 days/wk. x $20/day	= 1,800	
	$12,000	$12,000
Per Diem Expenses:		
Team in Tanzania		
15 wks. x 7 days/wk. x $87/day	= $ 9,135	
Team Leader Briefing in Washington, DC		
2 days x $75/day	= 150	
Team Debriefing in Washington, DC		
3 days x 3 members x $75/day	= 675	
	$ 9,960	$ 9,960
Other Expenses:		
Local Typist		
5 wks. x 20 hrs./wk. x $6.50/hr.	= $ 650	
Copying of Report		
50 copies x $20/copy	= 1,000	
Miscellaneous		
Supplies, Communication, ect.	= 500	
	$ 2,150	$ 2,150
TOTAL ESTIMATE		$43,025

*Includes associates taxis, baggage fees, airport taxes, etc.

Appendix 1

MEMORANDUM

February 13, 1981

Water and Sanitation for Health Project
Order of Technical Direction (OTD) Number 26

TO: Mr. James Arbuthnot, P.E.
WASH Contract Project Director

FROM: Mr. Victor W.R. Wehman, Jr., P.E., R.S.
AID WASH Project Manager

SUBJECT: Provision of Technical Assistance Under WASH Project Scope of Work for USAID/Tanzania

Refs:
A) Dar Es Salaam 00791, 2/9/81
B) Dar Es Salaam 00726, 2/4/81
C) Dar Es Salaam 00713, 2/3/81
D) WASH cable to Tanzania, 2/2/81
E) Dar Es Salaam 00509, 1/27/81
F) WASH Contact Report, 1/23/81
G) Ehmer/Warner Telcon, 1/22/81
H) Warner OTD Analysis, 1/21/81
I) State 005412, 1/9/81
J) Dar Es Salaam 1/8/81
K) Dar Es Salaam 06923, 2 pages of 2, 12/10/80
L) Dar Es Salaam 05634, 10/6/80
M) Dar Es Salaam 05033, 9/5/80
N) Dar Es Salaam 04960, 9/4/80
O) State 137429, 5/24/80
P) Hemp PID, 3/7/80

1. WASH contractor requested to provide technical assistance to USAID/Tanzania as per Ref. K, Ref. G, Ref. F, Ref. E, Ref. C, Ref. B, and Ref. A.

2. WASH contractor/subcontractor/consultants authorized to expend up to (130) person days effort over a six (6) month period to accomplish this technical assistance effort.

3. Contractor to provide final reports of all consultant visits to mission before leaving mission. Consultant should debrief mission and discuss report and follow-up action each time in country with USAID/Tanzania personnel.

4. Contractor to coordinate directly with Mr. Paul Ehmer in USAID/Tanzania on all project matters dealing with Hemp and training master plan aspects. Inform Mr. Tummarello (AFR/DR/ENGR), AFR/DR/HN and Tanzania desk officer of all coordination involving progress, especially ETA's and country clearance of consultants.

5. Make sure individuals in (4) above receive copies of this OTD.

6. Contractor authorized to pay for training materials plus graphics associated with the effort up to a total of $12,000.

7. Contractor authorized 120 international per diem days.

8. WASH contractor authorized to allow consultants to make up to 8 round trips, in and out of Tanzania, as necessary over the next 6 months through Washington, D.C. to his/her home base as appropriate during the technical assistance effort. Consultants should come to Washington for debriefings with AFR Bureau and DS/HEA after each trip. Handle coordination by phone or cable/telex.

9. Mission should be contacted immediately and technical assistance initiated as soon as possible and convenient to USAID/Tanzania.

10. Appreciate your prompt attention to this matter. Good luck.

DS/HEA:V.Wehman:ja:2/13/81

Appendix 2

ITINERARY

23 February	USAID Mission Inspect Dar es Salaam Sewerage and Sanitation Facilities in Gymkhana and Kinondoni areas and at ocean outfall.
26 February	U.S. Ambassador
2 March	USAID Mission Muhimbili Division of Community Medicine
3 March	USAID Mission Muhimbili Division of Community Medicine
4 March	USAID Mission Muhimbili Division of Community Medicine
5 March	USAID Mission World Bank Resident Representative Muhimbili Division of Community Medicine
6 March	USAID Mission Howard Humphrey's Ltd., Consulting Engineers
7 March	Muhimbili Division of Community Medicine
9 March	USAID Mission
13 March	Ross Institute, London School of Hygiene and Tropical Medicine

Appendix 3

OFFICIALS INTERVIEWED

USAID Mission

Luther House, City Drive, Box 9130, Dar es Salaam, Tel. 22532

Dr. Barry Riley	Deputy Chief of Mission
Mr. Paul Elmer	Public Health Advisor

U.S. Embassy

Bagamoyo Road, Box 9123, Dar es Salaam, Tel. 22775

Mr. Richard Viets	Ambassador

Muhimbili Division of Community Medicine

Muhimbili Medical Centre, Dar es Salaam

Mr. Martin P. Mandara	Head, Division of Community Medicine and Department of Community Health
Dr. F.D.E. Mtango	Head, Department of Epidemiology and Biostatistics
Mr. Hans Remme	Department of Epidemiology and Biostatistics
Dr. J.Z.J. Killewo	Department of Epidemiology and Biostatistics
Ms. Masuma Mamdani	Department of Epidemiology and Biostatistics
Dr. C.M. Kihamia	Head, Department of Parisitology and Entomology
Prof. H.S. Takuliya	Department of Behavioral Sciences
Mr. Melkizedeck Leshabari	Department of Behavioral Sciences
Dr. Chris Hegenhougen	Department of Behavioral Sciences
Mr. F. Magoma	Health Officer, Department of Community Health

Ministry of Lands, Housing and Urban Development (ARDHI)

Ardhi Hous, Kivukoni Front, Dar es Salaam, Box 9132, Tel. 21241

Ms. Hilda Vanlankveld	Sociologist, Low Cost Sanitation Unit, Sewerage and Drainage Division
Mr. Charles Kuhenga	Health Officer, Low Cost Sanitation Unit, Sewerage and Drainage Division

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Mr. P.V. Smith	Resident Manager

World Bank Resident Mission

NIC Investment House, Independence Avenue, Box 2054, Dar es Salaam, Tel. 23439

Mr. Robert H. Nooter	Resident Representative

World Bank

1818 H. Street, N.W., Washington, D.C.

Mr. Peter Callejas	Engineer; Energy, Water and Telecommunications Department
Mr. Richard Middleton	Engineer; Energy, Water and Telecommunications Department
Ms. Heli Perrett	Social Science and Health Education Advisor
Dr. Richard G. Feacham	Consultant, Ross Institute, London School of Hygiene and Tropical Medicine

Ministry of Health (AFYA)

Box 9083, Dar es Salaam, Tel. 20261

Dr. W.K. Ntuyabaliwa	Agriculture, Principal Secretary

USAID, Africa Bureau

Washington, D.C.

Mr. Brian Kline	Tanzania Desk Officer
Mr. James Vanden Bos	Tanzania Desk Officer
Mr. John Burdick	Tanzania Mission Population Advisor, Dar es Salaam
Ms. Janet Anderson	Health Officer, DS/HEA

Appendix 4

IMPORTANT DOCUMENTS

1. Agency for International Development, Tanzania Health and Environmental Monitoring Project, Project Identification Document, Project No. 621-0165, Washington, D.C., March 10, 1980.

2. R.G. Feacham, Tanzania Public Health and Sanitation Aspects of the Morogoro Urban Project, Report TAG/Ta-04, UNDP Global Project GLO/78/006, April 1979.

3. R.G. Feacham and M. Tonen, Low Cost Sanitation in Tanzania: Report of a Third Mission to Tanzania, Report TAG/Ta-05, UNDP Global Project GLO/78/006, August 1979.

4. Howard Humphreys and Partners, Dar es Salaam Sewerage and Sanitation Study: Preliminary Engineering Design and Feasibility Study - Stage I, prepared for Tanzania Ministry of Lands, Housing and Urban Development, October 1980, (draft).

5. J.Z.J. Killewo, Evaluation of the Compost Latrines Installed in Three Villages and One Peri-Urban Squatter Area in Morogoro, Bagamoyo and Kinondoni Districts (Their Acceptability in the Community), Diploma in Public Health dissertation, University of Dar es Salaam, 1980.

6. Marilyn Tonen, Demonstration Project in Low-Cost Sanitation. Report of a Sixth Mission to Tanzania, Report TAG/Ta-08, UNDP Global Project GLO/78/006, October 1980.

7. R.G. Feachman, D.J. Bradley, H. Garalick, and D.D. Mara, Health Aspect of Excreta and Wastewater Management, World Bank, October 1978.

8. J.M. Kalbermatten, D.S. Julius, C.G. Gunnerson, Appropriate Technology for Water Supply and Sanitation: A Summary of Technical and Economic Options, World Bank, December 1980.

9. D.D. Mara, J.M. Kalbermatten, D.S. Julius and C.G. Gunnerson, Appropriate Technology for Water Supply and Sanitation: Sanitation Field Manual, World Bank, December 1980.

10. D. Warner, Evaluation of the Development Impact of Rural Water Supply Projects in East African Villages, Stanford University, Report EEP-50, December 1973.