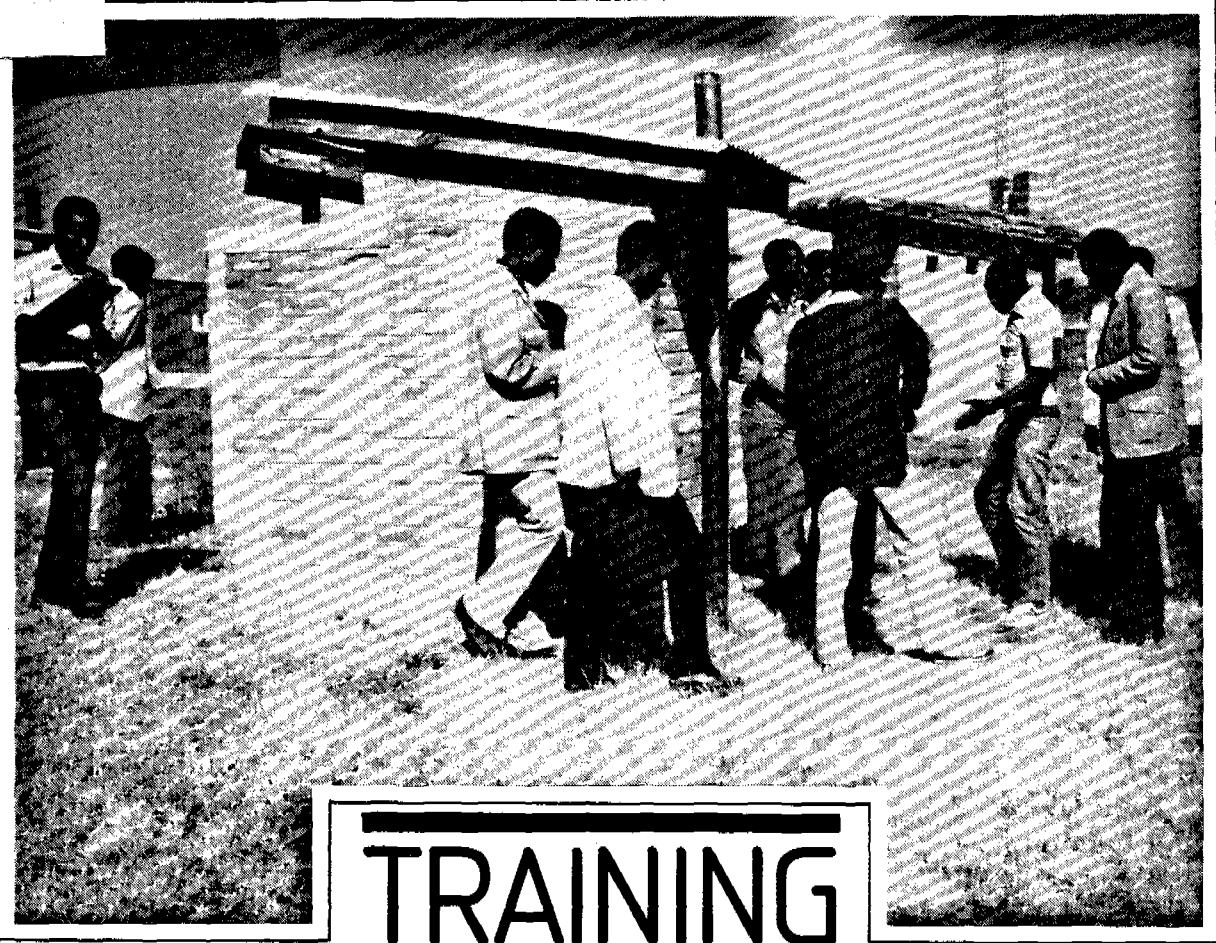


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TRAINING MANUAL

for Courses on Low Cost Water Supply and Sanitation

Volume I

Mrs. E. Chaggu and Mr. H.A. Mengers

SCIENCE CENTRE
FOR WATER SUPPLY AND

Centre for Housing Studies
ARDHI INSTITUTE
Dar es Salaam, Tanzania



In cooperation with:
The Institute for Housing Studies.
Rotterdam

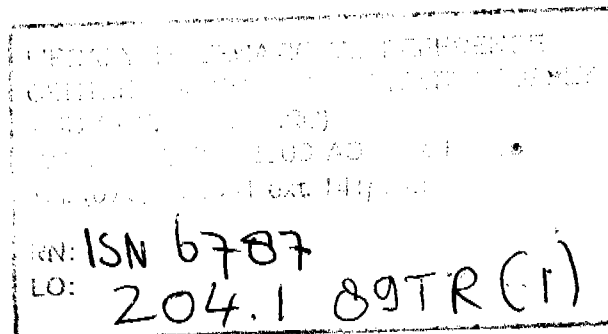
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TRAINING MANUAL
FOR
COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES
ARDHI INSTITUTE
DAR ES SALAAM, TANZANIA

Mrs. E.CHAGGU and Mr. H.A.MENGENS

VOLUME I



In cooperation with:

The Institute for Housing Studies, Rotterdam, the Netherlands

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INTRODUCTION

A Training Manual for Courses on Low-cost Water Supply and Sanitation serves as a reference document for the preparation, planning, execution and evaluation of training activities on the respective subjects. It serves as a tool for training coordinators to organise courses, as well as a more elaborate description of these courses to agencies, organizations and institutes that are involved in training, who require more information than can be provided in a course brochure.

The Manual is the outcome of the 11th, 16th and 24th Course on Low-cost Water Supply and Sanitation, that were conducted in 1984, 1986 and 1989 at the Centre for Housing Studies, Ardhi Institute, Dar es Salaam, Tanzania for water engineers, architects, planners and health officers from Tanzania, as well as from other Eastern and Southern African countries. The courses have been supported by staff from the Institute for Housing Studies, Rotterdam, the Netherlands under the bilateral collaboration established since 1979.

The Training Manual has been prepared by Mrs. E.Chaggu of the Centre for Housing Studies, Tanzania and Mr. Harry Mengers of the Institute for Housing Studies, the Netherlands.

The Manual is comprised of a number of paragraphs that deal with the following subjects:

1. Course Objectives
 2. Course Participants
 3. Course Achievements
 4. Course Duration
 5. Secretarial Support, Stationary and Equipment
 6. Course Accomodation
 7. Course Stationary and Equipment
 8. Participants Boarding, Lodging and Representation
 9. Participants' Arrangements for Travel, Insurance, Medical Care, Allowances and Recreation
 10. Course Structure and Elements
 11. Course Handbook
 12. Registration, Opening and Introduction to the Library
 13. Professional Briefings
 14. Bench Mark Tests
 15. Standard Reading List
 16. Course Lectures
 17. Guest-Lecturers; Invitation, preparation and Evaluation
 18. Participants' Group and Individual Exercises
 19. Field Exercises
 20. Site Visits
 21. Field Work
 22. Participants' Individual Reports
 23. Course Evaluation
 24. Participants' Appraisal, Certificates and Closing Ceremony
 25. Course Timetable
 26. Course File and Documentation
- References
 - Annexes

1. COURSE OBJECTIVES

The Course on Low-cost Water Supply and Sanitation has the following objectives:

- a) to give an overview of the aspects involved in the planning of environmental health in human settlements, i.e. safe human waste disposal and water supply;
- b) to deepen the participants' understanding of low-cost options for water supply and sanitation for human settlements;
- c) to improve the understanding and ability of participants to plan and implement projects for the improvement of environmental health in human settlements through a practical and pragmatic approach;
- d) to improve the understanding and ability of participants to manage sanitation and water supply facilities through the appropriate utilization of human, financial and institutional resources.

2. COURSE PARTICIPANTS

The Course is intended for engineers, technicians, architects, planners and health officers, who are involved in water supply and sanitation, either at public bodies or private agencies and organizations, and who wish to deepen their understanding of low-cost water supply and sanitation.

Profile:

Participants should be qualified in the field of engineering, architecture, planning, health, etc. at established education institutions up to the level of graduated Bachelor.

Secondly, participants should have gained at least two years of relevant experience in the field of water supply, sanitation or health.

Thirdly, participants should be nominated and recommended by the present employer, either public or private.

Fourthly, the age should be between 25 and 45 years.

Fifth, participants should have good command of the English language in reading, writing and speaking. English will be the medium of communication at the Centre.

Number of participants:

In order to achieve satisfactory interactive training, exchange of professional experience and group cohesion, the maximum number of attending participants is 25. The minimum number of attending participants should be 10.

Applications:

The application should be done by a letter addressed to the Director of the Centre for Housing Studies, Ardhi Institute, P.O.Box 35124, Dar es Salaam, Tanzania. The application should contain a nomination and recommendation letter of participant's present employer, a statement and specification of payments of fees, a basic curriculum vitae and copies of qualifications, diplomas or certificates. Closing date of applications is two months prior to

the start of the course, in order to allow for selection of the candidates and invitation of the participants.

Selection:

The selection of candidates is done according to the stated criteria above. However, one should avoid groups in which one discipline is dominating.

Ideally, the group should have professionals in the field of engineering, planning and execution of health education, both working in water supply and sanitation programmes. As a matter of fact the subjects of water supply and sanitation will attract more male candidates. Female candidates applying should be favored, as effective discussion of gender issues on water supply and sanitation require female participants. Another criterium for selection is the international or regional balance of participants. Reference to a variety of national or regional experiences, contexts and conditions should be achieved by selecting participants of different regions or countries.

An additional criterium is to select participants from different organizations: governmental, non-governmental and (semi-)private agencies. The different organizational backgrounds will allow fruitful discussions on organizational matters of projects and programmes.

A maximum of 28 participants could be selected to allow for 3-4 participants to drop out before the start of the course. In any case, the result should be that a maximum of 25 participants will attend the Course.

Invitation:

After selection, the participants have to be invited by a letter, confirming name of the participant, course dates and giving instructions for travel, visas, arrival date, registration, boarding, lodging and payments of fees and other dues. The letter is accompanied by the Course Handbook (see chapter 11).

3. COURSE ACHIEVEMENTS

It is important to state what objectives are expected to be achieved after the completion of the course. Achievement of Course objectives regarding the improvement of ability to plan, implement and manage water supply and sanitation facilities (sub. c. and d.) are difficult to be measured directly after the course. Achievement of those objectives can only be verified at the work floor.

The expected achievements after completion of the Course that should be verified, are as follows:

- a) participants can give an overview of the aspects involved in the planning of environmental health in human settlements, i.e. safe human waste disposal and water supply;
- b) participants can give the essential features of low-cost options for water supply and sanitation for human settlements;
- c) participants can give the criteria, constraints and conditions for the planning and implementation of projects for the improvement of environmental health in human settlements;
- d) participants can give features of good management of sanitation and

water supply facilities, specified into appropriate measures for the utilization of human, financial and institutional resources.

A questionnaire is the most adequate tool to conduct this verification. Secondly, an oral evaluation can supply additional information about the comprehension of the covered subjects among the participants (see chapter 23).

4. COURSE DURATION

The optimal duration of the Course in respect of the scope of the Course Elements, the Centre's other training activities, financial and manpower resources, is between 9 and 12 weeks. An elaboration of its elements and structure will follow in chapter 10.

5. SECRETARIAL SUPPORT, STATIONARY AND EQUIPMENT

During the different stages of preparation, execution, evaluation and also thereafter, a number of activities require secretarial support. These activities are listed below, and can be used as a checklist.

Preparation

- Preparing and sending Course announcement brochures and letters to the different agencies and organization in and outside Tanzania.
- Preparation and duplication of Course Handbooks.
- Registration and filing of applications.
- Sending invitation letters and additional information to the participants.
- Typing and sending invitation/confirmation letters to guest-lecturers.
- Correspondence in preparation of the fieldwork, excursions and site-visits.
- Typing and duplication of lecture notes, Course timetable, exercises, questionnaires, assignments, tests, and other written information to the participants.
- Letters that regard preparation of financial, transport, stationary and personnel matters.
- Letters that regard required boarding and lodging arrangements for participants and guest-lecturers from outside Dar es Salaam.
- Letters that might be required for Immigration and Customs when foreign participants and guest-lecturers enter Tanzania.
- Reservation of class room, audio-visual and or library facilities.
- Purchase of stationary and training aids.

Execution

- Registration of the arriving participants.
- Accommodation of the arriving participants.
- Typing and sending confirmation letters to guest-lecturers.
- Additional correspondence and recommendation letters for the fieldwork, excursions and site-visits.
- Typing and/or duplication of professional briefings, lecture notes, adjusted Course timetable, and other written information to the participants
- Additional letters that regard preparation of financial, transport, stationary and personnel matters.

- Letters that might be required for Immigration and Customs when foreign participants and guest-lecturers leave Tanzania.
- Reservation of class rooms, audio-visual and or library facilities during the run of the Course.
- Preparation and duplication of certificates and diplomas.

Post-Course

- Preparation, duplication and sending of evaluation reports.
- Documentation and filing of Course material and correspondence.
- Outstanding financial and personnel matters.

In order to execute the secretarial activities - more often than not under pressure of time - it is a prerequisite that stationary is available in sufficient quantities, i.e. paper, carbon ribbon, ink, stencil sheets, toner recharge, correction fluid, pencils, paper pads, etc. The required secretarial equipment should be in good working order and have sufficient spare parts. If one of the items is in short supply or not in good working order, timely measures should be taken.

In the preparation and execution phase an office vehicle should be operational and be made available.

6. COURSE ACCOMMODATION

The course accommodation should be a classroom that offers space and furniture to a maximum 25 participants, lecturer(s) and course coordinator(s). Furthermore the room should be well ventilated, have ceiling fans, have enough day light (in case the power is off), enough artificial light, curtains to darken the room for slide, film or video projection, and sufficient power connections. A blackboard should be available and in good condition.

The Course accommodation should be cleaned, tables and chairs reset after each teaching day.

7. COURSE STATIONARY AND EQUIPMENT

The basic package of Class Room stationary and equipment is as follows: chalk, a brush, a bucket and sponge, a long scale, a circle drawer, a projection screen, a slide projector (with spare bulbs), two slide carrousels, an overhead projector (with spare bulbs) and an extension cable. Valuable equipment should be stored in a safe place, even between two sessions or during a lunch break. Other equipment like video projectors or film projectors and reels can be borrowed from the Ardhi Institute.

The participants should be provided with writing pads, pencils, pens, rubbers and rulers. Other equipment like T-squares, set-squares, drawing pens and pocket calculators should be kept available and can be borrowed from the Centre. However participants are requested to bring their own pocket calculators (see Course Handbook).

The Course coordinators should have available for their own use or for guest-lecturers sufficient writing paper, pens and pencils, reserve chalks and overhead sheets and pens.

8. PARTICIPANTS BOARDING, LODGING AND REPRESENTATION

In general, it should be avoided that participants Course performance is hampered by unsatisfactory boarding or lodging arrangements. If so, adequate measures should be taken immediately.

The Centre is now capable to provide adequate accommodation at the campus of the Ardhi Institute. The rooms should be clean upon arrival, provided with beds, mattresses, bed sheets, tables and chairs, bulbs in working order, doors and windows in good order and with good locks. The rooms should be cleaned, bed sheets should be changed by the Centre's caretakers. In the Course handbook the participants are requested to bring their own towels and toilet articles.

It should be checked whether the washing facilities and latrines are in good condition, clean and functioning. Repairs and maintenance should be undertaken prior to the start of the Course.

Lodging, i.e. the provision of breakfast, morning and afternoon tea and coffee, lunches and evening meals, should be taken care of by the Centre in an adequate manner.

At the very beginning of the Course the participants should elect a participants' representative that functions as the intermediary between participants and the Course Coordinator or the Centre. When general questions or problems arise in respect of the Course Time-table, accommodation, meals, transportation, allowances, etc. the participants should address these issues to the representative who can raise the matter with the Course Coordinator. Vice versa the Course Coordinator can inform the representative about any changes in the programme, etc. who is then made responsible to inform the other participants.

9. PARTICIPANTS' ARRANGEMENTS FOR TRAVEL, INSURANCE, MEDICAL CARE, ALLOWANCES AND RECREATION

Participants are expected to make their own travel arrangement to and from the Centre with their employers. The costs are not met by the Centre. Upon request participants may be collected from railway or bus station or airport. Early notice should however be given (two weeks).

Travel and medical insurance and other insurance during their stay at the Centre are not covered by the Centre. These insurance have to be arranged by the participants.

The dispensary at the Ardhi Institute provides medical care for the participants free of charge.

For sports participants can make use of the out-door and in-door facilities of the Ardhi Institute. Also the Centre has some limited sports wear for use by the participants.

Other recreational activities, like visiting museums, shopping centres, dancing and bars are all possible outside the Institute's campus and at own cost.

The Centre does not provide daily allowances. Allowances should be met by the employer or by the participant's salary.

10. COURSE STRUCTURE AND ELEMENTS

The Course on Low-cost Water Supply and Sanitation is structured according to four distinctive Periods, with each distinctive elements.

1. Introductory Period

In the Introductory Period, participants have to get registered and boarded properly. An opening session will be given by the Director of the Centre, after which the programme of the Course will start.

The first week of the Course will be used to let the participants get acquainted with each other, the Centre's staff and facilities, as well as with the contents of the course.

An important part of this period are the Professional Briefings.

A Bench Mark Test will also be given in the first week, in order to assess the basic knowledge of the participants on the issues of low-cost water supply and sanitation.

Another session will be spent in the Centre's Library, where they will be introduced to the Library's stock of books, journals, periodicals, bulletins, articles, etc, and to its documentation system. This session is important for assignments, exercises, study and reporting at a later stage of the Course.

The Introduction Period takes one to one and a half week.

2. The Workshop Period

A major part of the Course will be spent for lectures, discussions, individual assignments and group exercises, all of which are mainly class room sessions. Another element of this period are the site-visits and field exercises.

The lectures scheduled should be a nice balance of providing basic knowledge, technologies, concepts, theories, models in respect of low-cost water supply and sanitation, and examples, case-studies and experiences in Tanzania, as well as in other countries of the world where these ideas, technologies and concepts have been applied. Theory and practice should be in balance.

Another balance that should be aimed at is the balance between technological, institutional, legal, organizational, managerial, environmental health and community involvement aspects. Technological, nor bureaucratic issues should not become dominant. The Course is aiming at providing a comprehensive overview of the aspects that are involved in water supply and sanitation projects and management. Chapter 16 deals with the lectures of this Course, and in the Annex Outlines are given.

Discussions should also become an integral part of the Course. Although participants might not be used to interactive education or training, they

should be made aware and even urged to raise issues for discussion, that might benefit the understanding of the topics dealt with, and in general promote the exchange of experiences, ideas and insights. Sessions should be reserved to discuss issues important to the Course, e.g. health education, community participation, gender issues, cost-recovery and affordability, etc.

Group exercises are an important tool to apply the gained knowledge, concepts and ideas, and to promote the exchange of experiences among the participants. Moreover the Course coordinators get an impression of the understanding of the participants and their capability to work creatively in a team.

Individual assignments are a tool to assess the individual understanding of the participants of the topics dealt with in the course, and his/her capability to apply the gained knowledge. They do not serve the exchange of experiences. In chapter 18 a range of individual assignments and group exercises are given. As a matter of course these are very strongly linked to the topics of lectures.

So far, **Field exercises** have not been applied during the Course, but could prove an useful element. The objective is to confront participants with the physical implementation of a particular technology, its advantages, its disadvantages, risks, the time-consumption, its required site organization, utilization of tools and equipment, the labour and skill requirements, material requirements, etc. One has thought of building a Ventilated Improved Pit Latrine. Other field exercises are also possible, e.g. installing and dismantling village handpumps and executing pit-emptying with new pit-emptying devices (MAPET project). See also chapter 19.

Site-visits are an affirmation of the lectures and exercises, as well as an exposure to new experiences, concepts, ideas and technologies. The site-visits should have bearing with the Course content. Preparation by a lecture or by reading is a prerequisite. In order to promote active participation and critical observation, participants should submit site-visits reports containing a description of the visited works and sites, their findings, conclusions and suggestions. A discussion after the site-visit could even more stimulate the reviewing process. For more details see also chapter 20.

The workshop period takes 5-6½ weeks.

3. The Field-work Period

The Field-work period is a substantial period of the Course and aims at the participants' application of the acquired knowledge, technologies, concepts and ideas to an existing area. The application will have to materialize into a written project proposal for a chosen area. See also chapter 2.

The Field-work Period takes 1-2 weeks.

4. The Concluding Period

The Course will conclude with a period that will mainly comprise of finalizing the Field-work Project Proposal, individual report writing, submission and presentation, evaluation, appraisal and hand-out of certificates.

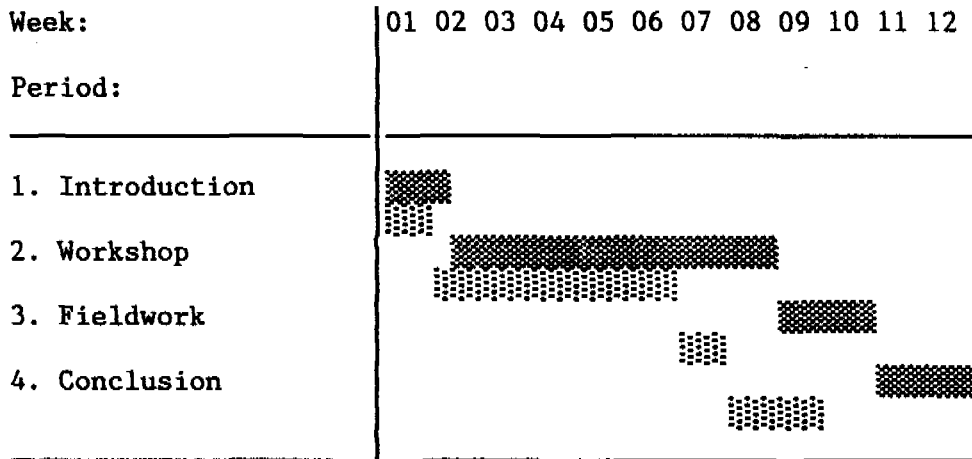
Also a limited number of lectures, exercises and discussions will be added to

this period. In this chapter no special attention is given to these elements and one is recommended to read chapters 14, 16, 18, 20, 22 and 23.

The Concluding Period takes 2 weeks.

In retrospect, the Course Periods could be structured on a bar-chart as follows:

CHART 10.1 COURSE STRUCTURE



■ = 12-WEEK COURSE

■ = 9-WEEK COURSE

When the Course is structured as a 9-week and a 12-week course it is recommended to schedule the different types of sessions as is shown below. The following types of sessions have been identified:

- Registration (chapter 12);
- Opening (chapter 12);
- Professional Briefings (chapter 13);
- Introduction to the Library (chapter 12);
- First Bench Mark Test (chapter 14);
- Lectures (chapter 16 and 17): sessions that should cover the introduction to the various topics of water supply, sanitation, environmental health and project management;
- Exercises and presentations (chapter 18 and 19); sessions for group and individual exercises to execute, report and present to fellow-participants;
- Reporting and presentations (chapters 18-22): sessions to be used for preparing reports on site-visits, fieldwork reports and individual final reports and their presentation;
- Site-visits (chapter 20);
- Class preparation before leaving for the Fieldwork period (chapter 21);
- Fieldwork period (chapter 21);
- Presentations of Individual Reports (chapter 22);
- Evaluation (chapter 23); and
- Closing Ceremony (chapter 24).

A week is supposed to have 17 sessions of 2 hours each, excluding the coffee-, lunch- and tea-break.

TABLE 10.1 9-WEEK COURSE SESSION SCHEDULE

Period:	Introduction	Workshop	Fieldwork	Conclusion	Total
Weeks:	1	5	1	2	9
Type of Sessions:					
Registration:	2				2
Course Opening:	1				1
Profess. briefing:	10				10
Introd. Library:	1				1
First Bench Mark Test:	1				1

Lectures:	2	42		10	54
Exercises & Present.:		17		2	19
Reporting & Present.:		10		6	16
Site-visits:		14		2	16
Preparation Fieldwork:		2			2

Fieldwork:			17		17

Present. Individ. Rep.:				10	10
Second Bench Mark Test				1	1
Evaluation:				2	2
Closing Ceremony:				1	1

Totals:	17	85	17	34	153

Below the session schedule for a 12-week course is given.

TABLE 10.2 12-WEEK COURSE SESSION SCHEDULE

Period: Weeks:	Introduction 1½	Workshop 6½	Fieldwork 2	Conclusion 2	Total 12
Type of Sessions:					
Registration:	2				2
Course Opening:	1				1
Profess. briefing:	10				10
Introd. Library:	1				1
First Bench Mark Test:	1				1

Lectures:	6	61		10	77
Exercises & Present.:	2	20		2	24
Reporting & Present.:		14		6	20
Site-visits:		16		2	18
Preparation Fieldwork:		2			2

Fieldwork:			34		34

Present. Individ. Rep.:				10	10
Second Bench Mark Test				1	1
Evaluation:				2	2
Closing Ceremony:				1	1
Totals:	23	113	34	34	204

11. COURSE HANDBOOK

A Course Handbook serves as a reference document for the participants when they have been selected for the Course. It should provide sufficient information for the preparation of the participant before travelling to the Centre in Dar es Salaam. As preparation take time the handbook should reach the address of the selected participants at least 3 weeks before travelling to the Centre. But also during the Course the handbook should serve as a reference. It should contain the following information:

1. General information about the history and consultancy, research and educational activities, and staff of the Centre.
2. Course objectives and achievements.
3. Course structure and elements.
4. Course participants.
5. Appraisal and Certificates.
6. Required preparations by participants.

7. Boarding, lodging, registration, administration, insurance, allowances, travel arrangements, stationary and equipment, medical and recreational facilities, and library facilities.

In the Annex an example of a Handbook is enclosed.

12. REGISTRATION, OPENING AND INTRODUCTION TO THE LIBRARY

The Course starts with the registration of the participants. This is required for various reasons. Not only to know who will attend the first sessions and who will not, but also, for the provision of accommodation, food, and stationary, requires to have an official list of registered participants. Registration is scheduled to take 2 sessions. It is the duty of the administrator to collect all the facts and to deal with the first problems that might come up: visa, special food requests, accommodation provision, etc. The administrator is assisted by the Course Coordinator.

The Opening is the first official session of the Course. The Director of the Centre or his/her representative welcomes the participants, after which the Course Coordinator can explain the basic facts of the Course, i.e.:

- names of staff involved in Course;
- organization of the Centre;
- provision of boarding and lodging;
- provision of equipment, manuals and materials;
- Course objectives and expected results;
- Course structure and elements;
- Introduction Period;
- Workshop Period;
- Fieldwork;
- Conclusive Period;
- Assessment and Awards; and
- Questions.

The introduction to the Library of the Centre, and if possible the Library of the Ardhi Institute, should inform the participants how they can get access to the available books, journals, periodicals, reports, reference books, etc. Especially those documents that are related to water supply and sanitation should receive special attention. The catalogue and thesaurus system should be explained, and an exercise may help to familiarize the participants with the system. Also the Library Internal Rules should be explained.

13. PROFESSIONAL BRIEFINGS

Each participant is expected to give an oral presentation to fellow-participants and the Centre's staff on his/her professional training, experience and role in the organization of the employer. The briefing should be summarized in a paper of not more 5 typed pages, to be handed to the staff of the Centre at the beginning of the Course. In detail, the briefing should deal with:

- the structure of the organization of the employer, the scope of activities undertaken by the organization;
- the involvement of the organization in water supply and sanitation projects, a description of these projects, and responsibilities of the organization in these projects;

- the personal involvement in the above mentioned projects and explanation of conducted tasks and duties; and
- description of the present personal activities in the organization, the position in the organization and a review of the work, its pleasures and difficulties.

14. BENCH MARK TESTS

Bench mark tests have in the present situation two objectives:

1. To assess the knowledge of the participants at the beginning of the Course in respect of the Course topics; and
2. To assess the knowledge, skills, capabilities of the participants at the end of the Course in respect of the set Course Objectives and Achievements (chapters 1 and 3).

The first objective can be achieved in the first week of the Course by a questionnaire to be filled in by each participant. The questionnaire could also be used to identify the expectations and fields of interest that participants have. Thus, the questions of the first Bench Mark Test should cover the following topics:

- expectations of the Course;
- basic facts of water supply;
- low-cost options in water supply;
- basic facts of sanitation systems;
- low-cost options in sanitation systems;
- basic facts of environmental and public health;
- basic measures of water supply and sanitation that improve public health;
- basic facts of organization and management of water supply and sanitation in Tanzania; and
- fields of interests.

In Annex III examples are given of First Bench Mark Tests.

The second objective is achieved in the last week of the Course by another questionnaire to be filled in by each participant. This Final Bench Mark Test should not be combined with the evaluation of the Course as the questionnaire will become too long to be filled in at one time. In order to appraise progress of individual participants one should aim at asking similar questions as in the first Bench Mark Test. However, the emphasis should be upon the understanding of low-cost options of water supply and sanitation, and the basic issues of project organization, management and public health.

A Final Bench Mark Test was planned for in the 24th Course, but was cancelled due to the shortage of time.

15. STANDARD READING LIST

At the beginning of the Course the participants should be handed out a Standard Reading List that provides a list of titles available in the Library, that might help to broaden their knowledge and understanding. In Annex IV the Standard Reading List of the 24th Course has been enclosed. A Standard Reading List needs to be reviewed before every Course to omit outdated titles and to include new interesting Library entries.

16. COURSE LECTURES

The lectures are one of the major elements of the Course and need good preparation and execution. The major selection criteria for choosing lecture subjects and lecturers should reflect the aim to achieve the Course objectives, taking into account the knowledge and skills of the target group. The objectives have been set but the knowledge and skills of the participants might vary with each Course. This implies that there should be some flexibility in the programming of the Course lecture subjects and the outline of each lecture. This requirement might result into omission of certain lectures, inclusion of other lecture subjects, or a change in emphasis in a number of lectures.

In the present situation the Centre is to a large extent dependent on several outside resource persons to provide the desired lectures. This implies that a certain level of flexibility is required on their behalf to achieve the desired programming. However, gone should provide a clear understanding of the objectives of the lectures, outline, structure, literature, audio-visuals and duration. For this purpose a Lecture Outline Data-sheet has been developed that gives a quick overview of these basic facts.

In the Table 16.1 below an overview is given of the Course Lecture Subjects. The table indicates:

1. The subject of the lecture.
2. Whether the subject is considered basic (B) and should be covered in each Course, or whether the subject is considered optional (O) and could be covered dependent on the participants needs or availability of resource persons;
3. The Course periods: Introductory (I), Workshop (W), Fieldwork (F) or Conclusive Period (C). For explanation see chapter 10.
4. The number of sessions that a lecture subject might require. Each session is 2 hours, including the short intermediate break of 10 minutes.

TABLE 16.1 OVERVIEW OF SUBJECTS FOR COURSE LECTURES

SUBJECT:	BASIC/ OPTIONAL:	COURSE PERIOD:	NO. OF SESSIONS
<u>General:</u>			
G-1 Political Economy of WS and SAN.	B	W	1-2
G-2 Integrated Urban Development.	O	W/C	1-2
G-3 Storm- and Rainwater Drainage.	B	W	2
G-4 Solid Waste Management.	B	W	2
G-5 International Experiences Sites & Services.	O	W	2
G-6 International Experiences Slum Upgradation.	O	W	2
G-7 Private Sector Involvement in the Provision of Infrastructure.	O	W/C	2
G-8 Report writing and data presentation.	B	W	1-2
G-9 Standards for infrastructure design.	B	I/W	1
G-10 Introduction to the Library	B	I	1
<hr/>			
<u>Water Supply:</u>			
W-1 Tanzanian Water Law.	B	W	4-5
W-2 Tanzanian Water Policies.	B	W	2
W-3 Internat. Water & San. Decade 80-90.	O	W	1
W-4 Hydrological Cycle.	O	I/W	1
W-5 Properties of Water.	B	I/W	1
W-6 Water & Health.	B	I/W	3
W-7 Water Consumption Needs.	B	W	1
W-8 Sources of Water Supply.	B	W	1
W-9 Water Collection Methods and Construction.	B	W	1-2
W-10 Wells and Handpumps.	B	W	1-2
W-11 Rainwater Roof Catchment Systems.	B	W	1-2
W-12 Water Storage.	B	W	1
W-13 Principles of Water Treatment.	B	W	1
W-14 Slow and Rapid Sand Filtration.	B	W	2-3
W-15 Gravity-Flow Systems.	O	W	1
W-16 Community Water Distribution.	B	W	2
W-17 Organization and Management of Public Water Works.	O	W/C	1
W-18 International WS Experiences.	O	W/C	1

I = Introductory period Course
 W = Workshop period Course
 C = Conclusive period Course
 WS = Water Supply
 SAN = Sanitation

TABLE 16.1 CONTINUED

SUBJECT:	BASIC/ OPTIONAL:	COURSE PERIOD:	NO. OF SESSIONS
<u>Sanitation:</u>			
S-1 Sources of (Human) Waste Water.	B	W	1-2
S-2 Introduction to SAN Systems.	B	I/W	1-2
S-3 Introduction to Low-cost SAN.	B	I/W	2
S-4 Conventional Sanitation.	O	W	1-2
S-5 Sewerage Systems.	B	W	1
S-6 Small Bore Sewerage.	B	W	1
S-7 Oxidation and Stabilization Ponds.	B	W	2-3
S-8 Planning of Low-Cost SAN in Sites & Services and Housing Projects.	B	W	2
S-9 Planning and Construction of VIP	B	W	1
S-10 Financial Aspects of SAN.	B	W/C	1
S-11 Case Studies of Low-Cost SAN.	B	W/C	2-3
S-12 Goals and Elements of Dar es Salaam Low-Cost Sanitation Projects.	O	W/C	2-3
S-13 Operation and Maintenance of DSM City Sewerage and Sanitation Systems.	O	W/C	1-2
<u>Environmental Health:</u>			
E-1 Introduction to Environmental Health.	B	I/W	4
E-2 Transmission of Infectious Diseases.	B	W	2-4
E-3 Laboratory Work for WS and SAN.	O	W	1-2
E-4 Malaria versus design SAN units.	O	W	1-2
E-5 Role of Health Education	B	W	2
E-6 Administration and Management of Public Health Programmes.	B	W/C	2
E-7 Health Institutions in Tanzania	B	W/C	1-2

I = Introductory period Course
W = Workshop period Course
C = Conclusive period Course
WS = Water Supply
SAN = Sanitation

TABLE 16.1 CONTINUED

SUBJECT:	BASIC/ OPTIONAL:	COURSE PERIOD:	NO. OF SESSIONS
<u>Project Management:</u>			
P-1 Principles of Project Cycle and Management.	B	W	2
P-2 Project Preparation and Implementation	B	W	1-2
P-3 Data-Collection Methods and Analysis.	B	W	1-2
P-4 Aerial Photography for Data-Collection	O	W	2
P-5 Economic Appraisal of Projects.	O	W	1-2
P-6 Technology and Materials Selection.	O	W	1-2
P-7 Institutional and Financial Aspects of WS and SAN Projects.	B	W	1-2
P-8 Legal Aspects of WS and SAN Projects	O	W	1
P-9 Community Involvement and Communication Techniques.	B	W	3
P-10 Role of Women in WS and SAN Projects.	B	W	2
P-11 Principles of Post-Project Issues; Operation and Mainten. of WS and SAN.	B	W/C	4
P-12 Monitoring and Evaluating Infrastructure development.	B	W/C	1-2

I = Introductory period Course

W = Workshop period Course

C = Conclusive period Course

WS = Water Supply

SAN = Sanitation

Thus, the following number of lectures are being offered in this Training Manual:

TABLE 16.2 OVERVIEW OF COURSE LECTURES

FIELD:	SUBJECTS:	BASIC LECTURES:		OPTIONAL LECTURES:	
		Minimum	Maximum	Minimum	Maximum
General:	10	8	10	7	8
Water Supply:	18	21	26	5	5
Sanitation:	13	14	18	4	7
Environmental Health:	7	11	14	2	4
Project Management:	12	15	19	5	7
TOTAL:	60	69	87	23	31

In Annex VI a Lecture Outline of each subject is given indicating the objectives, the lecture achievements, the topics to be covered, background literature, hand-outs, exercise material, audio-visual material, discussion topics and the possible resource persons and organizations.

Each lecture should provide for lecture-notes and/or hand-outs that cover the content of the lecture. These need to be provided by the guest-lecturers. At the Centre they can be typed out (only if requested) and duplicated to be handed out to the participants. In both cases sufficient time should be allowed for typing and duplication.

17. GUEST-LECTURERS; INVITATION, PREPARATION AND EVALUATION

The guest-lecturers or organization as indicated in the Lecture Outlines need to be approached well in advance. The best way is to pay a visit to the respective persons or organization to request for their input in the Course. These visits should start three months before the Course. The Course Timetable should have been set provisionally and the Lecture Outline should be prepared to hand over for discussion. The following issues should be discussed:

- the topics he (or she) can cover,
- the literature he will use,
- the provision of a lecture-notes and/or hand-outs,
- the exercises or topics for discussions that might accompany the lecture,
- the number of sessions to be covered,
- the scheduling of the sessions, suiting his/her agenda,
- the fee arrangements,
- the required class room equipment and stationary, and finally
- the transportation arrangements.

Subsequently, a letter that confirms the invitation can be sent to affirm the agreed issues and lecture outline. Another formal letter need to be sent to his or her superior to request for the release of the guest-lecturer for the agreed sessions of input. This letter can be sent shortly before the Course starts. An Example of such a letter is shown in the Annex.

A guest lecturer might request the Centre to type the handwritten lecture-notes. As said, the notes should be offered well in advance to allow for typing and duplication.

It is important to reconfirm the input some two weeks before the start of the Course in order to allow for other arrangements or rescheduling of sessions, and for typing and duplication of lecture-notes and hand-outs. This should be repeated two or three days before the actual input to ascertain his or her availability, and to arrange for changed class room requirements and for transportation, if necessary.

The Course Coordinator needs to make some personal notes about the performance of the guest-lecturer, in order to appraise whether the Lecture Objectives have been achieved through the input of a guest-lecturer. The following points should be taken into consideration:

- Does he/she explain and talk clearly?
- Does he/she manage to keep the participants attentive?
- Does he/she make use of the class room facilities adequately?
- Did he/she provide hand-outs or lecture-notes?
- Did he/she refer to the provided hand-outs or lecture-notes?
- Were the number of sessions sufficient to cover the topics?
- Is there interaction between lecturer and participants?
- Does he/she respond satisfactory to the participants questions or remarks?
- Did he/she raise enough discussion?
- Were the used audio-visuals supportive?
- Are the lecture topics covered to a satisfactory extent?
- Were the Lecture Objectives achieved?

In the Annex IX these questions have been reshaped into a Lecture Evaluation Form.

18. PARTICIPANTS' GROUP AND INDIVIDUAL EXERCISES

Group exercises are an important tool to apply the gained knowledge, concepts and ideas, and to promote the exchange of experiences among the participants. Moreover the Course coordinators get an impression of the understanding of the participants and their capability to work creatively in a team.

It is a matter of course that exercises should have bearing with the topics that are dealt with in lectures at a stage of the Course. As a rule, exercises are preceded by a lecture on the subject with which the exercise deals. Ideally, the exercise should follow directly after the lecture, but a lap of two days after the lecture is also acceptable. The reason is obvious: participants still remember the contents of this lecture in detail. It is recommended that guest-lectures not only introduce, but also monitor, attend presentations and appraise group exercises, especially in those cases where the Course Coordinator is not familiar with the subject.

Individual assignments are a tool to assess the individual understanding of the participants of the topics dealt with in the course, and his/her capability to apply the gained knowledge. They do not serve the exchange of experiences. As a matter of course these are also very strongly linked to the topics and timing of lectures.

Over the last number of courses several group and individual exercises have been developed that can be used in future courses as well. In the table 18.1 below these exercises are listed, with their applicability (Group or Individual), their approximate timing (Introduction, Workshop or Conclusive Period) and the expected number of sessions, including the presentations and discussions.

TABLE 18.1 OVERVIEW OF GROUP AND INDIVIDUAL EXERCISES

SUBJECT:	GROUP/ INDIVIDUAL	COURSE PERIOD:	NO. OF SESSIONS
<u>General:</u>			
g-1 Elaboration of the concept of "Basic Needs".	G	I/W	2-3
g-2 Land development through drainage.	G	W	2-3
g-3 Roads and drainage design for a low-income neighbourhood.	G	W	2-3
g-4 Solid waste samples analysis for processing.	G	W	2
g-5 Private sector involvement in the provision of infrastructure.	G	W/C	2-3
g-6 Infrastructure literature list review	G/In	I/W	1
g-7 Development of data-collection methods for Fieldwork period.	G	W	3

<u>Water supply:</u>			
w-1 Piped network design for low-income neighbourhood.	G	W	3
w-2 Gravity-flow system design for rural settlement.	G	W	3
w-3 Water tariff policy setting.	G	W	2

<u>Sanitation:</u>			
s-1 Low-cost sanitation options for Wedcana area.	G/In	W	2
s-2 Algorithm for selecting appropriate sanitation technologies in rural areas.	G	W	2-3
s-3 Sanitation design for urban low-income neighbourhood.	G	W	2-3
s-4 Comparison of Water-borne sanitation systems.	G	W	2-3

<u>Environmental health:</u>			
e-1 Laboratory tests for WS and SAN.	G/In	W	2-3

G = Group exercise
 In = Individual exercise
 I = Introduction period Course
 W = Workshop period Course
 C = Conclusive period Course
 WS = Water supply
 SAN = Sanitation

TABLE 18.1 CONTINUED

SUBJECT:	GROUP/ INDIVIDUAL	COURSE PERIOD:	NO. OF SESSIONS
<u>Project management:</u>			
p-1 Role-play for the implementation of an urban upgrading project.	G	W/C	2
p-2 Actor configuration for the implementation and operation and maintenance of an urban neighbourhood upgrading project.	G	W	2
p-3 Methodology design for socio-economic data-collection for urban neighbourhood upgrading project.	G	W	2
p-4 Training Curriculum development for staff upgrading project.	G/In	W	2
p-5 Network planning; impact of unexpected events.	G/In	W	1-2

G = Group exercise
 In = Individual exercise
 I = Introduction period Course
 W = Workshop period Course
 C = Conclusive period Course
 WS = Water supply
 SAN = Sanitation

Every group or individual should submit a report that contains the description of the exercise, the followed methodology, the results, conclusions, recommendations, drawings and calculations.

In Annex X an Exercise Outline of each exercise is given, indicating the objectives, the exercise achievements, the description, background literature, hand-outs, exercise aids, audio-visual material, and discussion topics.

19. FIELD EXERCISES

During the Workshop Period one might include a Field Exercise. A Field Exercise has the objective to apply the gained knowledge not on paper as in the case of group or individual exercises but in the field. A field exercise confronts the participants with the operational requirements and difficulties of executing or construction, i.e. material, logistics, human skills, handling, equipment, time-consumption, site-management, and planning. Field Exercises are a group undertaking.

Field exercises require quite some preparations from the Course Coordinator: site-location, material supply and transportation, equipment, skilled/-unskilled labour, supervision, preparation and transportation of partici-

pants, working clothes and boots, payments of salaries, administration, cost estimates and approval by the Centre and other assisting agencies.

In the past Field Exercises have not been applied in courses. In spite of the lack of experience, the following Field Exercises could be included in future courses:

TABLE 19.1 PROPOSED FIELD EXERCISES DURING WORKSHOP PERIOD

SUBJECT:	NO. OF SESSIONS
1. Construction of Ventilated Improved Pit Latrine.	4-6
2. Dismantling and mantling of Handpump	2
3. Construction of (ferrocement) storage tanks for domestic use.	4-6
4. Residents satisfaction about water supply quality and tariffs.	2-3

Many other field exercises could be added to this short list. It is recommended to schedule Field Exercises during the Workshop Period of the Course.

Reporting of their experiences can be done by a group or by each individual. Their reports should at least cover the exercise description, methodology, and operational experiences. The reports should have a final chapter of conclusions and recommendations. In the Annex tables, drawings, calculations and charts can be added.

20. SITE-VISITS

Site-visits are an affirmation of the lectures and exercises, as well as an exposure to new experiences, concepts, ideas and technologies. The site-visits should have bearing with the Course content. Participants' preparation by a lecture or by reading a hand-out or discussion is a prerequisite. In order to promote active participation and critical observation, participants could be given a group or individual assignment, e.g. to collect particular data, to find an answer to given questions, to produce a lay-out and description, etc. It should be included in the site-visits reports containing a description of the visited works and sites, their findings, conclusions and suggestions. A discussion after the site-visit could even more stimulate the reviewing process.

Site-visits require early preparation by the Course Coordinator, by corresponding to hosting agencies or organizations, agreement on the programme, the guiding staff, dates, locations and times, the collection of reading material

and hand-outs for the participants, preparing the introductory lectures and discussions sessions, preparing the group or individual assignments, organising the transportation, lunches, gifts for guiding staff, etc. Site-visits tend to deviate from the schedule. Therefore it is recommended to schedule site-visits in the afternoon or on Saturdays when no other sessions are planned afterwards.

In the past the following site-visits have been organised in the different courses:

TABLE 20.1 OVERVIEW OF SITE-VISITS PAST COURSES

SUBJECT:	COURSES:	COURSE PERIOD:	NO. OF SESSIONS
<u>General:</u>			
1. Mlalakua squatter area water supply and sanitation construction.	16,24	W/C	2
2. Manzese upgrading area water supply and sanitation provision.	16,24	W/C	2
3. Tabata Solid Waste Deposal Site; City Council.	24	W	2-3
<u>Water Supply:</u>			
1. Lower and Upper Ruvu Water Treatment Plant.	11,16,24	W	2-3
2. Mbeya Water Supply works for intake, treatment and storage.	24	F	3
3. Iringa Bamboo technology project.	24	F	2
<u>Sanitation:</u>			
1. Buguruni Low-cost sanitation project.	11,16	W	2-3
2. Utafiti Latrines in Manzese, DSM.	11	W	2-3
3. Gymkhana sewer pumping station and outfall works.	11,16,24	W	2-3
4. Temeke Ventilated Improved Pit Latrines, DSM.	11,16,24	W	2-3
5. VIP-material research: Building Research Unit DSM.	16	W	2
6. Oxidation ponds, University of DSM	16	W	2
7. Muhimbili Hospital waste water treatment plant, DSM.	24	W	2
8. Manual Pit-emptying Truck demonstration DSSD, Dar es Salaam.	24	C	2

- I = Introduction period Course
W = Workshop period Course
C = Conclusive period Course
WS = Water supply
SAN = Sanitation
DSM = Dar es Salaam

21. FIELD-WORK

In order to achieve the aim of the Field-work Period an area should be chosen that fulfills the following requirements:

1. The area should have potential for improvement of water supply and sanitation.
2. The area should have some interesting projects or works of Water Supply and Sanitation that can be studied.
3. Sufficient secondary data should be obtainable.
4. Cooperation and agreement should be established from official bodies, as well as from communities in the area (through CCM or other representative organizations).
5. The area should be within reasonable travelling distance from Dar es Salaam (maximum one full travelling day, as a half-days rest is required the next day).
6. The area should provide nearby, sufficient and cheap boarding and lodging facilities.

It is strongly recommended that the Coordinator pays a visit to the Field Work area prior to the Course, to meet the officials, to agree on the programme, to investigate research sites and to select guest houses. These major preparations, including transportation, for the Field-work should be started well in advance, so that by the beginning of the Course all arrangements have been settled. During the Course there will be little opportunity to settle these matters.

The following checklist can be used when leaving for the Fieldwork period:

- copies of letters, telexes and telegrams to different officials;
- copies of addresses and telephone numbers of different offices, guest-houses;
- standard introduction letter signed by Director, explaining the purpose of Fieldwork, introducing staff and participants and to ask for cooperation in the execution of the Course Fieldwork;
- blank paper with CHS letter head;
- calculators;
- writing pads;
- first aid kit;
- field clothes and shoes;
- camera and films;
- spare parts for the vehicles;
- tools;
- towing rope;
- mechanical check-up for the vehicles;
- extra jerry-cans for fuel;
- money (and cheques) for fuel expenses, maintenance, road tools, accommodations of staff and participants, and some for unforeseen expenses.
- payment of meal allowances to the participants.

For the participants the Field-work Period is prepared by a number of lectures and a group exercise, that deals with the methodological issues of socio-economic data-collection. This should result in a field survey checklist for the description of infrastructure amenities and environment, a household questionnaire and an officials questionnaire. The designed questionnaires will be typed, duplicated and be taken to the Field (See Exercise Outline g-7). In Annex XII such checklists and questionnaires are enclosed.

During the Fieldwork the programme could have the following components:

1. Travelling to Field work location (max. 1 day).
2. Recuperation ($\frac{1}{2}$ day).
3. Courtesy visits to hosting agencies.
4. Site surveys: survey of infrastructure amenities and environment.
5. Household questionnaires in selected communities.
6. Officials questionnaires of involved agencies or organizations.
7. Site-visits in the region.
8. Data-processing.
9. Drafting project first proposals and reports.
10. Discussion of proposals with officials and community leaders.
11. Concluding and farewell session.
12. Evaluation with the participants.
13. Travelling back to Dar es Salaam.
14. Recuperation (1 day).

It is recommended that the Field Work period should be attended by two staff members of the Centre. The Course Coordinator can then focus upon the content of the programme, field activities and performance of the participants, and the second staff member can focus more upon the logistical and official requirements of the Field Work (transport, letters, invited officials, announcements, maintenance, accommodation and lodging).

In order to review critically the Fieldwork activities by the participants, it should become a routine to evaluate the activities day-by-day in the evening, such as to allow for changes when activities do not result into the expected outcomes. Questions, such as "Does the data-collection methods provide us with sufficient and reliable data?", "Do our identified resource persons provide us with sufficient data, or do we need to find other sources of information?", "How does the community respond to our surveys and households questionnaires; do we need to change our approach?", "What are the individual problems of executing households questionnaires; what can be done to overcome the problems?" and "What can we learn out of these experiences?", should be dealt with during such evaluating sessions.

The Finalization of the Field-work Project Proposal by the participants is supposed to be done shortly after the return to Dar es Salaam. The Proposal is to be submitted to the Course Coordinator and a presentation and discussion by the participants should be planned for in this period. The Proposal should contain:

1. A description of the area;
2. A description of the existing water supply and sanitation situation;
3. A description of method of data-collection;
4. An overview of the gathered data;
5. An analysis of the socio-economic data;
6. On basis of the above findings a proposal for the improvement of the existing water supply and sanitation situation;
7. A proposal for the organizational set-up of the implementation of the project;
8. The involvement of the community in the planning and implementation of the project;
9. The organizational set-up for the management of the operation and maintenance of the proposed facilities and the involvement of the community;

10. A proposal for supportive programmes on public health, skill training, etc; and
11. Conclusions and recommendations.

At present the group reports cover points 1 through 5, while the individual Field Reports cover the other points. A number of sessions are reserved for report writing. In the 24th Course the analysis of data and the writing of group and individual reports took a whole week. In the second week after the Fieldwork groups and individuals presented their reports.

22. PARTICIPANTS' INDIVIDUAL REPORTS

As said, the present practice (16th and 24th Course) is that participants also write individual Field Work reports after their return to Dar es Salaam. The outline of their reports is discussed with the Course Coordinator, and refers to the area where the participant (as part of a group) has done research. He/she makes use of the data that has been gathered, processed and analyzed during and after the Field Work period, and adds his/her personal findings and opinions to the results. However, the report outline should contain the topics 6 through 11, as described above in chapter 21. Also the individual Field Work reports are presented after a period of report writing.

An alternative to the above practice is to have the Field Work reports written by group effort only, if necessary in a condensed form. Secondly, each participants has to write an individual report about a chosen subject. Thus, the Individual Report is the final product that each participant has to write, to submit and to present to fellow-participants. The subject is determined in consultation with the Course Coordinator and should reflect the content of the Course, the interest of the participant, the professional background and the relevance for the work of the participant. The participant may make use of brought material, lecture readings and hand-outs, Field Work material, material from the Library of the Centre or the Ardhi Institute.

A number of sessions should also be allocated for this report writing. In the meantime they can consult the Course Coordinator.

The appraisal of the Report in both cases is determined by a number of factors:

- the depth of the Report in respect of the subject;
- the extent to which the participant has made use of the available resources provided;
- the capability and effort of the participant in producing the Report;
- the originality and personal touch of the Report;
- the written quality of the report (neatness, table of contents, bibliography, etc.);
- the quality of the presentation;
- the quality of response to fellow-participants questions and remarks; and
- the timely submission of the report.

23. COURSE EVALUATION

The Evaluation of the Course by the participants is an important feed-back to the Course Coordinators. The Evaluation can be done by handing out question-

naires to filled in by the participants (Annex XVII). This information provides often general information and does not provide much detail. Therefore it is necessary to evaluate the Course in a plenary discussion session and to ask specific questions about lectures, site-visits, exercises, assignments, fieldwork, etc. If the results of the evaluation questionnaire are known, these results can be used to start off discussion. A Evaluation Report should be made by the Coordinator for the Course File. An example of an Evaluation Report is enclosed in Annex XVIII.

24. PARTICIPANTS' APPRAISAL AND CERTIFICATES, AND CLOSING CEREMONY

The Appraisal of the participants by the Course Coordinator is one of the last tasks of the Coordinator during the Course. The Appraisal should be done systematically, in order to rule out personal sympathies as much as possible. An important Appraisal tool is to give the early Bench Mark Test once again and have it filled in by the participants. The comparison of these answers with the earlier answers can prove the progress and increased understanding of the participants during the course.

Summarizing, the appraisal of the participants should be done by including the following considerations and scores:

1. The contribution of the participant to discussions, group exercises, field exercises, site-visits, Field-work and group reporting;
2. The dedication or seriousness of the participant;
3. The quality of the professional briefing;
4. The scores on individual assignments and group exercises;
5. The score on the Group Field work report;
6. The score on the Individual Report;
7. The score on the presentation of the Individual Report; and
8. The progress as indicated by the Bench Mark Tests.

In the Annex XIX a format of an Appraisal Form has been enclosed.

The hand-out of the Certificates is the final act (by the Director or an invited guest) on behalf of the Centre for those participants that have performed satisfactory, according to the above defined standards.

25. COURSE TIMETABLE

The design of a Course Timetable is a complicated process. The final result depends on quite a number of criteria:

1. the availability of guest-lecturers.
2. the logic sequence of general and detailed lectures
3. the planning of exercises linked to lectures.
4. the scheduling and opportunity of site-visits.
5. the planning of reporting and presentation sessions linked to site-visits.
6. didactic reasons of assuring variance of topics, variety in passive and active sessions, absorbing and creative sessions, reading and writing, variance in individual and group activities, and variance in complexity of lectures and exercises. Thus, the Course Timetable should be colored sufficiently.

Even if a nicely balanced and colourful Timetable has been designed many changes before and during the Course will occur and will make it necessary to alter the schedule. Flexibility is thus the major requirement of a Course Timetable. Back-up sessions should be kept ready to replace certain drop-outs of lectures or site-visits. Case-studies presentation, exercises or discussion of literature or hand-outs, and lectures of colleague staff of the Centre can serve this purpose very well.

In Annexes XIII-XVI a Course Timetable Form and the Course Timetables of the 11th, 16th and 24th Course have been included for reference.

26. COURSE FILE AND DOCUMENTATION

It is important to keep a Course File that can be used in future courses. the Course should contain:

- List of participants' names;
- Professional Briefing Reports by participants;
- Standard Reading List for participants;
- Lecture-notes;
- Hand^a-outs;
- Exercise Description as was handed-out;
- Exercise Reports submitted by participants;
- Site-visits programmes as was handed-out;
- Site-visits Reports by participants;
- Course Handbook;
- Course Timetable;
- Questionnaires and checklists developed by participants for the Fieldwork;
- Fieldwork group reports;
- Fieldwork individual reports;
- Bench-mark Tests as was handed-out;
- Bench-mark Tests submitted by participants;
- Appraisal Form participants;

Copies of correspondence concerning the guest-lectures, hosting organizations for Site-visits and Fieldwork are of course kept with the secretariat of the Centre. Also administrative letters and lists, that concern participants' applications, selection, invitations, boarding, lodging, etc. are kept with the secretariat.

As participants are making use of the library it is required to review and update the stock of books, journals and articles, etc., at regular intervals and order and acquire from time to time new publications, etc. New titles that are of general interest to the participants can be added to the Standard Reading List before every Course.

REFERENCES

1. Alan Harding, Analysis of Training Needs and the Design and Evaluation of Training Programmes, Paper presented at IHS, May 1st 1986.
2. International Reference Centre for Community Water Supply and Sanitation, Training Course "Evaluating Water Supply and Sanitation Projects", Guide for Course Moderators and Course Modules, Training Series No. 2, August 1987.
3. UNESCO/UNEP, Handbook for the Organisation and Design of Courses, Volume 1, July 1977.

ANNEXES

- I - Course Brochure
- II - Course Handbook 24th Course
- III - First Bench Mark Tests
- IV - Standard Reading List 24th Course
- V - Format Description Lectures Sessions
- VI - Descriptions Lecture Sessions
- VII - Format Invitation Letter Guest-lecturer
- VIII - Example Lecture Notes 24th Course
- IX - Evaluation Form Lectures
- X - Description Sessions Group Exercises
- Description Sessions Individual Exercises
- XI - void
- XII - Field-work Questionnaire
- XIII - Format Course Timetable
- XIV - 11th Course Timetable
- XV - 16th Course Timetable
- XVI - 24th Course Timetable
- XVII - Questionnaires for Course Evaluation
- XVIII - Evaluation Report 24th Course
- XIX - Format Appraisal Form Participants

ANNEX I

**Course Brochure
24th Course**

The programme of the Course will consist of multi-disciplinary lectures, site visits, assignments, exercises and discussions. Another important component in the Course is a period of field-work in one of the regions of Tanzania. Data will be collected that will be used to make a joined draft proposal for improving local water supply and sanitation. This draft will be presented to the local authorities. After return to Dar es Salaam participants will have to draft an individual and group report based on the field work.

The Course is scheduled to start on 23rd January 1989 to 11th April 1989.

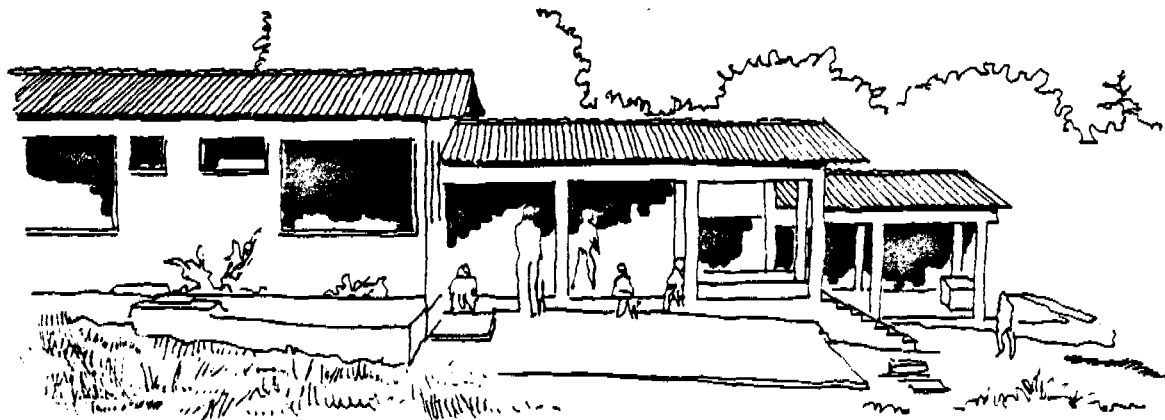
The Course is intended for practising professionals from East and Southern Africa working in fields of planning, implementation and decision making of water supply, sanitation and health promotion. A minimum of two years of professional practice is a prerequisite. As the course will be conducted in English, a good command of the English language is required. Upon admission, the Tanzanian participants will pay part of the tuition fee. However, participants employed in private sectors and foreign participants will meet the full cost of the Course. For further details, write to the Centre.

Application by aspiring professionals can be made as follows:

1. A formal application letter, endorsed by applicants' employer.
2. An attached brief curriculum vitae containing personal particulars, educational (primary - highschool) record, professional and occupational career.

The application letter should be addressed to the Director of the Centre for Housing Studies, P.O.Box 35124, Dar es Salaam. Closing date for applications is November 30th, 1988.

24th Course on Watersupply and Low Cost Sanitation



ORGANISED BY:
the Centre for Housing Studies (CHS) at Ardhi Institute -
Dar es Salaam.

January 23 - April 11

Focus
Course objectives
Main elements of the Course

The 24th Course focusses upon the appraisal of appropriate and low cost techniques and programmes for water supply and sanitation in low-income settlements in Southern and East Africa, by planners, health officers, engineers and decision makers at several levels, in and outside the civil service, and secondly upon their skill to apply these.

The objectives of the Course are:

- To broaden and enhance the understanding of the linkages between environmental health, water supply and sanitation.
- To deepen the understanding and necessity of organisation of institutional support.
- To improve the ability to plan and implement water supply and sanitation projects through practical training and exercises.
- To exchange professional experiences and to discuss possibilities to apply the gained knowledge and skills at working level.

Water supply

- Water law and policies
- Water sources and collection
- Water treatment technologies
- Water distribution systems
- Water and Health
- Managerial, financial and social aspects of water supply projects

Low cost sanitation

- Low Cost Sanitation planning and technologies
- Sanitation policies
- Waste water and sewage treatment
- Construction of Ventilated Improved Pit Latrines
- Sanitation and Health
- Managerial, financial and social aspects of sanitation projects

Environmental health

- Introduction to pathology
- Water supply and sanitation design in support of health improvement
- Public health promotion
- Structure, policies and programmes of Health Institutions

Project management

- Introduction to economic, social, institutional, technical and financial aspects of project management
- Project cycle: appraisal, feasibility, design, planning, implementation, operation, maintenance and evaluation
- Monitoring of quality and quantity

ANNEX II

Course Handbook 24th Course

~~CENTRE~~ FOR HOUSING STUDIES

ARDHI INSTITUTE

P.O. BOX 35124

DAR ES SALAAM

TANZANIA.

(TEL. 49112 EXT. 260-265 and 272)

COURSE HANDBOOK

TWENTY FOURTH REGIONAL COURSE ON WATER SUPPLY
AND LOW COST SANITATION.

16TH JANUARY - 2ND APRIL, 1989

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CENTRE FOR HOUSING STUDIES

1.0 INTRODUCTION

A) History and aims

The Centre for Housing Studies (CHS) located at Ardhi Institute, in Dar es Salaam, Tanzania has been established to deal with housing, building and planning studies. It was officially established on 1st January, 1979, as a regional project to serve Eastern and Southern African English - speaking countries.

The Centre is a semi-autonomous training and research centre under the general umbrella of Ardhi Institute. The special emphasis is given to the community requirements and housing needs of both rural and urban low-income families and to the facilities and infrastructure related to housing and low-income human settlements. The work of the Centre is aimed at contributing towards the improvement of living conditions and standards in rural and urban areas of Tanzania, Southern and Eastern Africa. This aim is being carried out in five different but complementary ways:-

- (1) Training of middle and high level manpower;
- (2) Conducting applied research;
- (3) Running conferences and seminars, workshops and symposiums;
- (4) Providing documentation and information service; and
- (5) Providing consultancy services.

B) Training

(i) General

The Centre offers courses and seminars to the middle grade and senior officials concerned with programmes and projects, and who work in planning sections of the ministries. It mostly concentrates on applied techniques of development programming, project analysis and project management in housing, building and planning. All the courses and workshops emphasize realistic situations and proven techniques in housing, building and planning. Case studies, exercises, site visits and in some other cases role playing methods are used to enable participants to spend much of their time in learning by doing.

In order to have an effective exchange of ideas and experiences, each course draws a maximum number of 25 participants.

(ii) Training activities

There are two types of courses offered by the Centre; the long courses (2 - 4 months) and short courses (2 - 6 weeks). The long courses are aimed at participants from Tanzania and outside Tanzania (Regional course) while short courses are aimed at Tanzanian participants only (local course). However, it has not always been the case that long courses so far offered were of regional nature.

Long courses:

(a) The long courses given so far by the Centre were on:-

- Rural Housing Construction and Improvement (for Tanzanian Technicians)
- Planning of small settlements (for professionals and sub-professionals)
- Planning of upgrading Sites and Services Projects (for professionals and sub-professionals).
- Housing Finance (for professionals and sub-professionals)
- Construction Management of Self-help Housing (for professionals and sub-professionals)
- Construction Management (for small contractors)
- Water supply and low-cost sanitation (for professionals and sub-professionals).

Training courses are prepared and developed as compact packages, including widebased case-studies, lectures, workshops, practical exercises and literature study. A long course may include a package, that could be run as short course, or a seminar, attracting additional participants. Practice - oriented fieldwork and excursions do supplement classwork.

(b) Short courses:

So far, the Centre has organised short courses on:-

- Urban Surveys with the use of Aerial Photography
- Introduction to Human Settlements (on special request of Habitat for Namibian trainees only). Often, short courses can be developed out of parts of longer courses. Occasionally, they may be developed separately, and may later be inserted as a package in longer courses..

(iii) Seminars, Workshops and Conferences.

These are meetings with an average duration of one week, for much larger groups of participants than in courses. The majority of participants are usually Tanzanians and a small number selected from neighbouring countries. So far, the Centre has organized or co-organized seminars and conferences on:-

- towards a national housing policy for Tanzania
- fibre-cement building material
- rural housing
- plan implementation and human settlements administration
- sanitation
- documentation and information
- promotion of housing co-operation
- planning and design standards for human settlements
- research methodology

Some of the seminars programmed were particularly oriented towards skill development of the staff of the Centre and related institutions, for instance in the fields of research, teaching methods, and documentation.

(c) Research

The aims of research activities are:-

- to increase understanding of human settlements' development and housing production processes, and specifically of rural and urban low-income housing and human settlements;
- To support the training activities of the Centre in developing local and African teaching materials which is then used to confront participants with practical problems, projects and programmes, of which they will gain additional and relevant experience;

- To improve and accelerate the decision-making and planning processes and policy implementation for low-income human settlements, housing, building and planning;
- To encourage and support research activities of professionals in the Government and public sector;
- To support the Centre's documentation and information services in the provision of up-to-date information of practical use to the Government, the public and private sectors in Tanzania, Eastern and Southern Africa.
- To undertake comparative regional research on the planning, development and management of human settlements and housing in East and Southern African and to make it a learning experience for all parties involved.

In order to make the outcome of these research activities to be beneficial to the Government agencies, parastatals and public sector, they are carried out in close collaboration or consultation with people and officials in the Government, the public and private sectors.

The researches done so far concentrated on:-

- Residents' Investments in Upgrading and Sites and Services.
- Housing Production in three different areas of Dar es Salaam: Sinza, a Sites and Services area, Tandale, an upgraded neighbourhood and Mwananyamala Kisiwani, a squatter area in Dar es Salaam City.
- The financing of Urban Housing, both by the public sector and by non-conventional methods
- How can upgraded drainage system affect the housing situation in Manzese, Dar es Salaam.
- Urban Growth and urban reform management in Tanzania.

(d) Consultancy services

The consultancy offered by UNHCR so far was on Rehabilitation of Tanzania Sisal's Housing Estates.

(e) Twenty fourth Regional Course on "Water Supply and Low Cost Sanitation"

This course handbook is for the course on WATER SUPPLY AND LOW-COST SANITATION. The course is scheduled to take place from January to April, 1989. The handbook outlines the main elements of the course and the Centre's expectations about the performance of participants. Read it carefully please before attending the course and note especially the information and materials all participants are required to collect and bring with them and the Centre's regulations.

2.0 THE COURSE PARTICIPANTS

The course is aimed at water engineers, technicians architects, planners and health officers from Tanzania.

All participants should have a good command of English language which is the medium of instruction at the Centre.

The aims of the course are:-

- a) To deepen the participants' understanding of Water and Sanitation and of its institutional support.
- b) To improve their ability to plan and ~~implement~~ such projects, through a very much practice-oriented education and orientation.
- c) To give an overview of environmental health planning in human settlements, especially that which is related to human waste disposal and water supply.
- d) To prepare the participants to plan and implement new low cost sanitation projects in their places of work.

3.0 COURSE ELEMENTS

3.1 Introductory Period

The first week of the course will be introduction to the main elements of the course. The professional briefings also will be done in this week by course participants. Each participant is required to give a short oral presentation to the other participants and the Centre's staff on his/her role in his/her organization. In addition

to the oral part of the professional briefing each participant is requested to write a paper not exceeding 5 typed pages to be handed to the staff of the Centre at the beginning of the course.

This paper should outline and contain the following:-

- i) different water supply and low cost sanitation projects executed by his/her region, with an indication of people involved, whether contractors or individuals.
- ii) the contribution or part which his/her region/institution play in those projects.
- iii) his /her work and responsibilities within this organisation;-
 - description of daily activities and resources at your disposal
 - summary of the main obstacles and problems met in the work; mentioning those ones which you think or expect the course could help to solve them.

3.2 The workshop period

Most of the time in the course will be spent on lectures, discussions, practicals and theoretical exercises.

a) Lectures:

The staff of the Centre and outside invited experts will present theories, case studies, background material and other related matters. Whenever possible lectures will be supported by handouts, slides, and films.

b) Discussions:

Every participant is expected to participate fully in discussions. This will promote exchange of experience and ideas by participants from different fields. It will therefore help in widening the participant's outlook in attempting to solve environmental sanitation problems.

.../7...

3.3 Field trips and practical exercises:

Field visits will be made to several (low-cost) sanitation and water projects as indicated in the course time-table.

For practical purposes, it is planned that participants will go to Mlimani Primary School to build 2 VIP's which can later be used by the pupils.

From the past courses' evaluation and field experience and the aspects to be covered during the field work, it has been decided that the field work will be one to two weeks.

3.4 Appraisal period

The last week of the course will be used to evaluate the course, i.e. appraisal regarding the performance of the course and its role in the improvement of low-income settlements.

Upon completion of the course, successful participants will be issued with certificates. The certificates will only be issued to participants who perform well in the course. In appraising your performance, the staff of the Centre will take into consideration the following:-

- What you, as the participant have gained from the course. This will be illustrated by the progress you have made throughout the course, including your attendance.
- Your contribution to the course in discussions, exercises and practical work i.e. the participants' input in the discussions and presentations of his/her experiences plus interest in communicating information to other participants and staff.

4.0 COURSE OUTLINE

The following is the course outline for the Water Supply and Low-cost Sanitation course.

The main subjects which will be covered includes:-

- Water Supply
- Environmental Health
- Project Management
- Sanitation
- Water law (legal aspects)

For each of these subjects a short introduction of the subject has been given, outline of lectures, literature references, case studies and suggestions for assignments and exercises have been proposed.

4.1 Water Supply

This section is aiming at giving an overview of simple water supply systems for Low-income settlements.

An introduction details on the role of water in nature and the properties of drinking water. Methods of collection, treatment, transport, storage and distribution of water are reviewed. The emphasis in all this is on small scale systems especially in relation to peri-urban and rural settlements. The Tanzania Water Supply policy, and the achievements of the last decade will be included in the course assignments. Site visits to urban water treatment plants and a rural water project have been included in the programme.

4.2 Environmental Health

This subject aims at introducing the participants to different components of the environment and how they interact with health and how man can use this knowledge to maintain a balanced ecosystem. The subject seeks to explain the ways in which man can use the natural processes to upkeep his environment.

The idea of pollution will as well be included

4.3 Project Management

This section will dwell on establishing practical links between the various course components. The development planning aspects which will be dealt with includes:-

a) Economic aspects

- impacts on health, water supply and sanitation provision
- the resources available
- cost of the systems
- economic capabilities of the people

b) Social aspect

- population and social environment (i.e. culture, beliefs, habits, traditions, taboos, needs, desires and aspirations)...

- house and housing as related to health, sanitation and water supply
 - social services as regards health provisions
 - public health education for support and participation in projects
- a) Institutional aspect
- structure and composition of the institution
 - work techniques within the institution
 - planning for health, water supply and sanitation
- d) Technical aspect
- types of technologies available for low-cost water supply and sanitation
 - applicability to Tanzanian or third world situations
 - the question of appropriate technology (O and M)
- e) Financial aspect
- who is financing water supply and sanitation projects and
 - who is to finance future projects
 - the question of paying for services provided e.g. who pays for water?
 - community participation

4.4. Sanitation

There are several aspects to be dealt with under this section; namely:-

- a) excreta disposal systems and health
- b) waste water disposal methods and health
- c) surface water drainage and health
- d) solid waste management and health.

The main aim of this section is to introduce the participants to the field of sanitation with emphasis on low - cost options. It is expected:-

- To train the participants in techniques of promoting low cost sanitation
- Analyse the experience of other third world Countries with low cost sanitation.
- To review experience of Tanzania pilot projects in the promotion and implementation of low cost sanitation systems.

- To review maintenance procedures
- To develop methods of management
- Learn new approaches to the maintenance and promotion of low cost sanitation projects.

4.5 Water law

This section is aimed at introducing the participants to the water control measures. Laws, by-laws and guidelines related to health, water supply and sanitation will be discussed

5.0 GENERAL INFORMATION ABOUT THE COURSE:

5.1 Language: The medium of instruction is English

5.2 Staff:

The Centre for Housing Studies has ~~thirteen~~ permanent academic staff members at the moment who/and provide some lectures in the courses. They will be supplemented with a number of outside lecturers, who are often invited to lecture in the Centre's courses because of their particular professional qualifications and experience with the subject matters to be treated.

The permanent academic staffmembers are:-

1. Professor S.M. Kulaba - (Director) Economist/Planner)
2. V.T. Chisanga - (Workshop Co-ordinator) Architect
3. F.J. Maganga - (Workshop Co-ordinator) Housing Economist
4. E.J.A. Magembe - (Workshop Co-ordinator) Sociologist
5. L.V.S. Uisso - (Workshop Co-ordinator) Planner
6. M.L. Zacharia - (Workshop Co-ordinator) Sociologist
- + 7. A. Mgogolo - (Workshop Co-ordinator) Planner
8. S.S. Mshana Kisare (Mrs) - (Workshop Co-ordinator) Planner
9. D. Rugaiganisa - (Workshop Co-ordinator) Valuer/
Land Economist
10. A.A. Mwaiselaga (Mrs) - (Workshop Co-ordinator) Architect.
- + 11. V. Mwombeki - (Workshop Co-ordinator) Valuer/
Land Economist

∟ takes care of the general organisation of the courses

12. E. Chaggu (Mrs) - (Workshop Co-ordinator) Civil Engineer
13. H. Rajabu - (Workshop Co-ordinator) Civil Engineer

5.3 Library:

The Centre has a small but growing library of its own, out of which books, magazines and articles may be borrowed for a maximum period of two weeks at a time. The Centre's Library has a wide range of books, articles, reports and journals on housing, building, and planning, economics, sociology, town and country planning, engineering, architecture, sanitation, appropriate technology, construction, estate management and valuation/land economics. There is a restriction regarding the number of books borrowed at the same time. In addition, Ardhi Institute has its own library with a good collection of books and reports on housing, building and planning, land surveying, architecture which may be consulted or borrowed provided prior arrangements are made with the librarian.

5.4 Travel:

Participants are expected to make their own travel arrangements to and from the course with their employers, who are to meet their travel costs. The Centre will not accept claims for the reimbursement of travel expenses. However, if they wish to be picked from a railway or bus station in Dar es Salaam, they should inform the Centre two weeks before their arrival. Upon arrival in Dar es Salaam each participant is required to make his/her own return travel arrangements at the end of the course.

5.5 Course accommodation

The course will be conducted in the Centre's classroom which is at the main building of the Centre for Housing Studies at Ardhi Institute.

5.6 Boarding and Lodging

Boarding and lodging expenses will directly be met by the Centre. Food, accommodation and bedsheets will be provided but participants are expected to bring their own towels, and toilet articles, such as toothpaste, razor-blades, bathing soap, perfumes etc. Participants will be accommodated in the CHS hostel at the Ardhi Institute Campus.

5.7 Allowances

All costs outside boarding and lodging which are not related to the course have to be met by the participants, under the existing regulations. All expenses related to social activities, such as smoking, drinks, outings, etc. shall be met by the participants themselves out of their own salaries. It is clearly emphasized that there will be no allowance paid outside boarding and lodging. And as social life is expensive in Dar es Salaam, participants are advised to make concrete arrangements to get their salaries in time from their employers.

NOTE: Employers are advised to supplement their employees attending this course with some allowances.

5.8 Public transport

All transport related to private matters, recreation, entertainment etc. is at the participants own costs and initiative. The Dar es Salaam City public transport service by UDA connects Ardhi Institute to Mkwenge, and from there another links Mkwenge with the old post office (posta) in the city centre. The cost is Shs. 6/= for a single or one way trip. The cost for a round trip to the City Centre by public transport from the Institute is T.Shs. 36/= the fare may be slightly higher if one uses the private "Dala Dala buses.

5.9 Date of arrival at the Institute

All participants should report to the Dean of Students' Office at the Ardhi Institute, or directly to the janitor of the Students Hostel. Reporting date is on 14th January or 15th January, 1989. At the latest for registration, briefing and the allocation of accommodation. Late comers will not be entertained.

5.10 Places of entertainment

The Dar es Salaam City Centre has several Tourist and Standard Hotels which can be visited on weekends. Such places include the famous Kilimanjaro, New African, Motel Agip, Twiga, Mawenzi etc. In addition there are a number of beach hotels situated along the Indian Ocean coast. They include Kijunduhi Beach Hotel, Bahari Beach Hotel, Silversands and the Africana Vacation Village, Anyone wishing to visit places at odd hours should be prepared to pay between 200/= - 400/= as transport charges by Taxi. However there are a number of medium cost

entertainment places (bars and disco-theques). The cost of these places is not only a great expense for beer and soft drinks but also between alcohol and

5.11. Fees. Current average prices for a full soft drink of 200 ml. Participants from Governmental institutions are expected to pay T.Shs. 8,000/- as tuition fees and those from governmental organisations T.Shs. 12,000/-.

course Participants employed in the private sector have to meet the full cost of the

5.12. Medical facilities

Ardhi Institute has a small good dispensary, which services the Institute's community including the participants of the Centre's courses.

5.13. Sports facilities

Ardhi Institute has a number of sports facilities amongst others for soccer and volleyball and several in-door games. Those who wish to participate in sports are advised to bring with them some additional private equipment and clothes. The Centre for Housing Studies has a limited number of sports wear for use by course participants.

5.14. Stationary and Equipment.

The Centre will provide all the stationary needed for the course, such as writing pads, pens, pencils, rubbers and rulers. Stationary for private use has to be purchased by the participants. Some of the equipment will be lent to the participants by the Centre; this may include T-squares, set-squares and drawing pens, etc.

If a participant is in possession of a calculator, it would be advisable to bring it with him/her for the exercises.

6.0 DATA TO BE COLLECTED BY THE PARTICIPANTS:

6.1 Upon arrival at the Centre each participant should hand in his/her professional briefing containing a description of:-

- 1) different water supply and low cost sanitation projects executed by his/her region, with an indication of people involved, whether contractors or individuals.
- 11) the contribution or part which his/her region/institution play in those projects

- iii) his/her work and responsibilities within this organisation:-
- description of daily activities and resources at your disposal
 - summary of the main obstacles and problems met in the work; mentioning those ones which you think or expect the course could help to solve.

You may clarify these points and others you consider relevant, by writing about one or two projects you have been dealing with recently.

- 6.2 Collect as well enough data on water supply and sanitation of your area because they can be very useful in exercises and discussions.

7. CAUTION MONEY

Upon arrival, each course participant is required to deposit the sum of T.Shs. 100/= as caution money to cover minor losses and damages of the Centre's and Institute's properties loaned to him/her or being used by the participant. The money is refundable to the participant at the end of the course when all the Centre's properties have been returned to the Centre safely and undamaged. Losses and damages of other properties of the Centre and Arzhi Institute will be dealt on and their value recovered from the participant on their merits.

8.0 ADMISSION REGULATION

8.1 Candidates

Candidates for admission in all the Centre's courses are chosen on the basis of the following criteria. (1) Education qualifications (2) Present position (3) Work experience (4) Command of the English Language (5) Candidate's government's or nominating agency's recommendations (6) Proof of sponsorship and (7) Age—normally between 25 and 45 years. When considering the present position of candidates for admission, important considerations are: level of responsibility, relevance of duties to course content, length of time in the position, probable future assignments, and likelihood of training others when the candidates return to his/her place of work.

ANNEX III

First Bench Mark Test

16th Course

Benchmark Test 1

Name:

Date:

- 1) What is Sanitation?
- 2) Explain what is meant by the water supply and sanitation decade.
- 3) Name the fields of environmental sanitation you know
- 4) What is the role of local government in the provision of sanitary facilities?
- 5) Name five types of human diseases related to the lack of sufficient and clean water supply and sanitation
- 6) What do you understand by appropriate sanitation technology?
- 7) a) What is meant by on-site sanitation?
b) Name the on-site options you know.
- 8) Mention several factors which can cause a failure of already built sanitary facilities.
- 9) What is the importance of having health education to the people?
- 10) What is solid waste?
- 11) Mention several methods used for final disposal of solid waste
- 12) Why is it important to manage the solid waste?
- 13) What is water supply?
- 14) Name the different methods of water supply you know?
- 15) Name water treatment methods you know!
- 16) How can the villagers obtain safe water locally?
- 17) Which factors in your perception do determine human health
- 18) Which elements should be included in a water supply project in order to ascertain a long term and effective operation.
- 19) Name sources of raw water; which of those require treatment before human consumption
- 20) Name domestic water uses you know and amounts required per capita per day.

..... B E S T W I S H E S

BENCH MARK TEST I

- 1) What is sanitation?
- 2) Why is excreta disposal necessary in any society?
- 3) Which types of excreta disposal systems do you know?
- 4) What do you understand by "the International Decade of Water supply and sanitation"?
- 5) Why is water essential for life?
- 6) Name the water - related diseases you know and their transmission routes.
- 7) Why is it important to treat drinking water?
- 8) Mention the treatment methods you know. Mention their advantages and disadvantages.

ANNEX IV

**Standard Reading List
24th Course**

READING LIST FOR
COURSES ON
LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES
DAR ES SALAAM, TANZANIA

All listed books are available in the Library of the Centre for Housing Studies, Dar es Salaam.

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3. R. Atman, Project Planning and Management, IHS-reader, 1980.
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7. Boot, M. (1984), Making the links: guidelines in health education in water supply and sanitation, IRC, The Hague.
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9. Clifton, R.H. (1974), Principle of planned maintenance, Edward Arnold, 230pp.
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31. Kilama (1978), Alternative Waste Disposal methods in Tanzania 1975-77, NSR
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33. M.Lindfield (1987), Integrated Urban Projects, Integrated Urban Development Seminar, May 1987, Bangkok, Thailand.
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35. H.Mengers (1988), The Aspects of Privatization of Basic Urban Infrastructure of Basic Urban Infrastructure, IHS.
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ANNEX V

Format Lecture Outline

LECTURE OUTLINE
FOR
COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	
NUMBER OF SESSIONS	:	
RESOURCE PERSONS/ORGAN.	:	
OBJECTIVES	:	
ACHIEVEMENTS	:	
TOPICS TO BE COVERED	:	
BACKGROUND LITERATURE	:	
HAND-OUTS	:	
EXERCISE MATERIAL	:	
AUDIO-VISUAL MATERIAL	:	
DISCUSSION TOPICS	:	

ANNEX VI

Lecture Outlines

LECTURE OUTLINE
FOR
COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	G-1 Political Economy of Water Supply and Sanitation.
NUMBER OF SESSIONS	:	1-2
RESOURCE PERSONS/ORGAN.	:	M.Zacharia/CHS
OBJECTIVES	:	To introduce the participants to the concepts of political economy in respect of WS and SAN, particular in a historical context.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - Definitions of WS and SAN. - What is the political context of WS and SAN? - Definitions of political economy. - Analysis of WS and SAN efforts in a historical context. - Conclusions.
ACHIEVEMENTS	:	To recall the basic concepts and meaning of WS and SAN in the context of political economy.
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - Lecture Notes M.Zacharia, 12/8/86. - Lesley Doyal, The Political Economy of Health, 1981, Pluto Press. - Gerhard and Tschannerl. Rural Water Supply in Tanzania. Is Politics or Technics in command?, 1979.
HAND-OUTS	:	Lecture Notes M.Zacharia, 12/8/86.
EXERCISE MATERIAL	:	
AUDIO-VISUAL MATERIAL	:	
DISCUSSION TOPICS	:	What is the implication of presented analysis for the present WS and SAN projects?

LECTURE OUTLINE
FOR
COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	: G-2 Integrated Urban Development
NUMBER OF SESSIONS	: 1-2
RESOURCE PERSONS/ORGAN.	: City Council, Dar-es-Salaam
OBJECTIVES	: To give a basic understanding of the concept and requirements of integrated urban planning and development.
TOPICS TO BE COVERED	: <ul style="list-style-type: none"> - concept of integrated urban development. - levels of i.u.d.: macro, meso and micro. - geographical i.u.d. - sectoral i.u.d. - legislative, organizational, financial and managerial implications of i.u.d.
ACHIEVEMENTS	: to reproduce the basic elements and requirements of integrated urban development.
BACKGROUND LITERATURE	: <ul style="list-style-type: none"> - M.Lindfield (1987), Integrated Urban Projects, Integrated Urban Development Seminar, May 1987, Bangkok, Thailand. - H.Suselo, A.Wegelin, The Integrated Urban Infrastructure Development Programme in Indonesia; Management and Coordination Issues in Implementation. - M.Jansen (1986), Towards Integrated Approaches, Lecture Notes ICHPB, IHS, Rotterdam.
HAND-OUTS	: Taken from literature.
EXERCISE MATERIAL	: Exercise p-2.
AUDIO-VISUAL MATERIAL	:
DISCUSSION TOPICS	: On what scale, and at what level is integrated urban development feasible in Tanzania?

LECTURE OUTLINE
FOR
COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	G-3 Storm- and Rainwater Drainage and Protection.
NUMBER OF SESSIONS	:	2
RESOURCE PERSONS/ORGAN.	:	Mr. Mbwette/University of DSM Mr. Kasenga/Ardhi Institute - PHE
OBJECTIVES	:	To give the principles of storm- and rainwater runoff and its design and implementation works.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - definition of storm- and rainwater drainage. - hydrology and runoff. - relation with WS and SAN. - calculation and design methods of drainage. - required civil works and construction. - Operation and maintenance, and community involvement.
ACHIEVEMENTS	:	To be able to plan and design drainage systems in broad outlines, and to identify the requirements of implementation and operation and maintenance.
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - WEDC (1986), Infrastructure Development Manual, Loughborough University. - Bandung Urban Development Program, Drainage Design Manual Bandung, Indonesia.
HAND-OUTS	:	Take from WEDC publication.
EXERCISE MATERIAL	:	Exercise g-2 and g-3.
AUDIO-VISUAL MATERIAL	:	
DISCUSSION TOPICS	:	What is the priority of drainage in comparison with water supply and sanitation or solid waste?

LECTURE OUTLINE
FOR
COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	: G-4 Solid Waste Management
NUMBER OF SESSIONS	: 2
RESOURCE PERSONS/ORGAN.	: Mrs. Chaggu/CHS Mr. Yhdego/ PHE - Ardhi Institute
OBJECTIVES	: To give an overview of the different aspects and stages of solid waste and its management.
TOPICS TO BE COVERED	: <ul style="list-style-type: none"> - definitions. - sources of waste. - health aspects of waste. - disposal at household and neighborhood level. - collection. - transportation and overhaul. - processing, sanitary landfill. - reuse/recycling/scavenging. - case studies.
ACHIEVEMENTS	: to reproduce the basic aspects and stages of solid waste management.
BACKGROUND LITERATURE	: <ul style="list-style-type: none"> - Cointreau (1982), Environmental Management of Urban Solid Waste in Developing Countries. - Flintoff (1984), Solid Waste Management in Developing Countries. - J.Versnel (1982), Scavenging and Solid Waste Management in Bandung, Indonesia.
HAND-OUTS	: Cointreau: chapter I-IV
EXERCISE MATERIAL	: Exercise g-4.
AUDIO-VISUAL MATERIAL	: Tabata Waste Dump Site (slides to be developed)

LECTURE OUTLINE CONTINUED:

DISCUSSION TOPICS	: How can solid waste at neighborhood level be made less hazardous? Is it desirable that scavenging is integrated in solid waste management? If yes, how can scavenging be integrated in the management of waste in a safe manner?
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LECTURE OUTLINE
FOR
COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	G-5 International Experiences in Sites and Service Projects.
NUMBER OF SESSIONS	:	2
RESOURCE PERSONS/ORGAN.	:	Mr. Magembe/CHS Mr. M.Zacharia/CHS
OBJECTIVES	:	To give an overview of the experiences in sites and service projects in other countries and in Tanzania, and to draw conclusions in respect of the relevance for Tanzanian circumstances.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - What is sites and service? - Levels of standards to be provided: plots and infrastructure. - Overview of some projects: India, Thailand, Zambia, Tanzania. - Draw conclusions in respect of Tanzanian conditions. - Discussion.
ACHIEVEMENTS	:	To be able to summarize the major features of sites and service projects that were presented and to give an opinion about its relevance for Tanzanian circumstances.
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - Swan, et al (1983), Management of Sites and Services Projects, IHS. - F.Davidson (1983), Urban Projects Manual. - Magembe: several papers in Library CHS.
HAND-OUTS	:	From literature.
EXERCISE MATERIAL	:	
AUDIO-VISUAL MATERIAL	:	Slides from different projects with Magembe.

LECTURE OUTLINE CONTINUED:

DISCUSSION TOPICS	:	Is sites and service an appropriate approach for Tanzania? What are the criteria for success?
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LECTURE OUTLINE
FOR
COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	: G-6 International Experiences in Slum Upgradation Projects.
NUMBER OF SESSIONS	: 2
RESOURCE PERSONS/ORGAN.	: Mr. Magembe / CHS Mr. M.Zacharia / CHS
OBJECTIVES	: To give an overview of experiences in upgrading projects in other countries (and in Tanzania), and to draw conclusions in respects of Tanzanian conditions.
TOPICS TO BE COVERED	: - What is upgrading? - Levels of upgrading: housing, plot lay-out. infrastructure. - Overview of some projects: Zambia, India, Thailand. - Draw conclusions in respect of Tanzanian circumstances.
ACHIEVEMENTS	: To be able to summarize the major features of the presented cases and to give an opinion about its relevance for Tanzanian conditions.
BACKGROUND LITERATURE	: - Project documents (Library). - Slum Upgrading Programme in Bombay and Slum Improvement Project in Visakhapatnam, India. - Tong Song Hong area, Bangkok. - Cika Payang, Bandung, Indonesia. - ESCAP (1984), Improvement of Slum and Squatter Areas: Infrastructure and Services.
HAND-OUTS	: - Lecture notes to be developed.
EXERCISE MATERIAL	:
AUDIO-VISUAL MATERIAL	: Slides from international projects.

LECTURE OUTLINE CONTINUED:

DISCUSSION TOPICS

:

How can be slum upgrading be an appropriate approach for Tanzania?
Is slum upgrading more preferable than sites and services?

LECTURE OUTLINE
FOR
COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	: G-7 Private Sector Involvement in the Provision of Infrastructure.
NUMBER OF SESSIONS	: 2
RESOURCE PERSONS/ORGAN.	: URP / Ardhi Institute
OBJECTIVES	: To give a basic understanding of the aspects of private sector involvement in the provision of Infrastructure.
TOPICS TO BE COVERED	: <ul style="list-style-type: none"> - What is the private sector? - What is "privatization" and "private sector involvement"? - Modes of involvement: semi-public enterprises, public-private partnership, private companies, vouchers, contracts, etc. - Policy considerations for private sector involvement. - Examples of private sector involvement.
ACHIEVEMENTS	: To be able to recall the basic aspects of private sector involvement in the provision of infrastructure.
BACKGROUND LITERATURE	: <ul style="list-style-type: none"> - Gabriel Roth (1987), The Private Provision of Public Services in Developing Countries, WB/EDI. - H.Mengers (1988), The Aspects of Privatization of Basic Urban Infrastructure of Basic Urban Infrastructure, IHS. - Savas (1979), Public versus Private Refuse Collection, Urban Analysis, Vol.6, pp 1-13.
HAND-OUTS	: Taken from literature.
EXERCISE MATERIAL	: Exercise g-5.
AUDIO-VISUAL MATERIAL	:

LECTURE OUTLINE CONTINUED:

DISCUSSION TOPICS	:	What are the criteria to involve the private sector in the provision of infrastructure in Tanzania?
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LECTURE OUTLINE
FOR
COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	G-8 Report writing and data presentation.
NUMBER OF SESSIONS	:	1-2
RESOURCE PERSONS/ORGAN.	:	Mrs. Chaggu / CHS
OBJECTIVES	:	To introduce the participants to the principles of proper report writing and data presentation in reports.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - What is a good report? - What are its contents and lay-out. - What are the rules of writing a report? - Data: what data to present and how? - Reader-oriented writing and presentation.
ACHIEVEMENTS	:	To be able to recall the principles of good report writing and data presentation.
BACKGROUND LITERATURE	:	IHS, Guidelines for the report writing and data presentation.
HAND-OUTS	:	Checklist (to be developed)
EXERCISE MATERIAL	:	E.g.: Develop a report outline for a report on Operation and Maintenance of a village piped water supply system.
AUDIO-VISUAL MATERIAL	:	
DISCUSSION TOPICS	:	To your experience what is the best way to write a report?

LECTURE OUTLINE
FOR
COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	G-9 Standards for Infrastructure Design.
NUMBER OF SESSIONS	:	1
RESOURCE PERSONS/ORGAN.	:	URP / Ardhi Institute Mrs. Chaggu / CHS
OBJECTIVES	:	To elaborate the setting of standards for infrastructure design, and to discuss the appropriateness of standards in Tanzania.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - What are standards? - Criteria and objectives of standards. - Rigid versus flexible standards. - Bodies of regulation and enforcement. - Various standards applied in different countries. - Appropriate standards for Tanzania; discussion.
ACHIEVEMENTS	:	To be able to define what are appropriate infrastructure standards.
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - UNCHS (1982), Appropriate Infrastructure Services and Standards. - UNESCAP (1979), Guidelines for Human Settlement Standards. - R.Gakenheimer and C.Brande, Infrastructure building: breaking the standards stalemate, Open House International, Vol.11, No.2, 1986, pp. 54-57. J.Kirke, The provision of infrastructure and utility services, in Low-Income Housing in the Developing World, Edit. by G.K.Payne, Chapter 15, pp. 233-248.
HAND-OUTS	:	Article Gakenheimer and C. Brande or J.Kirke
EXERCISE MATERIAL	:	

LECTURE OUTLINE CONTINUED:

AUDIO-VISUAL MATERIAL :

DISCUSSION TOPICS :

What are appropriate infrastructure standards for Tanzania?

LECTURE OUTLINE
FOR
COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	G-10 Introduction to the Library.
NUMBER OF SESSIONS	:	1
RESOURCE PERSONS/ORGAN.	:	Mrs. Mary Mbogo / CHS
OBJECTIVES	:	To introduce the participants to the content of the library and the use of reference and catalogue systems.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - Purpose of the library; Ardhi Library. - the contents of the CHS Library. - Location system of books, journals, articles, etc. - Reference and catalogue systems; how to use it. - demonstration searching for literature.
ACHIEVEMENTS	:	To be able to find literature about a specific topic in the library through its reference and catalogue systems.
BACKGROUND LITERATURE	:	
HAND-OUTS	:	
EXERCISE MATERIAL	:	E.g. to identify publications on solid waste management or village water supply.
AUDIO-VISUAL MATERIAL	:	
DISCUSSION TOPICS	:	

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CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	W-1 Tanzanian Water Law
NUMBER OF SESSIONS	:	4-5
RESOURCE PERSONS/ORGAN.	:	Mr. Ringo / University DSM
OBJECTIVES	:	To provide an introduction to the meaning and existence of laws in Tanzania in respect of water supply.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - Land acquisition procedures - Water Law in Tanzania - Implications of law for WS and SAN projects
ACHIEVEMENTS	:	To be able to recall the basic facts about water law in Tanzania.
BACKGROUND LITERATURE	:	- Water Utilization Act, 1974
HAND-OUTS	:	Lecture notes to be developed.
EXERCISE MATERIAL	:	
AUDIO-VISUAL MATERIAL	:	
DISCUSSION TOPICS	:	

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ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	: W-2 Tanzanian Water Policies
NUMBER OF SESSIONS	: 2
RESOURCE PERSONS/ORGAN.	: Mr. Rutashobya / Project Preparation Section Ubungu Water Section
OBJECTIVES	: To provide a introduction to the governments water policies and its implications for water supply programmes.
TOPICS TO BE COVERED	: - Historical background of water supply in Tanzania. - Tanzanian water policy versus the International Decade in Water Supply and Sanitation. - Implementation of programmes. - Integration of several departments - Supporting health education programmes.
ACHIEVEMENTS	: To be able to recall the basic facts about Tanzanian water policies.
BACKGROUND LITERATURE	: - Tanzanian Water Policy (1988), Ministry of Water (forthcoming).
HAND-OUTS	: Tanzanian Water Policy proposal by the Ministry of Water, 1988.
EXERCISE MATERIAL	:
AUDIO-VISUAL MATERIAL	:
DISCUSSION TOPICS	:

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ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	: W-3 International Decade on Water Supply and Sanitation 1980-1990
NUMBER OF SESSIONS	: 1
RESOURCE PERSONS/ORGAN.	: Mr. Njau / Min. of Water - Sanitation Section
OBJECTIVES	: To provide an introduction to the objectives and achievements of the IDWSS and how it tallies with the Tanzanian water policies and efforts in this field.
TOPICS TO BE COVERED	: <ul style="list-style-type: none"> - Background of IDWSS. - Why IDWSS? - Its achievements. - Its implementation in Tanzania. - The aftermath and future of the IDWSS.
ACHIEVEMENTS	: To be able to recall the basic objectives of the IDWSS and its achievements in Tanzania.
BACKGROUND LITERATURE	: <ul style="list-style-type: none"> - World Bank (1976), Village Water Supply, Washington. - Urban Edge magazines - UNCHS publications - WHO (1981), Sanitation for All.
HAND-OUTS	: Taken from the literature.
EXERCISE MATERIAL	: WB module on Decision-makers information. Visual learning kit.
AUDIO-VISUAL MATERIAL	: WB module on Decision-makers information.
DISCUSSION TOPICS	: Why is it important to deal with IDWSS?

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CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	: W-4 Hydrological Cycle
NUMBER OF SESSIONS	: 1
RESOURCE PERSONS/ORGAN.	: Mr. Rutashobya / Maji - Ubungo
OBJECTIVES	: To provide an introduction to the basic principles of the hydrological cycle.
TOPICS TO BE COVERED	: <ul style="list-style-type: none"> - energy sources of the cycle; gravity and sun; - different stages of water cycle. - water movement in air, water and soil. - water and climate regulation. - role of vegetation. - evaporation and transpiration. - storage of water and captivity - geological transformation and processes. - water and ecological issues.
ACHIEVEMENTS	: To be able to recall the basic facts about the hydrological cycle.
BACKGROUND LITERATURE	: - IRC (1983), Small Community Water Supplies, The Hague.
HAND-OUTS	: Sketch of the hydrological cycle (see IRC-publication)
EXERCISE MATERIAL	:
AUDIO-VISUAL MATERIAL	:
DISCUSSION TOPICS	: What role does water play in our biosphere?

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CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	W-5 Properties of water.
NUMBER OF SESSIONS	:	1
RESOURCE PERSONS/ORGAN.	:	
OBJECTIVES	:	To provide the basic fact about the physical, chemical and biological properties of water.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - Chemical composition of water, and its capability to react to other chemical compositions, acidity, etc. - Physical properties of water. - Biological properties.
ACHIEVEMENTS	:	To be able to recall the physical, chemical and biological properties of water.
BACKGROUND LITERATURE	:	
HAND-OUTS	:	
EXERCISE MATERIAL	:	
AUDIO-VISUAL MATERIAL	:	
DISCUSSION TOPICS	:	

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CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	: W-6 Water and health.
NUMBER OF SESSIONS	: 3
RESOURCE PERSONS/ORGAN.	: Mrs. Chaggu / CHS
OBJECTIVES	: To provide an introduction to the role of water in the transmission of diseases.
TOPICS TO BE COVERED	: <ul style="list-style-type: none"> - What is health? - What is a disease? - Water related diseases. - Control possibilities. - Public health education.
ACHIEVEMENTS	: To be able to recall the basics of the relationship between health and diseases, and their possible control measures.
BACKGROUND LITERATURE	: <ul style="list-style-type: none"> - Tebbutt, T.H.Y. (1983), Water Quality Control, Pergamon Press. - Cairncross, S, R.G.Feachem (1983), Environmental Health Engineering in the Tropics, John Wiley & Sons. - IRC (1983), Small Community Water Supplies, the Hague.
HAND-OUTS	: Case material on health programmes.
EXERCISE MATERIAL	: E.g., to present a cycle of water-related disease and to determine the possible control measures.
AUDIO-VISUAL MATERIAL	: <ul style="list-style-type: none"> - Film "Prescription for Health", IDRC. - World Bank Modules 3.1.
DISCUSSION TOPICS	: How realistic are the phenomenon shown in the film, and how could such a film be used in health education?

L E C T U R E O U T L I N E
 FOR
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CENTRE FOR HOUSING STUDIES

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DAR ES SALAAM, TANZANIA

SUBJECT	:	W-7 Water Consumption Needs.
NUMBER OF SESSIONS	:	1
RESOURCE PERSONS/ORGAN.	:	Mrs. Chaggu / CHS
OBJECTIVES	:	To provide an introduction in the various consumers of water, their activities and water demands, and the implications for the design and planning of Water Supply schemes.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - Functions of water in human life. - Variation in consumption, social and religious factors, ethnic factors and taste preferences. - Accessibility and consumption. - Present and extrapolated consumption. - Water quality and quantity. - Implication for the design of water supply systems.
ACHIEVEMENTS	:	To be able to distinguish the different consumers of water, their consumption pattern and volume, and to indicate the implication for the design of water supply systems.
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - IRC (1983), Small Community Water Supplies, the Hague, the Netherlands. - Ross University (1978), Water Supplies.
HAND-OUTS	:	Lecture notes with overview of consumption.
EXERCISE MATERIAL	:	E.g., estimation for future water consumption.
AUDIO-VISUAL MATERIAL	:	
DISCUSSION TOPICS	:	

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DAR ES SALAAM, TANZANIA

SUBJECT	: W-8 Sources of water supply.
NUMBER OF SESSIONS	: 1
RESOURCE PERSONS/ORGAN.	: Mr. Rutashobya / Maji - Ubungo.
OBJECTIVES	: To elaborate the features of existing water sources, their appropriateness against the criteria for a sound and reliable water source for different human needs.
TOPICS TO BE COVERED	: <ul style="list-style-type: none"> - Criteria for a good water source. - Potential water sources and their catchment. - Village and city level water demand. - Standards for construction. - Deep wells, catchments, handpumps. - Operation and maintenance of water sources.
ACHIEVEMENTS	: To be able to recall the features of existing water sources and their appropriateness for water supply systems.
BACKGROUND LITERATURE	: <ul style="list-style-type: none"> - UNCHS (1984), A review of Technologies for the Provision of Basic Infrastructure in Low-income settlements, Nairobi. - World Bank Handbook module 4.1, 4.2.
HAND-OUTS	: Taken from literature.
EXERCISE MATERIAL	: See World Bank module 4.1, 4.2.
AUDIO-VISUAL MATERIAL	: World Bank slides, Modules 4.1 and 4.2.
DISCUSSION TOPICS	: Why is it important to explore different water sources before selecting one?

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CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	W-9 Water Collection Methods and Construction.
NUMBER OF SESSIONS	:	1-2
RESOURCE PERSONS/ORGAN.	:	Mr. Mbwette / University of DSM, Engineering Fac.
OBJECTIVES	:	To give an overview of the technologies of water collection and its construction implications.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - Criteria for a safe water source. - Construction criteria for water supply. - Types of sources; surface, shallow, deep. - Construction methods and requirements at different scales: village to urban networks.
ACHIEVEMENTS	:	To be able to recall the basic water collection technologies and their construction requirements.
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - White (1978), Drawers of water; domestic water use in East Africa. - Huisman (1983), Small Community Water Supplies; Technology of Small Water Supply Systems in Developing Countries, IRC, Techn. Paper No. 18, the Hague. - Okun, E. (), Community Water Supply Systems in Developing Countries: A Planning Manual, World Bank Technical Paper No. 60.
HAND-OUTS	:	Taken from literature.
EXERCISE MATERIAL	:	
AUDIO-VISUAL MATERIAL	:	World Bank Modules 4.2.
DISCUSSION TOPICS	:	What Collection Methods are acceptable for rural and urban environments?

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DAR ES SALAAM, TANZANIA

SUBJECT	: W-10 Wells and Handpumps.
NUMBER OF SESSIONS	: 1-2
RESOURCE PERSONS/ORGAN.	: Handpumps Suppliers, Morogoro.
OBJECTIVES	: To provide an overview of the different types of wells and handpumps, their construction and Operation and Maintenance requirements.
TOPICS TO BE COVERED	: <ul style="list-style-type: none"> - Manually drilled and dug wells. - Mechanical drilled/dug wells. - Shallow/deep wells. - Well construction and materials. - Handpumps: types and operation. - Public tapstand lay-out and construction. - Cost comparison. - Operation and maintenance requirements.
ACHIEVEMENTS	: To be able to recall the different wells and handpumps technologies and their requirements.
BACKGROUND LITERATURE	: <ul style="list-style-type: none"> - World Bank Handbook Module 4.2. - Pacey (1978), Handpump maintenance. - Watt, et al (1977), Hand dug wells.. - Development Cooperation Information Department (1978), Shallow wells. - S.Sharp, et al (1982), Village Handpump Technology.
HAND-OUTS	: Taken from literature.
EXERCISE MATERIAL	: See WB-Module 4.2
AUDIO-VISUAL MATERIAL	: WB Slides Module 4.2
DISCUSSION TOPICS	: What technologies are acceptable and adequate in rural, peri-urban and urban areas?

LECTURE OUTLINE
FOR
COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	W-11 Rainwater Roof Catchment Systems.
NUMBER OF SESSIONS	:	1-2
RESOURCE PERSONS/ORGAN.	:	PHE / Ardhi Institute.
OBJECTIVES	:	To provide an overview of the technologies of rainwater catchment, its construction and operation and maintenance requirements.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - Features of rainwater catchments - Hydrological requirements and estimations - Construction and materials. - Operation and maintenance, treatment of water. - International experiences and research.
ACHIEVEMENTS	:	To be able to recall the different rainwater catchment systems and their requirements.
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - World Bank Handbook Module 4.1. - ITDG Ltd. (1969), The introduction of rainwater catchment tanks and micro-irrigation to Botswana.
HAND-OUTS	:	Taken from literature.
EXERCISE MATERIAL	:	See WB Module Handbook 4.1.
AUDIO-VISUAL MATERIAL	:	WB Slides Module 4.1
DISCUSSION TOPICS	:	Is rainwater catchment an appropriate system for Tanzania? Under what conditions?

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DAR ES SALAAM, TANZANIA

SUBJECT	:	W-12 Water Storage
NUMBER OF SESSIONS	:	1
RESOURCE PERSONS/ORGAN.	:	Dr. Mashauri / University of DSM, Faculty of Engineering
OBJECTIVES	:	To give an understanding of the various water storage options: sizes, construction, different purposes, Operation and maintenance requirements.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - Rationale of water storage. - Purpose of water storage: domestic, communities and cities. - Estimation methods. - Designs. - Construction and operation and maintenance.
ACHIEVEMENTS	:	To be able to reproduce the basic engineering principles of water storage.
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - White (1978), Drawers of water; domestic water use in Eastern Africa. - Huisman (1983), Small Water Supplies; Technologies of Small Water Supply Schemes in Developing Countries, IRC Technical Paper No. 18, The Hague.
HAND-OUTS	:	Take from literature.
EXERCISE MATERIAL	:	In combination with other lectures Exercises w-1 and w-2.
AUDIO-VISUAL MATERIAL	:	
DISCUSSION TOPICS	:	What storage options are environmentally safe in rural Tanzania?

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DAR ES SALAAM, TANZANIA

SUBJECT	:	W-13 Principles of Water Treatment.
NUMBER OF SESSIONS	:	1
RESOURCE PERSONS/ORGAN.	:	Dr. Mashauri / Univ. of DSM - Engineering Fac.
OBJECTIVES	:	To provide the criteria and principles of water treatment, and to introduce the available options.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - When is treatment required? - Criteria and principles of treatment. - Technologies overview: materials, chemicals, skills, operation and maintenance, costs, risks and research. - Appropriate treatment for small to large systems.
ACHIEVEMENTS	:	To be able to recall the basic criteria, principles and options of water treatment.
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - Huisman (1983), Small Community Water Supplies; Technologies of Small Water Supply Schemes, IRC Technical Paper No.18, The Hague. - Mann, et al (1979), Water Treatment and Sanitation, London.
HAND-OUTS	:	Take from literature.
EXERCISE MATERIAL	:	
AUDIO-VISUAL MATERIAL	:	
DISCUSSION TOPICS	:	What kind of treatment is feasible in urban and rural conditions in Tanzania?

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DAR ES SALAAM, TANZANIA

SUBJECT	: W-14 Slow and Rapid Sand Filtration.
NUMBER OF SESSIONS	: 2-3
RESOURCE PERSONS/ORGAN.	: Dr. Mashauri / Univ. of DSM - Engineering Facul.
OBJECTIVES	: To provide an introduction into the principles, technologies and operational implications of slow and rapid filtration.
TOPICS TO BE COVERED	: <ul style="list-style-type: none"> - Necessity and criteria of sand filtration. - Principles of SSF and RSF: selection criteria. - Technologies and construction of SSF and RSF. - Operational implications, including maintenance requirements.
ACHIEVEMENTS	: To be able to recall the basic features and operational implications of slow and rapid sand filtration.
BACKGROUND LITERATURE	: <ul style="list-style-type: none"> - Dijk, et al (1978), Slow sand filtration for Community Water Supply in developing countries, IRC, The Hague. - Mann (1973), Water treatment and sanitation: simple methods for rural areas, London. - Huisman (1983), Small Community Water Supplies, IRC Technical Paper No.18, The Hague
HAND-OUTS	: Take from literature.
EXERCISE MATERIAL	: Compare SSF and RSF. Design of SSF.
AUDIO-VISUAL MATERIAL	: Slides Module 4.5a World Bank
DISCUSSION TOPICS	: What are the advantages and disadvantages of SSF and RSF? Are they applicable in rural and urban Tanzania?

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DAR ES SALAAM, TANZANIA

SUBJECT	:	W-15 Gravity Flow Systems
NUMBER OF SESSIONS	:	1
RESOURCE PERSONS/ORGAN.	:	Dr. Mashauri / Univ. of DSM - Engineering Facul.
OBJECTIVES	:	To provide an introduction to the features of gravity-flow systems: Design, lay-out, operation and maintenance.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - What are gravity-flow systems? - When gravity-flow systems? - Main components of gravity-flow systems. - Requirements of data, skills, labour and materials. - Design calculations. - Implementation; potential role of communities. - Operation and maintenance: quality monitoring.
ACHIEVEMENTS	:	To be able to reproduce the basic features of gravity-flow systems.
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - World Bank Handbook Modules 4.3a,b. - UNICEF: Village Water Supply Manual, Nepal.
HAND-OUTS	:	Take from WB Modules 4.3 a and b.
EXERCISE MATERIAL	:	Exercise w-2. See also WB module Handbook 4.3.
AUDIO-VISUAL MATERIAL	:	WB Slides Modules 4.3a, b and c.
DISCUSSION TOPICS	:	Use Coordinators Instruction Sheet WB Module 4.3.

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DAR ES SALAAM, TANZANIA

SUBJECT	:	W-16 Community Water Supply Systems.
NUMBER OF SESSIONS	:	2
RESOURCE PERSONS/ORGAN.	:	University of DSM - Faculty of Engineering.
OBJECTIVES	:	To provide an introduction into the piped community water supply systems: design, planning, construction, operation and maintenance.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - Overview of the components of piped water supply. - Piped water supply; design and planning. - Material and labour requirements. - Project execution. - Operation and maintenance. - Community Involvement.
ACHIEVEMENTS	:	To be able to recall the basics of piped community water supply.
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - Handbook World Bank Module 4.4. - Huisman (1983), Small Community Water Supplies, WHO, 1981. - Okun (1986), Community piped water supplies in developing countries, World Bank technical Paper No. 60.
HAND-OUTS	:	Take from literature.
EXERCISE MATERIAL	:	Exercise w-1.
AUDIO-VISUAL MATERIAL	:	World Bank Module slides 4.4
DISCUSSION TOPICS	:	What level of water supply is recommendable at individual and community level?

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DAR ES SALAAM, TANZANIA

SUBJECT	:	W-17 Organization and Management of Public Water Works.
NUMBER OF SESSIONS	:	1
RESOURCE PERSONS/ORGAN.	:	Maji - Ubungo, DSM.
OBJECTIVES	:	To provide an introduction to the organizational and managerial requirements of public water works in urban centres.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - Description of urban water supply systems (DSM) - Organizational and managerial objectives and tasks. - Bodies and departments to cover these tasks. - Equipment and manpower requirements. - Difficulties and constraints to execute tasks.
ACHIEVEMENTS	:	To be able to recall the basic organizational and managerial requirements of public water works in urban areas.
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - World Bank, Monitoring and Evaluating Urban Development Programs, 1986. - R. Atman, Project Planning and Management, IHS-reader, 1980.
HAND-OUTS	:	Take from literature.
EXERCISE MATERIAL	:	
AUDIO-VISUAL MATERIAL	:	
DISCUSSION TOPICS	:	What are the strong and weak points of the presented urban public water works organization?

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DAR ES SALAAM, TANZANIA

SUBJECT	:	W-18 International Water Supply Experiences.
NUMBER OF SESSIONS	:	1
RESOURCE PERSONS/ORGAN.	:	Mr. Njau / Ministry of Water - Sanitation Section
OBJECTIVES	:	To present water supply projects executed in other countries and to discuss the relevance of these experiences for Tanzanian conditions.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - Technical features of several projects - Implementing agencies. - Financial and other assistance. - Costs, recovery and revenue collection. - Community involvement. - Operation and maintenance. - Discussion about relevance experiences for Tanzania.
ACHIEVEMENTS	:	To be able to recall the main facts of presented projects and to formulate an opinion about the relevance of these experiences for Tanzania?
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - World Bank Handbook Modules 4.1c, 4.2d, 4.3c and 6.1b. - ITDG Ltd (1969), Introduction of rainwater catchment tanks and micro-irrigation to Botswana. - White (1978), Drawers of water. - Elong (1972), Water problems at Douala-Younde, University of Cameroon.
HAND-OUTS	:	Lecture note to be developed.
AUDIO-VISUAL MATERIAL	:	World Bank slides modules 4.1c, 4.2d, 4.3c and 6.1d.
DISCUSSION TOPICS	:	What is the relevance of these experiences for Tanzanian urban and rural water supply projects.

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DAR ES SALAAM, TANZANIA

SUBJECT	: S-1 Sources of (human) waste water.
NUMBER OF SESSIONS	: 1-2
RESOURCE PERSONS/ORGAN.	: Mr. L.G. Msimbe / University of DSM Mr. Michael / Ardhi Institute
OBJECTIVES	: To provide an introduction to the different source of (human) waste water, their production processes, their bacteriological and chemical composition, and their environmental hazards
TOPICS TO BE COVERED	: - What is waste water? - When is waste water an environmental hazard? - Sources of waste water: domestic, commercial, industrial, institutional, hospitals, etc. - Their physical, chemical and bacteriological composition and environmental risks. - Case material (e.g. DSM).
ACHIEVEMENTS	: To be able to identify the different sources of waste water and their main features.
BACKGROUND LITERATURE	: - Arceivala (1981), Waste Water treatment and Disposal. - Fair, et al (1968), Water and Waste Water Engineering, Vol. 1 and 2. - Msimbe, Handout 16th Course.
HAND-OUTS	: Take from literature.
EXERCISE MATERIAL	:
AUDIO-VISUAL MATERIAL	:
DISCUSSION TOPICS	: At what level of government can the different sources of waste water be controlled best?

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DAR ES SALAAM, TANZANIA

SUBJECT	: S-2 Introduction to Sanitation Systems.
NUMBER OF SESSIONS	: 1-2
RESOURCE PERSONS/ORGAN.	: Mr. Baradyana / Building Research Unit, DSM
OBJECTIVES	: To provide an introduction to the importance, development and possibilities of sanitation systems.
TOPICS TO BE COVERED	: <ul style="list-style-type: none"> - The history of sanitation. - Development of rural to urban sanitation. - The importance of sanitation in human settlements. - Criteria of safe sanitation systems. - Small and large sanitation systems. - Main components of sanitation systems. - Affordability Manageability of sanitation systems.
ACHIEVEMENTS	: To be able to recall the importance, development and possibilities of sanitation systems.
BACKGROUND LITERATURE	: <ul style="list-style-type: none"> - WEDC Hand-outs 16th Course. - C.Nimpuno (1973), Sewage Disposal in Developing Countries, IHS, Rotterdam. - Arceivala, S.J. (1981), Waste Water Treatment Disposal.
HAND-OUTS	: - WEDC Handouts 16th Course.
EXERCISE MATERIAL	: Exercise s-2.
AUDIO-VISUAL MATERIAL	: Is sanitation without water recommendable?
DISCUSSION TOPICS	:

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DAR ES SALAAM, TANZANIA

SUBJECT	: S-3 Introduction to Low-cost Sanitation Systems.
NUMBER OF SESSIONS	: 2
RESOURCE PERSONS/ORGAN.	: Mr. Magembe / CHS
OBJECTIVES	: To provide an introduction to the available low-cost sanitation technologies and their applicability in Tanzania.
TOPICS TO BE COVERED	: <ul style="list-style-type: none"> - What is low-cost sanitation; criteria? - Overview of the different options. - Applicability and requirements. - Designs and construction. - Operation and maintenance. - Community response and involvement. - Discussion about appropriateness of options.
ACHIEVEMENTS	: To be able to summarize the basic of low-cost sanitation options.
BACKGROUND LITERATURE	: <ul style="list-style-type: none"> - Kalbermattan, Appropriate Sanitation Alternatives; A Planning and design Manual. - UNCHS (1986), A Review of technologies for basic infrastructure in low-income human settlements. - World Bank handbook module 5.1.
HAND-OUTS	: Take from literature.
EXERCISE MATERIAL	: Exercises s-1, s-2 and s-3.
AUDIO-VISUAL MATERIAL	: Slide-sound show World Bank module 5.1.
DISCUSSION TOPICS	: What is an appropriate low-cost sanitation technology for Tanzania?

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CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	: S-4 Conventional Sanitation
NUMBER OF SESSIONS	: 1-2
RESOURCE PERSONS/ORGAN.	: Mr. Msimbe / University of DSM
OBJECTIVES	: To provide an introduction to conventional sanitation systems and their features.
TOPICS TO BE COVERED	: <ul style="list-style-type: none"> - What are conventional sanitation systems? - Conventional sewerage. - Septic tanks. - Treatment systems: stabilization ponds, aerated lagoons, filters, activated sludge, etc. - discussion about appropriateness of different systems in Tanzania.
ACHIEVEMENTS	: To be able to recall the basic features of conventional sanitation
BACKGROUND LITERATURE	: <ul style="list-style-type: none"> - WEDC Handouts 16th Course. - Fair/Geyer/Okun, et al (1968), Water and Waste Water Engineering, Volume 1 and 2. - Steel, E, T.J.McGhee (1979), Water Supply and Sewerage. - S.J.Arceivala (1981), Waste Water Treatment and Disposal.
HAND-OUTS	: WEDC Handouts 16th Course.
EXERCISE MATERIAL	: In combination with other lectures Exercise s-4.
AUDIO-VISUAL MATERIAL	: Slide-sound show World Bank modules 5.2c, 5.4a, b.
DISCUSSION TOPICS	: When and where are conventional sanitation systems appropriate?

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DAR ES SALAAM, TANZANIA

SUBJECT	: S-5 Sewerage Systems.
NUMBER OF SESSIONS	: 1
RESOURCE PERSONS/ORGAN.	: Mr. Msimbe / University of DSM
OBJECTIVES	: To provide an introduction to conventional sewerage systems and their features.
TOPICS TO BE COVERED	: <ul style="list-style-type: none"> - What are conventional sewerage systems? - What are their requirements: water, skills, designs, operation and maintenance, costs. - Engineering aspects. - Operation and maintenance. - discussion about appropriateness of different systems in Tanzania.
ACHIEVEMENTS	: To be able to recall the basic features of conventional sewerage.
BACKGROUND LITERATURE	: <ul style="list-style-type: none"> - WB Handbook module 5.2c. - Fair/Geyer/Okun, et al (1968), Water and Waste Water Engineering, Volume 1 and 2. - Steel, E, T.J.McGhee (1979), Water Supply and Sewerage. - S.J.Arceivala (1981), Waste Water Treatment and Disposal.
HAND-OUTS	: Take from literature.
EXERCISE MATERIAL	: In combination with other lectures Exercise s-4.
AUDIO-VISUAL MATERIAL	: Slide-sound show World Bank modules 5.2c.
DISCUSSION TOPICS	: When and where are conventional sewerage systems appropriate?

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DAR ES SALAAM, TANZANIA

SUBJECT	: S-6 Small Bore Sewerage.
NUMBER OF SESSIONS	: 1
RESOURCE PERSONS/ORGAN.	: Mr. Msimbe / University of DSM
OBJECTIVES	: To provide an introduction to the water-borne sanitation technology of small bore sewerage.
TOPICS TO BE COVERED	: <ul style="list-style-type: none"> - What is small bore sewerage? - What are their requirements: water, skills, designs, operation and maintenance, costs. - Engineering aspects. - Operation and maintenance. - discussion about appropriateness in Tanzania.
ACHIEVEMENTS	: To be able to recall the basic features of small bore sewerage.
BACKGROUND LITERATURE	: - WB Handbook module 5.2b.
HAND-OUTS	: Take from literature.
EXERCISE MATERIAL	: In combination with other lectures Exercise s-4.
AUDIO-VISUAL MATERIAL	: Slide-sound show World Bank modules 5.2b.
DISCUSSION TOPICS	: When and where can small bore sewerage systems be appropriate in Tanzania?

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DAR ES SALAAM, TANZANIA

SUBJECT	: S-7 Oxidation and Stabilization Ponds
NUMBER OF SESSIONS	: 2-3
RESOURCE PERSONS/ORGAN.	: Mr. Mayo / University of DSM
OBJECTIVES	: To provide an introduction to main features of oxidation and stabilization as a waste water treatment system.
TOPICS TO BE COVERED	: <ul style="list-style-type: none"> - What are oxidation and stabilization ponds? - Applicability and constraints; waste water properties, skills, designs, operation and maintenance, costs. - Engineering aspects. - Biological, chemical and physical processes. - Operation and maintenance. - discussion about appropriateness of oxidation and stabilization ponds in Tanzania.
ACHIEVEMENTS	: To be able to recall the basic features of oxidation and stabilization ponds.
BACKGROUND LITERATURE	: <ul style="list-style-type: none"> - WB Handbook module 5.4. - Fair/Geyer/Okun, et al (1968), Water and Waste Water Engineering, Volume 1 and 2. - S.J.Arceivala (1981), Waste Water Treatment and Disposal.
HAND-OUTS	: Take from literature.
EXERCISE MATERIAL	: E.g. What parameters governs the choice of sanitation technology?
AUDIO-VISUAL MATERIAL	: Slide-sound show World Bank modules 5.4.
DISCUSSION TOPICS	: When and where are oxidation and stabilization ponds appropriate in Tanzania?

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DAR ES SALAAM, TANZANIA

SUBJECT	: S-8 Introduction to Low-cost Sanitation Planning in Sites and Service Projects.
NUMBER OF SESSIONS	: 2
RESOURCE PERSONS/ORGAN.	: Mr. Magembe / CHS
OBJECTIVES	: To provide an introduction to the available low-cost sanitation technologies that are applicable in sites and service projects in Tanzania.
TOPICS TO BE COVERED	: <ul style="list-style-type: none"> - What are sites and service projects? - What are low-cost sanitation options in S&S projects; criteria? - Applicability and requirements; "low-cost" for who? - Planning, designs and construction. - Community response and involvement. - Discussion about appropriateness of options.
ACHIEVEMENTS	: To be able to summarize the basic criteria and options of applying low-cost sanitation in sites and service projects.
BACKGROUND LITERATURE	: <ul style="list-style-type: none"> - Kalbermattan (1982), Appropriate Sanitation Alternatives; A Planning and design Manual. - UNCHS (1986), A Review of technologies for basic infrastructure in low-income human settlements. - World Bank handbook module 5.1.
HAND-OUTS	: Take from literature.
EXERCISE MATERIAL	: Exercises s-1 and s-3.
AUDIO-VISUAL MATERIAL	: Slide-sound show World Bank module 5.1.
DISCUSSION TOPICS	: What is an appropriate low-cost sanitation in Sites and Service projects in Tanzania?

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DAR ES SALAAM, TANZANIA

SUBJECT	: S-9 Planning and construction of Ventilated Improved Pit Latrines (VIP)
NUMBER OF SESSIONS	: 1
RESOURCE PERSONS/ORGAN.	: Mr. Baradyana / Building Research Unit. Mrs. Chaggu / CHS
OBJECTIVES	: To provide an introduction to planning and construction of VIPs, as part of the preparation for field visits and field exercises.
TOPICS TO BE COVERED	: - History of VIP and VIP programmes in Tanzania. - Construction planning, engineering aspects and construction costs, Operation and maintenance. - Examples of VIPs in Tanzania. - discussion about appropriateness of VIPs in Tanzania.
ACHIEVEMENTS	: To be able to recall the basic features of planning and construction of VIPs.
BACKGROUND LITERATURE	: - Nimpuno, K. (1981) et al, Seminar on Low-cost sanitation, July 1981, Bangkok. - Kalbermattan, et al (1982), Appropriate Sanitation Alternatives; A Planning and Design Manual, World Bank Technical Paper no.60. - Hoffman, L.F., et al (1981), On-site Low-cost Sanitation Options, IRC, The Hague.
HAND-OUTS	: Take from literature. D.M.Tam, Improved versions of pit latrine (1984).
EXERCISE MATERIAL	: E.g., design a VIP for a school campus of 1000 pupils.
AUDIO-VISUAL MATERIAL	: Slide-sound show World Bank modules 5.1.
DISCUSSION TOPICS	: How and where are VIPs appropriate in Tanzania?

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SUBJECT	: S-10 Financial Aspects of Sanitation.
NUMBER OF SESSIONS	: 1
RESOURCE PERSONS/ORGAN.	: Mr. Msimbe / University of DSM
OBJECTIVES	: To provide an insight in the financial implications of sanitation system in regard of investment and running costs.
TOPICS TO BE COVERED	: <ul style="list-style-type: none"> - What costs are to be considered? - Features of investment and running costs. - How to obtain the required data, and how to make an adequate comparison? - Who is th charged for what? - Cost recovery and revenue collection. - Discussion about user charges and affordability.
ACHIEVEMENTS	: To be able to summarize the basic financial implications of different sanitation systems.
BACKGROUND LITERATURE	: <ul style="list-style-type: none"> - UNCHS (1986), A Review of technologies for basic infrastructure in low-income human settlements. - Mandele, Financial Assessment of Project and Programmes. - Research results, VIP-programme, DSSD.
HAND-OUTS	: Take from literature.
EXERCISE MATERIAL	:
AUDIO-VISUAL MATERIAL	: Slide-sound show World Bank module 5.1.
DISCUSSION TOPICS	: What is an appropriate distribution of costs among users and government?

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DAR ES SALAAM, TANZANIA

SUBJECT	: S-11 Case-studies Low-cost Sanitation.
NUMBER OF SESSIONS	: 2-3
RESOURCE PERSONS/ORGAN.	: Mr. Kilama / Mr. Mshana /
OBJECTIVES	: To present low-cost sanitation projects executed in other countries and to discuss the relevance of these experiences for Tanzanian conditions.
TOPICS TO BE COVERED	: <ul style="list-style-type: none"> - Technical features of several projects - Implementing agencies. - Financial and other assistance. - Costs, recovery and revenue collection. - Community involvement. - Operation and maintenance. - Discussion about relevance experiences for Tanzania.
ACHIEVEMENTS	: To be able to recall the main facts of presented projects and to formulate an opinion about the relevance of these experiences for Tanzania?
BACKGROUND LITERATURE	: <ul style="list-style-type: none"> - World Bank Handbook Modules 5.1d, 6.1a and b. - DSSD, VIP Programme documents. - World Bank (1979), Alternative Sanitation Technologies for urban areas in Africa. - Kilama (1978), Alternative Waste Disposal methods in Tanzania 1975-77, NSRC. - Mshana, Morogoro sanitation case-study.
HAND-OUTS	: Lecture note to be developed.
AUDIO-VISUAL MATERIAL	: World Bank slides modules 5.1d, 6.1a and b.
DISCUSSION TOPICS	: What is the relevance of these experiences for Tanzanian urban and rural sanitation projects.

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DAR ES SALAAM, TANZANIA

SUBJECT	:	S-12 Goals and elements of Dar es Salaam Low-cost Sanitation Projects.
NUMBER OF SESSIONS	:	2-3
RESOURCE PERSONS/ORGAN.	:	Mr. Njau /
OBJECTIVES	:	To present the goals, elements and experiences of low cost sanitation projects in Dar es Salaam.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - Technical features of several projects - Implementing agencies. - Financial and other assistance. - Costs, recovery and revenue collection. - Community involvement. - Operation and maintenance. - Discussion about relevance experiences.
ACHIEVEMENTS	:	To be able to recall the main facts of presented projects and to formulate an opinion about the relevance of these experiences.
BACKGROUND LITERATURE	:	- Project documents, report, manuals, drawings.
HAND-OUTS	:	Lecture note to be developed.
AUDIO-VISUAL MATERIAL	:	(Slides brought by guest lecturer?)
DISCUSSION TOPICS	:	What is the relevance of these experiences for urban and rural sanitation projects in other regions?

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DAR ES SALAAM, TANZANIA

SUBJECT	: S-13 Operation and maintenance of DSM city sewerage and sanitation systems.
NUMBER OF SESSIONS	: 1-2
RESOURCE PERSONS/ORGAN.	: Mr. Mfangavo / DSSD
OBJECTIVES	: To present the organizational, financial, managerial and material requirements and performance of DSM sewerage and other sanitation system and services.
TOPICS TO BE COVERED	: <ul style="list-style-type: none"> - Technical features of present sanitation and sewerage systems. - Identified tasks and assignment to local departments and sections. - Financial and other assistance. - Costs, recovery and revenue collection. - Community involvement. - Operation and maintenance. - Faced problems and new strategies (MAPET?). - Discussion about relevance experiences.
ACHIEVEMENTS	: To be able to recall the main facts of presented DSM sewerage and other sanitation systems and to give an opinion of the relevance of these experiences.
BACKGROUND LITERATURE	: - Project documents, report, manuals, drawings.
HAND-OUTS	: Lecture note to be developed.
AUDIO-VISUAL MATERIAL	: (Slides brought by guest lecturer?)
DISCUSSION TOPICS	: What is the relevance of these experiences for urban and rural sanitation systems in other regions of Tanzania?

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DAR ES SALAAM, TANZANIA

SUBJECT	:	E-1 Introduction to Environmental Health
NUMBER OF SESSIONS	:	4
RESOURCE PERSONS/ORGAN.	:	Mr. Yhedego / Ardhi Institute
OBJECTIVES	:	To provide a broad introduction to the various aspects of environmental pollution and public health.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - What is an healthy environment - Biology of environment. - Pollutants of environment. - Forms of pollution: soil, water, air, surface. - Possible control measures to protect the environment and public health.
ACHIEVEMENTS	:	To be able to recall the main facts about various types of activities that threatens public health.
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - World Bank handbook module 3.1. - Gaudy and Gaudy (1980), Micro-biology for environmental scientists and engineers, McGraw Hill.
HAND-OUTS	:	Lecture notes to be developed, or taken from literature.
EXERCISE MATERIAL	:	
AUDIO-VISUAL MATERIAL	:	<ul style="list-style-type: none"> - World Bank slide-sound show modules 3.1. - IBRD, film "Prescription for health".
DISCUSSION TOPICS	:	What role has the individual and the government to play in the environmental protection?

L E C T U R E O U T L I N E
FOR
COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	: E-2 Transmission of Infectious Diseases.
NUMBER OF SESSIONS	: 2-4
RESOURCE PERSONS/ORGAN.	: Prof. Kihamia / Muhimbili Faculty of Medicine.
OBJECTIVES	: To provide an introduction to the various infectious diseases and the routes by which they infect people, and to indicate the ways by which they can be controlled.
TOPICS TO BE COVERED	: <ul style="list-style-type: none"> - Identification of various infectious diseases, their nature, their bearers, the disease pattern, transmission and control. - Special attention to water related diseases, and human excreta related diseases. - Public health and education programmes.
ACHIEVEMENTS	: To be able to recall the basic facts about infectious disease, the routes of transmission and the ways to control them.
BACKGROUND LITERATURE	: <ul style="list-style-type: none"> - Pescod, M.B., D.A.Okun (1971), Water Supply and Waste Water Disposal in Developing Countries, Bangkok. - Tebbutt, T.H.Y. (1983), Water Quality Control, U.K. - Salvato, J.A. (1982), Environmental Engineering and Sanitation, London, John Wiley and Sons.
HAND-OUTS	: Lecture notes to be developed.
EXERCISE MATERIAL	:
AUDIO-VISUAL MATERIAL	: World Bank slide-sound show 3.1b and c.
DISCUSSION TOPICS	: How can a circle of disease, like bilharzia, be broken and prevented?

LECTURE OUTLINE
FOR
COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	E-3 Laboratory work for Water Supply and Sanitation.
NUMBER OF SESSIONS	:	1-2
RESOURCE PERSONS/ORGAN.	:	Mrs. Chaggu / CHS
OBJECTIVES	:	To familiarize the participants with laboratory work in support of environmental health and in particular water supply and sanitation efforts, and to give instructions for laboratory practical.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - What laboratory test are available in support of public health and WS and SAN, and what is their relevance? - Details of Total-coliform tests. - Details of E-coli tests. - Details of Staphylococcus Aureus.
ACHIEVEMENTS	:	To be able to recall relevant laboratory work for water supply and sanitation and to be able to perform laboratory tests.
BACKGROUND LITERATURE	:	- PHE Manuals (1988), Ardhi Institute.
HAND-OUTS	:	Instruction notes and lecture notes to be developed.
EXERCISE MATERIAL	:	Exercise e-1.
AUDIO-VISUAL MATERIAL	:	
DISCUSSION TOPICS	:	

LECTURE OUTLINE
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COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	E-4 Malaria versus Design of Sanitation Units.
NUMBER OF SESSIONS	:	1-2
RESOURCE PERSONS/ORGAN.	:	Mr. Rongo / Faculty of Medicine Muhimbili.
OBJECTIVES	:	To elaborate the relation of engineering designs and the control of diseases, notably malaria.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - Description of transmission of malaria. - Role that engineering structures play in malaria. - How malaria can be controlled by adopted designs.
ACHIEVEMENTS	:	To be able to recall the main engineering principles for the control of diseases, in particular malaria.
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - WHO (1982), Manual on Environmental Management for mosquito control, with special emphasis on malaria vectors, WHO offset, Publ. No. 66. - Waddy, B.B. (1974), Mosquito, malaria and Man in Man-made lakes in human health , London, Academic Press.
HAND-OUTS	:	Lecture notes Course File 16th Course.
EXERCISE MATERIAL	:	
AUDIO-VISUAL MATERIAL	:	World Bank slide-sound show 3.1c.
DISCUSSION TOPICS	:	How could malaria-aware engineering design be make more known to engineers and other professionals?

LECTURE OUTLINE
FOR
COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	: E-5 Role of Health Education
NUMBER OF SESSIONS	: 2
RESOURCE PERSONS/ORGAN.	:
OBJECTIVES	: To give a basic understanding of the elements of adequate health education and the features of effective implementation.
TOPICS TO BE COVERED	: <ul style="list-style-type: none"> - Why health education? - What forms of health education? - Different target groups of health education; men, women, children. - Community involvement and approaches. - implementing organizations, local infrastructure. - Training and guidance of local health workers.
ACHIEVEMENTS	: To be able to recall the basic elements of effective health education in WS and SAN projects.
BACKGROUND LITERATURE	: <ul style="list-style-type: none"> - World Bank, handbook modules 3.2. - VanWijk-Sijbesma (1979), Participation and education in community water supply and sanitation programmes, IRC, The Hague. - Boot, M. (1984), Making the links: guidelines in health education in water supply and sanitation, IRC, The Hague.
HAND-OUTS	: Take from literature.
EXERCISE MATERIAL	: See World Bank handbook 3.2 a-c
AUDIO-VISUAL MATERIAL	: World Bank slide-sound show 3.2a-c.
DISCUSSION TOPICS	: How can health education be effective (=achieve sustained health) in rural and urban areas?

LECTURE OUTLINE
FOR
COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	E-6 Administration and management of public health programmes.
NUMBER OF SESSIONS	:	2
RESOURCE PERSONS/ORGAN.	:	
OBJECTIVES	:	To give a basic understanding of the administrative and managerial requirements of public health programmes.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - components of public health programmes. - organizational requirements. - logistics and infrastructure. - human resource development. - planning, management and monitoring the programmes. - centralization and decentralization. - beneficiary involvement.
ACHIEVEMENTS	:	To be able to recall the administrative and managerial requirements of public health programmes.
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - VanWijk-Sijbesma (1979), Participation and education in community water supply and sanitation programmes, IRC, The Hague. - Boot, M. (1984), Making the links: guidelines in health education in water supply and sanitation, IRC, The Hague.
HAND-OUTS	:	Take from literature.
EXERCISE MATERIAL	:	See World Bank handbook 3.2 a-c
AUDIO-VISUAL MATERIAL	:	World Bank slide-sound show 3.2a-c.
DISCUSSION TOPICS	:	How can health education be effectively managed?

L E C T U R E O U T L I N E

FOR

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CENTRE FOR HOUSING STUDIES

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DAR ES SALAAM, TANZANIA

SUBJECT	:	E-7 Health Institutions in Tanzania.
NUMBER OF SESSIONS	:	1-2
RESOURCE PERSONS/ORGAN.	:	Mr. Rongo / Muhimbili Faculty of Medicine.
OBJECTIVES	:	To provide an overview of the present health institutions in Tanzania and their role in WS and SAN projects.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none">- Present health institutions in Tanzania.- Their policies, strategies, targets, means and organization structures.- The programmes they are involved in that are related to WS and SAN.- Their experiences of success and failures.
ACHIEVEMENTS	:	To be able to recall the most relevant health institutions that are contribute to the efforts in WS and SAN projects.
BACKGROUND LITERATURE	:	Ministry of Health publication.
HAND-OUTS	:	Administrative Chart Ministry of Health.
EXERCISE MATERIAL	:	
AUDIO-VISUAL MATERIAL	:	
DISCUSSION TOPICS	:	What is the relationship between health officers and public health engineers? What is your experience with the coordination of WS and SAN project and public health programmes?

LECTURE OUTLINE
FOR
COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	P-1 Principles of Project Cycle and Management.
NUMBER OF SESSIONS	:	2
RESOURCE PERSONS/ORGAN.	:	Mr. Chisanga/Rugaiganisa / CHS
OBJECTIVES	:	To give an overview of the different stages of projects and its requirements for organization, finance and management.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - The stages of a Project Cycle. - The involved and responsible agencies. - How to finance projects: fund raising and donor identification, negotiations and financial monitoring. - supportive policies, regulations, standards, legislation and by-laws.
ACHIEVEMENTS	:	To be able to recall the basics of the project cycle and management.
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - Baum (1978), The Project Cycle, Third World Planning Review. - Atman (1980), Project Planning and Management, reader IHS, Rotterdam. - Little (1976), Project Appraisal and Planning for Developing Countries. - Grover, Water Supply and Sanitation Project Preparation Handbook, Vol.1.
HAND-OUTS	:	Baum (1978), Project Cycle.
EXERCISE MATERIAL	:	In combination with other lectures Exercise p-1 and p-2.
AUDIO-VISUAL MATERIAL	:	World bank Decision-makers Information Module.
DISCUSSION TOPICS	:	What is the most important stage of the Project Cycle?

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CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	P-2 Project Preparation and Implementation.
NUMBER OF SESSIONS	:	1-2
RESOURCE PERSONS/ORGAN.	:	Mr. Chisanga/Rugaiganisa / CHS
OBJECTIVES	:	To give an elaboration of the Project Cycle in respect of Project Preparation and Implementation requirements of data, design, planning, finance, organization, etc.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - The steps of project preparation and implementation. - Identification and preparation. - Project approval, implementation, operation and maintenance. - Developing a program.
ACHIEVEMENTS	:	To be able to recall the basic elements of Project Preparation and Implementation.
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - F.Davidson (1983), Urban Projects Manual. - Little (1976), Project Appraisal and Planning for Developing Countries. - Grover et al, Water Supply and Sanitation Project Preparation Handbook, Vol.1. - World Bank, Handbook Modules 2.1.
HAND-OUTS	:	Take from literature.
EXERCISE MATERIAL	:	In combination with other lectures Exercise p-1 and p-2.
AUDIO-VISUAL MATERIAL	:	World Bank Slide-sound show Modules 2.1 a-c.
DISCUSSION TOPICS	:	See WB Modules Coordinator Instruction.

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ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	: P-3 Data-collection Methods and Analysis.
NUMBER OF SESSIONS	: 1-2
RESOURCE PERSONS/ORGAN.	: Mr. M.Zacharia / CHS
OBJECTIVES	: To give a basic understanding of the methodologies of data-collection and data-analysis for water supply and sanitation projects.
TOPICS TO BE COVERED	: <ul style="list-style-type: none"> - Objectives of data-collection. - Definitions: sample, population, household, at random, scientific validity, etc. - Data-collection methods: validity and applicability, quantitative, qualitative data, participatory observation, physical surveys, households questionnaires, key-informants interviews, structured/unstructured, open and closed questions. - Organization, planning, monitoring, costs and constraints. - Data processing, analysis and risks. - Presentation of data.
ACHIEVEMENTS	: To be able to recall the basics of data-collection and data-analysis for project preparation.
BACKGROUND LITERATURE	: <ul style="list-style-type: none"> - DHV, Guidelines for socio-economic surveys. - Simpson-Hebert, Methods for gathering socio-cultural data for water supply and sanitation projects. - H.Mengers (1989), Lecture notes 24th Course CHS.
HAND-OUTS	: Take from literature.
EXERCISE MATERIAL	: <ul style="list-style-type: none"> - Preparing questionnaires for Fieldwork, Exercise g-7. - Exercise p-3.

LECTURE OUTLINE CONTINUED:

AUDIO-VISUAL MATERIAL :

DISCUSSION TOPICS :

Is qualitative data more adequate than quantitative for water supply and sanitation projects?

LECTURE OUTLINE
FOR
COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	P-4 Aerial photography as a Data-collection method for water supply and sanitation programmes.
NUMBER OF SESSIONS	:	2
RESOURCE PERSONS/ORGAN.	:	Mr. Uisso / CHS
OBJECTIVES	:	To provide an introduction of the value and use of aerial photography for water supply and sanitation programmes.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - What is aerial photography? - Scope of applicability for urban development and WS and SAN in particular. - Technologies of aerial photography and data processing. - Examples of applications. - Introduction to Geo-Information Systems. - Costs, management and organization.
ACHIEVEMENTS	:	To be able to recall the basics of aerial photography and its applicability for WS and SAN Programmes.
BACKGROUND LITERATURE	:	To be identified.
HAND-OUTS	:	To be identified.
EXERCISE MATERIAL	:	To be identified.
AUDIO-VISUAL MATERIAL	:	Slides, aerial photographs and different processed maps
DISCUSSION TOPICS	:	When and how can aerial photography be an appropriate method of data-collection?

LECTURE OUTLINE
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COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	P-5 Economic Appraisal of Projects
NUMBER OF SESSIONS	:	1-2
RESOURCE PERSONS/ORGAN.	:	
OBJECTIVES	:	To provide an introduction to the principles of economic appraisal of projects.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - What is economic appraisal? - What is the use of economic appraisal? - The required data for economic appraisal. - Time-value of money; initial and recurrent cost factors. - Economic appraisal calculations and examples.
ACHIEVEMENTS	:	To be able to recall the principle of economic appraisal of projects.
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - World Bank Handbook module 2.3. - Grover (1983), Water supply and sanitation project preparation handbook, Vol.1. - Bamberger, B., E.Hewitt (1986), Monitoring and Evaluating Urban Programs, World Bank Technical Paper No. 52.
HAND-OUTS	:	Take from literature.
EXERCISE MATERIAL	:	World Bank handbook module 2.3.
AUDIO-VISUAL MATERIAL	:	World Bank slide-sound show module 2.3b.
DISCUSSION TOPICS	:	Consult Coordinator Instruction Module 2.3b.

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CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	P-6 Technology and Materials Selection
NUMBER OF SESSIONS	:	1-2
RESOURCE PERSONS/ORGAN.	:	Mr. Msimbe / University of DSM
OBJECTIVES	:	To provide an introduction to the various available materials and technologies for WS and SAN and in particular the use of algorithmic decision making.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - Different available materials for WS and SAN. - Criteria of utilization of different technologies and materials. - Introduction to algorithms. - Design and application of algorithms.
ACHIEVEMENTS	:	To be able to recall the principle technologies and materials selection using algorithms.
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - World Bank Handbook module 5.3a-c. - Kalbermattan et al (1980), Technical and Economic Options for WS and SAN, World Bank Technical Paper.
HAND-OUTS	:	Take from literature.
EXERCISE MATERIAL	:	World Bank handbook module 5.3c. Exercise s-2.
AUDIO-VISUAL MATERIAL	:	World Bank slide-sound show module 5.3b.
DISCUSSION TOPICS	:	Are presented algorithms appropriate for Tanzanian conditions?

LECTURE OUTLINE
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CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	P-7 Institutional and Financial Aspects of WS and SAN Projects.
NUMBER OF SESSIONS	:	1-2
RESOURCE PERSONS/ORGAN.	:	
OBJECTIVES	:	To provide an introduction to the institutional and financial arrangements required for WS and SAN projects.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - Institutions; their roles in implementation and operation and maintenance. - Finance: forms of finance, its implication for cost recovery and revenue collection. - Human resource development: training curriculum development.
ACHIEVEMENTS	:	To be able to recall the main requirements of institutional and financial arrangements for the effective execution of WS and SAN projects.
BACKGROUND LITERATURE	:	- World Bank Handbook module 2.2.
HAND-OUTS	:	Take from literature.
EXERCISE MATERIAL	:	World Bank handbook module 2.2. Exercise p-2 or p-4.
AUDIO-VISUAL MATERIAL	:	World Bank slide-sound show module 2.2a-c.
DISCUSSION TOPICS	:	See Coordinator Instruction WB Module 2.2.

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DAR ES SALAAM, TANZANIA

SUBJECT	:	P-8 Legal Aspects of WS and SAN Projects.
NUMBER OF SESSIONS	:	1
RESOURCE PERSONS/ORGAN.	:	Mr. Ringo / University of DSM.
OBJECTIVES	:	To provide an introduction to the legal procedures that are required for WS and SAN projects.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - Legal procedures that are related to land acquisition, financial transactions, contracting and sub-contracting, delegation of responsibilities to local bodies or non-public organization (community organizations), claim and appeal procedures, handing over of assets from one public body to another, etc. - Special issues of water supply and sanitation: environmental laws, user charger legislation, etc.
ACHIEVEMENTS	:	To be able to recall the basic legal aspects of WS and SAN projects.
BACKGROUND LITERATURE	:	To be identified by guest-lecturer.
HAND-OUTS	:	Id.
EXERCISE MATERIAL	:	Id.
AUDIO-VISUAL MATERIAL	:	Id.
DISCUSSION TOPICS	:	Why is it important to cover legal aspects of WS and SAN?

LECTURE OUTLINE
FOR
COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

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DAR ES SALAAM, TANZANIA

SUBJECT	:	P-9 Community Involvement and Communication Techniques.
NUMBER OF SESSIONS	:	3
RESOURCE PERSONS/ORGAN.	:	Mr. M.Zacharia / CHS
OBJECTIVES	:	To elaborate the aspects of community involvement, their organization, conflict and meaning, and to provide an introduction to the communication methods that can support effective community participation.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - Why community involvement? - The potential role of communities in organization, manpower, finance of projects. - Feasibility assessment: options and conflicts. Community techniques in support of implementation of project. <ul style="list-style-type: none"> - Leadership development and training. - Discussion.
ACHIEVEMENTS	:	To be able to recall the basic features of community participation and supportive communication techniques.
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - World Bank Module 2.4a-c Handbook. - Lecture Notes M. Zacharia + reference list.
HAND-OUTS	:	Lecture notes M.Zacharia.
EXERCISE MATERIAL	:	In combination with other lectures Exercise p-1 or p-2.
AUDIO-VISUAL MATERIAL	:	World Bank slide-sound show 2.4a-c.
DISCUSSION TOPICS	:	Can community involvement be effective, and how?

LECTURE OUTLINE

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COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	P-10 Role of Women in Water Supply and Sanitation Projects.
NUMBER OF SESSIONS	:	2
RESOURCE PERSONS/ORGAN.	:	Mrs. Alice / Mrs. Gumbo /
OBJECTIVES	:	To increase the awareness among the participants of the important role of women in water supply and sanitation, and to provide tools by which women can be involved in the different project stages effectively.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - Gender and sex: roles and duties. - Role of women in WS and SAN. - Present by male dominated practice of WS and SAN planning. - The consequences of masculine planning. - Meaning and strategies for the involvement of women in such projects. - Discussion.
ACHIEVEMENTS	:	To have increased the awareness, and to be able to give ways by which women can be involved in water supply and sanitation projects.
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - VanWijk-Sijbesma (1985), Participation of women in WS and SAN projects: roles and realities, IRC, The Hague. - Elmendorf (1981), Women, water and waste. - Barbara Rogers (1986), Domestication of women.
HAND-OUTS	:	Lecture notes Christine vanWijk, October 1988, IHS-course on low-cost infrastructure.
EXERCISE MATERIAL	:	E.g. develop a checklist for women involvement in each project stage.

LECTURE OUTLINE CONTINUED:

AUDIO-VISUAL MATERIAL :

DISCUSSION TOPICS :

Can women involvement be effective, and how?

LECTURE OUTLINE
FOR
COURSES ON LOW COST WATER SUPPLY AND SANITATION

CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	P-11 Principle of Post-project Issues; Operation and Maintenance of WS and SAN.
NUMBER OF SESSIONS	:	4
RESOURCE PERSONS/ORGAN.	:	Mr. Mfangavo / DSSD Mr. Msimbe, Mr. Mashauri, Mr, Njau.
OBJECTIVES	:	To enlarge the awareness of participants of the importance of proper operation and maintenance of WS and SAN, and to provide tools to establish proper O&M routines at an early stage.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - The different components of WS and SAN that require proper O&M. - Identification of operation and maintenance tasks. - Pre-planned, curative and preventive maintenance. - Administrative, financial, physical, material, equipment and tools, organizational and human skills requirements for the establishment O&M routines. - Discussion.
ACHIEVEMENTS	:	To be able to summarize the basics of establishing proper O&M routines.
BACKGROUND LITERATURE	:	<ul style="list-style-type: none"> - Clifsen, Principle of planned maintenance. - Davis, Some aspects of an open drainage canal maintenance program, Tunis. - Barnes and Wilson (1976), The design and operation of small sewage works. London. - Pacey (1978), handpump maintenance in the context of community well projects, London.
HAND-OUTS	:	Take from literature.

LECTURE OUTLINE CONTINUED:

EXERCISE MATERIAL	:	E.g. develop a manual for the proper operation and maintenance of a village handpump by villagers.
AUDIO-VISUAL MATERIAL	:	A video 8 or slide-show can be developed about the O&M status of infrastructure (e.g. water works) in DSM, and interviewing officials, engineers, technicians and mechanics.
DISCUSSION TOPICS	:	What are the main constraints of proper O&M in to your experience, and how can they be overcome?

LECTURE OUTLINE
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CENTRE FOR HOUSING STUDIES

ARDHI INSTITUTE

DAR ES SALAAM, TANZANIA

SUBJECT	:	P-12 Monitoring and Evaluating Infrastructure Development.
NUMBER OF SESSIONS	:	1-2
RESOURCE PERSONS/ORGAN.	:	
OBJECTIVES	:	To provide an introduction to the principles and methodologies of monitoring and evaluating infrastructure developments.
TOPICS TO BE COVERED	:	<ul style="list-style-type: none"> - What is evaluation and monitoring? - Definitions, organization and scope of M&E. - Outputs of feedback of Monitoring. - Methodologies of Evaluation.
ACHIEVEMENTS	:	To be able to recall the basic principles and methods of monitoring and evaluating infrastructure developments.
BACKGROUND LITERATURE	:	- B.Bamberger and E.Hewitt (1986), Monitoring and Evaluating Urban Development Programs, A Handbook for Program Managers and Researchers. World Bank Technical Paper No.52.
HAND-OUTS	:	Taken from literature.
EXERCISE MATERIAL	:	Exercise p-5.
AUDIO-VISUAL MATERIAL	:	
DISCUSSION TOPICS	:	Who is to be made responsible for Monitoring and Evaluation, regarding the sometimes negative outcome?

ANNEX VII

**Format Invitation Letter
Guest-lecturer**

CENTRE FOR HOUSING STUDIES
ARDHI INSTITUTE



Telephone 49112, 49000/8/9
Telegrams ARDHICENTRE

P.O. Box 35124
DAR ES SALAAM
TANZANIA

Our Ref: ARI/A.757/28

2nd Dec., 1988

Your Ref:

TO:
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.....
.....

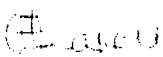
Dear Sir/Madame,

RE: RELEASE OF RESOURCE PERSON.

The Centre for Housing Studies, Ardhi Institute, Dar es Salaam will conduct a course on "Water Supply and Low-Cost Sanitation" which starts on 23rd January to 15th April, 1989. The course is for professionals and sub-professionals in water supply and sanitation section. Pro/Ur/Mr/Mrs/Miss:..... from your organisation has been chosen to be a resource person into our course; we therefore request your permission to enable him/her to give the participants what he/she has for the course. She/he is expected to lecture on the following date(s)

.....
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We thank you in advance.


Chaggu, Y. B. (Mrs)
COURSE CO-ORDINATOR.

CENTRE FOR HOUSING STUDIES
ARDHI INSTITUTE



Telephone 49112, 49000/8/9
Telegrams ARDHICENTRE

P.O. Box 35124
DAR ES SALAAM
TANZANIA

2nd December, 1988

Our Ref: ARI/A.751/

Your Ref:

To:

.....
.....
.....
.....
.....

Dear Sir/Madame,

RE: YOUR LECTURE INPUT INTO THE 24TH COURSE OF WATER SUPPLY AND LOW-COST SANITATION.

I have the honour to inform you the exact dates for your lecture input into the above mentioned course.

DATE	M	T	W	T	F	S	S
	8.00 - 10.00 a.m.			10.30 - 12.30p.m			2.00 - 4.00 p.m.
31/1/89 Tuesday				International Decade on Water Supply and Sanitation			

May you please submit your lecture notes at least one week before the lecture date for typing and duplication. Should any emergency occur which will make it impossible for you to come, inform the co-ordinator well in advance to remove inconveniences.

We are looking forward to your good co-operation.

Yours sincerely,

(Signature)
Chaggu, E.J. (Mrs)
COURSE CO-ORDINATOR

ANNEX VIII

**Example Lecture Notes
24th Course**

24TH COURSE ON WATER SUPPLY AND
LOW COST SANITATION

ENVIRONMENTAL HEALTH
LECTURE NOTES

By: Rongo, L.M.B
- Sanitary Engineer
- Assistant Lecturer in
Environmental Sanitation

February, 1989

INTRODUCTION

The environment is the collective term used to describe all the living and non living things that make up our surroundings. This includes the biological, physical, cultural and social, economic and political environment.

The physical environment is made up of all the geographical, physical and chemical features:-

- The land-mountains, valleys, plains
- Type of soil and water
- Climate
- Altitude
- Chemicals and toxic substances.

The biological environment is made up of all things that have life:-

- Vegetation, such as trees, grass, and crops
- Animals, including stock and predators
- Insects, particularly mosquitoes and houseflies
- Infective organisms, such as amoebae, bilharzia, and "tetanus."

The cultural and social environment is made up of all the customs, beliefs, and organizations in society:

- Customs and beliefs
- Family and kinships
- Religious
- Leadership and power structure.

The economic and political environment is made up of work, money, and government:

- Villagization and self-reliance
- Rural and urban economies
- CCM and political influences
- Development policies.

Health is a complete state of mental, social and physical well-being and not merely the absence of disease or infirmity.

The health, and even survival, of man depends on his ability to adjust to his environment. During the process of evolution man has adapted to a wide variety of physical and biological conditions to hot and cold climates, to dry and wet regions,

to sea level and mountainous areas each with its own pattern of vegetation and animals. Man has also learnt to a greater extent than any other animals to control his immediate environment by such methods as clothes, fires, and shelter. Man is also altering his environment, sometimes quite rapidly, by population growth migration, urbanization, industrialization, different methods of agriculture, communication and so on. Some changes improve the environment while others may damage or destroy it.

2. DISEASE AND THE ENVIRONMENT

In order to see clearly the relationship between disease and environment, let us consider some of the important, aspects of the physical environment and how they affect transmission of disease.

2.1. WATER

The availability of water for drinking, cooking, and washing is one of the main reasons why rural community develop in a particular area. Their sources of water are generally unprotected and easily polluted, especially when the number of people in the area using the same water sources increases.

2.2. EXCRETA DISPOSAL

Man is the reservoir host for many diseases and the unsatisfactory disposal of excreta leads to an increase in faecal oral transmission and spread of disease.

2.3. HOUSING

Inadequate housing, leading to overcrowding, lack of ventilation, and dampness favours the transmission of airborne diseases. Poor siting of houses, too close to where animals are kept and inadequate disposal of rubbish encourages mosquitoes, flies, and rats and increases the transmission of vector borne diseases. The use of agricultural chemicals and the waste products of industry may also pollute water, food, and air.

3.0. ENVIRONMENTAL HEALTH

In the above text, the terms environment and health were discussed in details. The relationship between the two terms as far as a disease is concerned is seen in environmental health. Another term ^{sometimes used is} environmental sanitation!

3.1. DEFINITION OF ENVIRONMENTAL HEALTH

Environmental health is the control of all those factors in man's physical environment which exercise a deleterious effect on his physical, mental, or social well being.

In particular it refers to the control of:-

- a. Methods for the disposal of excreta sewage and community wastes to ensure that they are adequate and safe;
- b. Water supplies, to ensure that they are pure and wholesome;
- c. Housing, to ensure that it is of a character likely to:
 - i) Provide as few opportunities as possible for the direct transmission of disease, especially respiratory infections, and
 - ii) Encourage healthful habits in the occupants;
- d. Milk and other food supplies, to ensure that they are safe;
- e. Personal and public habits of cleanliness, especially in relation to disease;
- f. Arthropod, rodent, mollusc, or other alternative host associated with human disease;
- g. Atmospheric conditions, to ensure that the external atmosphere is free from deleterious elements and that internal conditions of workshops, houses, etc., are suitable for the occupations undertaken in them.
- h. Factories, workshops, dwellings, streets, and general environment to ensure freedom from risk to health whether mechanical, chemical, or biological and to provide the best working and living conditions.

3.2. THE ROLE OF AN ENGINEER

Therefore to be an integral and effective part of a community health care delivery team, the engineer has to be much more than a sanitary engineer, a sanitary engineer was adequate when health meant merely the absence of disease or infirmity and when no real coordination or interdependence existed in health care education and delivery, but with today's circumstances a health related engineer is better trained as an "Environmental Health Engineer"

As such, he is given a health sciences engineering training and is better equipped to actually utilize health science principles in producing structures and techniques that will enhance the preservation, protection and promotion of the physical, social and mental well-being of the community.

Specifically, to communicate meaningfully and operate effectively within the community health team, the environmental health engineer should have a working knowledge of "health" and "disease", the nature, causes and effects of disease and disorders; the basic principles of preventing diseases, human behavioural patterns— as individuals, families and communities; how such patterns can be effectively utilised to promote physical, social and mental well-being and prevent the onset and spread of disease; parasitology, helminthology, rodents, vectors and other disease agents. He should be able to identify and manipulate the significant health factors in various institutions such as schools, industries, and places of public gathering. He should be able to organize and participate in the control of communicable disease; to identify diseases and disorders that may arise from using unsafe water, waste-water, solid wastes, poor ventilation and lighting, over-crowding and migration of people from place to place. Equipped with a working knowledge of the above and a thorough channel of communication with all members of the health team, the environmental health engineer is more easily able to extract the health parameters that could feature in the conception, design, construction, operation, maintenance, and regulation of all engineering structures that will facilitate the delivery of health services and sustenance of health generations. The attainment of this level of life by the population does prove that the environmental health engineer is indeed a deserving member of the health team.

4. ELEMENTS OF ENVIRONMENTAL HEALTH

Environmental health issues exist on three levels. The first level deals with health effects; the second with comfort, convenience, efficiency, and esthetics, the third with natural resources ecosystems. Environmental health programs that do not address each level while attempting to improve particular conditions fail. Populations who need assistance act on all three levels and do not respond to programs that they perceive as being too narrow or insensitive to important factors. Details of environmental health issues and environmental health programmes will be obtained in the relevant references. With all these information, I conclude this topic on environmental health.

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ANNEX IX

Evaluation Form Lectures

EVALUATION FORM

LECTURES

LECTURE SUBJECT:

NO. OF SESSIONS:

DATE(S):

NAME LECTURER:

PERFORMANCE ASSESSMENT:

REMARKS:

- Does he/she explain and talk clearly?

- Does he/she manage to keep the participants attentive?

- Does he/she make use of the class room facilities adequately?

- Did he/she provide hand-outs or lecture-notes?

- Did he/she refer to the provided hand-outs or lecture-notes?

- Were the number of sessions sufficient to cover the topics?

- Is there interaction between lecturer and participants?

- Does he/she respond satisfactory to the participants questions or remarks?

- Did he/she raise enough discussion?

- Were the used audio-visuals supportive?

- Are the lecture topics covered to a satisfactory extent?

- Were the Lecture Objectives achieved?

CONCLUSION: