

Africare

"Improving the quality of life in rural Africa through the development of water resources, increased food production and the delivery of health services."

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NTCHEU DISTRICT PROTECTED SPRINGS PROJECT (MLW/90/B01)

REPORT ON
THE WORKSHOP ON PROTECTED SPRINGS
IN NTCHEU DISTRICT
June 15 to June 19, 1992

WATER REFERENCE CENTRE
RURAL WATER SUPPLY AND
SANITATION UNIT

Submitted on: June 1992

Submitted by: the trainers:
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PREFACE

This report summarizes the outline and results of the workshop on protected springs, Htcheu, June 15 - 19, 1992..

The workshop became a success. We got a very positive response from all people involved. Out of all we would like to mention and thank:

- The Htcheu Water Department for their hospitality which resulted in an unlimited access to their office facilities.
- the Red Cross people who gave their authorization for using the Red Cross Hall in Htcheu.
- The resource people for their frequent and fruitful contributions.
- the AFRICARE staff in Blantyre and Htcheu for their enthusiasm and support.

To all participants, we appreciated your contributions and enthusiasm.

Blantyre, June 26, 1992

Marian Marseille
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1. Introduction

About the Ntcheu District Protected Springs Project:

The primary objective of the project is to provide safe drinking water for the Ntcheu district current refugee population of approximately 150,000. The project aims at protecting 100 springs in a ten months period and will be completed in September 1992. AFRICARE is the implementing agency. As such, it provides its services to the Government of Malawi (here: the Min. of Finance and the Water Department). The project is financed through the ICARA II division of the United Nations Development Programme (UNDP).

Prior to the start of the current Ntcheu District Protected Spring Project, AFRICARE completed 63 protected springs in the Ntcheu District and has collaborated with Medicins Sans Frontieres (MSF) in conducting health and sanitation activities to refugee communities within the district.

AFRICARE's governmental and non-governmental counterparts in the Ntcheu District, as well as AFRICARE's water technicians themselves, felt the need for a training on protected springs. It was agreed upon that the training should aim at an improvement of the technical skills of all parties involved, better collaboration, and more emphasis on community involvement and training. The parties involved are: the Ministry of Health, Community Services, the Water Department and AFRICARE.

Two trainers were asked to conduct the workshop: one Hydrogeologist/coordinator and one Sanitation and Health engineer. The trainers arrived two weeks before the start of the course. Problems were analysed and a program was made. After the workshop, one week was planned for in-depth discussions with AFRICARE staff on the results of the workshop and report writing.

This report summarizes the program and methodology of the workshop (chapter 2), discusses its main conclusions and recommendations (chapter 3) and presents the results of the workshop evaluation (chapter 4). A complete overview of the program and its handouts is presented in the annexes.

2. The Workshop

2.1. Preparation

The aims of the workshop, as initially formulated by Africare/Malawi, are: to train community development workers from throughout Ntcheu district in the technology of spring protection and to provide an opportunity to share field experiences. Besides, it should act as a refreshment training for Africare water technicians.

At the time the trainers arrived, several things were already prepared for:

- Participants were invited from Community Services, the Ministry of Health and the Water Department Ntcheu, besides the water technicians of Africare. Total number of participants: 34.
- Resource persons of these departments were contacted, to give information on the Ntcheu rural water supply situation to the trainers and to give an introduction during the workshop.
- A spring in Kandota, a community near Ntcheu, was selected to be protected as a demonstration project during the workshop.
- The place where the workshop could be conducted, was set to be the Red Cross Hall in Ntcheu. The period was set to be June 15 to 19, 1992. Workshop hours: 8.00 - 12.00h and 13.30 - 17.00h, except on Friday till 12.00h.

2.2. Participants and Aims of the Workshop

The participants invited formed a rather large and diverse group of 34 people:

- 12 from Africare (WTA)
- 7 from the Water Department (WTDep),
= 6 from Ntcheu and 1 from Lilongwe
- 7 from Community Services (CDA)
- 8 from the Ministry of Health (HSA)

Among them 3 women and 31 men.

All are involved in the process of protecting springs, but each in a different way. CDA's are involved in mobilization and community involvement. HSA's are involved in hygiene education. Water technicians of Africare are mainly involved in the construction, while water technicians of the Water Department are mainly involved in the maintenance of the protected springs.

As a result, their interests in this workshop were quite different: Africare people needed a detailed refreshment course on construction, the other participants needed a global knowledge on construction, focused specially on maintenance. At the same time, all participants needed refreshment of their knowledge/skills on collaboration and community involvement in this project.

The aim of the workshop was specified as follows:

At the end of the workshop all participants should:

- know the technology of protecting a spring, including site selection and maintenance needs
- be aware of the importance of collaboration and community involvement during the whole process of preparation and implementation, as well as during use and maintenance
- know how to achieve collaboration and community involvement, including the formation of water committees

The overall goal aims at the knowledge and awareness of all aspects concerning protected springs.

As a follow up, in the week after the workshop two meetings were held:

- One meeting on 22-6-1992 with the resource people, on the workshop conclusions and remarks (as given in chapter 3).
- One training-session with the Africare water technicians on 23-6-1992, on both construction remarks (as given in annex E) and workshop conclusions and remarks (as given in chapter 3). These discussions were continued during another field visit to the Kandota spring.

In this way the need of the Africare water technicians for a detailed refreshment training on construction was met with this extra session.

2.3. The Program

After the overall aims were specified, and some more discussions with resource people and Africare participants were held, the headlines for the workshop-message were specified in 5 important aspects and 5 stages in the process of protecting a spring:

- The 5 important aspects in the process of protecting a spring are:
 - Construction
 - Collaboration and coordination
 - Community involvement
 - Water quality and hygiene
 - Maintenance&follow-up

- The protection of a spring has to be seen as a process of 5 stages:

1. Introduction (including giving information to and getting information from the community, and site selection & survey)
2. Preparation (including formation of the water committee and preparations for construction work)
3. Construction
4. Handing over
5. Follow-up and Maintenance

The workshop started with an introduction on these headlines. Then the program continued with the construction, including site selection & survey, and maintenance needs. Next issues were community involvement and collaboration, and organization of maintenance/water committees. Water quality was stressed during site survey and during a session on hygiene and chlorination. Collaboration was repeatedly stressed in several sessions. At the end, an entertaining summary was given. In this way all important aspects, during all 5 stages of the process, were included in the program. For further detail: see annex C.

In order to make the workshop interesting for all participants of this interdisciplinary group, working methods were chosen that stimulated full participation of everyone, in a mix of theory, discussions and field visits. Specially during the many small-groups discussions (6 - 8 people in mixed groups) much time was available for sharing field experiences.

At most sessions hand-outs were distributed. (See hand-outs in annex C). These hand-outs are a summary of the workshop and should act as a guide and remembrance for the participants. As most participants probably are not used to reading long texts, the hand-outs contained many checklists, diagrams and schemes. All participants received a file for their handouts as well as a notebook, pencil and pen for their own notes.

Some ideas and materials were taken from a trainings manual on spring protection (WASH), and from publications of IRC Water and Sanitation Centre, as mentioned in the list of references in annex F.

For further detail on the program and hand-outs: see annex C.

3. Workshop Conclusions and Recommendations

Springs are owned by the different communities. By protecting them, AFRICARE aims at providing more water (night storage) of good quality. To reach this goal 5 aspects should be respected: a proper construction, collaboration between departments, community involvement, water quality and maintenance&follow-up.

To cope with these 5 aspects in order the result will be a sustainable protected spring, a systematic working method has to be used which is composed of 5 stages: introduction (getting information from and giving information to the community, site selection/survey), preparation (incl. formation of the water committee), construction, handing over, maintenance&follow-up.

Results of discussions on the different aspects are:

On collaboration and community involvement

- all parties should be involved from the beginning (introduction stage) upto the end (maintenance&follow-up). All parties means: HSA, WTDep, WTA, CDA and the community.
- the community (local leaders, men, women, all users of the spring) should be informed from the beginning and involved continuously in all stages.
- a water committee should be elected in the preparation stage and involved in all further stages. It is important to elect the right persons. CDA and WTA should advise the community and the local leaders on this issue.

On construction

Maximum attention should be given to:

- depth of the wingwall, which has to go down at least 50 cm below the bottom of the pond/eye of the spring. Its foundation should be build on solid soil.
- the outletpipe of the wingwall should be at or slightly below the bottom of the pond/eye of the spring.
- the top slab of the storage tank should be at least 50 cm below the outletpipe of the wingwall.
- the top slab of the springbox should be at least 20-30 cm below the outletpipe of the wingwall.
- a catchment trench has to be made upstream from the spring in order to protect it against contamination. A protected spring cannot be handed over to the community when the catchment trench is not yet finished.
- the working order has to be always from the wingwall to the tank.

Detailed discussion on the construction is given in annex E.

On water quality

- The spring should be protected in a way that contamination hazards will be reduced to a minimum (catchment trench + no activities within this circle).
- A good sanitation survey is necessary.
- Maintenance of the catchment trench and drainage ditches is essential.
- Regular chlorination is of no use. After completion of the construction, the springbox and the storage tank should be cleaned inside. Before closing the slabs chlorinated lime can be applied, if available.

On maintenance&follow-up

- After protection, the spring is handed over to the community and the Water Department.
- Regular checking and cleaning as well as minor repairs are the responsibility of the community. Major repairs should be undertaken by the Water Department.
- The water committee should be trained by the CDA, HSA and WTA. A technician of the Water Department should participate in this training.
- The community should be aware of its ownership, its responsibilities, the role and function of the water committee as well as of the Water Department.

Recommendations for future projects as discussed during the workshop

- include the construction of washing slabs
- study the possibilities of introducing removable manholes, necessary for checking and cleaning of the storage tank and spring box.
- study the possibility of a drainpipe connected from below to the bottom of the tank for cleaning purposes.
- use locally available taps: gate valves (VLOM concept) instead of earlier used talbot nipples.
- study the possibility of a guarantee-period on the construction, of for instance 6 months.
- plan for a workshop or some other kind of training in an early stage.

Some remarks by the trainers

The project was defined as an emergency project. Unfortunately little attention has been given to community involvement, collaboration and maintenance&follow-up. In some cases construction errors were made.

It is obvious that many springs were well protected in little time. As a result of the workshop the degree of community involvement, collaboration and maintenance&follow-up will improve. Less construction errors will be made.

After the workshop, working methods of the AFRICARE water technicians involved in the Ntcheu protected springs project were discussed. It was agreed upon that:

- During the introduction and preparation stage the two supervisors will be using a checklist with all aspects to be dealt with.
- Water technicians will be staying in the villages; during the preparation stage, lodging for the builders and water technicians will be looked after properly by the supervisors (the community has to provide lodging facilities, an issue for the meeting with the community).

4. Workshop Evaluation

In evaluating the workshop three methods were used:

- a. Each participant had to give an answer to the question: "What do you see as important about protecting a spring?". This was done twice: on Monday and on Friday.
- b. On Friday, each participant was asked to value the different sessions on a scale from 1 to 5.
- c. On Friday, each participant was asked to give his or her opinion on 5 different issues concerning the working methods used.

Annex B shows the evaluation form. Summarizing tables for part a. and b. are also given.

Results:

a. The answers on Monday and Friday were checked on the five important aspects and the five stages in the process of protecting a spring, as introduced during the workshop. On Monday, 78% of the participants mentioned only one important aspect: water quality and hygiene. Nobody mentioned more than three aspects.

On Friday, 55% of the participants mentioned one or two aspects only, of which water quality was mentioned by all. At the same time 45% of the participants mentioned four to five aspects or all five stages involved, which can be considered as excellent answers.

Though, based on discussions with participants after the workshop, the trainers estimate that ±75% of the participants are aware of all aspects and stages involved in the process of protecting a spring. This difference, 45% to 75%, is due to misinterpretation of the question by the participants.

b. On average, the sessions were valued with 4.4 points within a range of 3.7 upto 4.7 points (scale 1 to 5). The field visits as well as the entertaining summary were highly appreciated (4.5 and 4.7 points respectively).

Out of all 425 marks given by the participants to all sessions, 21 times (=5%) 1 or 2 points were marked while 350 times (=82%) 4 or 5 points were marked.

Sessions with little opportunity for participants' participation and sessions with too little time for the discussions were valued relatively lower (3.7 to 4.2).

c. In answering the open questions, most forthcoming observations made by the participants were:

- Time spent on and importance given to collaboration, community involvement as well as follow-up & maintenance during the workshop, was highly appreciated.
- In-depth discussions on construction issues were highly appreciated also.
- Negative statements were given concerning the height of the daily allowance (30% of all participants).
- About 30% of the participants said time for the workshop was too short. In consequence, the Kandota spring has not been completed before the end of the workshop - what was regretted.
- Comments on time spent in the classroom compared to time spent in the field as well as time spent in the group as a whole compared to time spent on small groups work, were quite positive. Many participants stressed the importance of small groups discussions.
- The handouts were highly appreciated. They were valued as clear and interesting and a good guide and remembrance once back in the field.

Some remarks by the trainers:

In a few cases questions posed by the trainers were misinterpreted. This is partly due to the fact that participants were not used to open questions, but also the limited knowledge of the English language caused problems in some cases. In the beginning participants were inclined to look for the right answer as if solving a mathematical problem. During the week, they got used to it and an improvement could be seen. Discussions in small groups were held in Chichewa.

The trainers feel the workshop was productive. The response of the participants was positive. An improvement of both the construction/design and the working method has been implemented. Most of the participants are now aware of the need for community involvement, collaboration and maintenance & follow-up.

ANNEX A: List of abbreviations

CDA = Community Development Assistant
HSA = Health Surveillance Assistance
WTA = Water Technician of Africare
WTDep = Water Technician of the Water Department

ANNEX B: Evaluation

Results of the evaluation of the different sessions

The table below shows the results of how the participants valued the different sessions, on a scale from 1 to 5. It shows the percentage of participants which chose a certain mark (main table) and the average mark given. (See eval.form on next page)

	1	2	3	4	5	AVERAGE MARK
<u>MONDAY</u>						
Field visit to Chipusile:	0	0	14	24	62%	4.5
Introduction on protecting a spring (important aspects):	0	0	11	14	75%	4.6
<u>TUESDAY</u>						
Methodology (identifying stages):	3	0	14	24	59%	4.3
Field visit to Kandota:	0	0	17	14	69%	4.5
Site selection (introduction, groupwork and discussion):	0	0	7	28	66%	4.6
Construction materials:	0	4	7	32	57%	4.4
<u>WEDNESDAY</u>						
Foundation, discharge, levelling:	3	7	10	38	41%	4.0
Practical work:	4	7	14	18	57%	4.1
Community involvement (introduction):	17	3	14	21	45%	3.7
Community involvement (discussion Ziasso case):	3	3	17	10	66%	4.3
<u>THURSDAY</u>						
Water quality and hygiene (introduction, discussion):	3	0	7	28	62%	4.4
Roles and Tasks (community involvement and collaboration):	0	4	38	17	42%	4.0
Field visit to Kandota:	0	0	3	31	66%	4.6
Maintenance (water committees):	0	7	15	26	52%	4.2
<u>FRIDAY</u>						
Entertaining summary:	0	3	7	3	87%	4.7

WORKSHOP on PROTECTED SPRINGS, Ntcheu district
AFRICARE, June 1992

EVALUATION FORM - WORKSHOP ON PROTECTED SPRINGS
(Please do not sign your name)

A. Circle the appropriate number, to indicate the degree to which you found the workshop session informative and interesting:
1 = NOT interesting 5 = VERY interesting
or informative and informative

MONDAY

Field visit to Chipusile: 1 2 3 4 5

Introduction on protecting a spring (important aspects): 1 2 3 4 5

TUESDAY

Methodology (identifying stages): 1 2 3 4 5

Field visit to Kandota: 1 2 3 4 5

Site selection (introduction, groupwork and discussion): 1 2 3 4 5

Construction materials: 1 2 3 4 5

WEDNESDAY

Foundation, discharge, levelling: 1 2 3 4 5

Practical work: 1 2 3 4 5

Community involvement (introduction) 1 2 3 4 5

Community involvement (discussion Ziasso case): 1 2 3 4 5

THURSDAY

Water quality and hygiene (introduction, discussion): 1 2 3 4 5

Roles and Tasks (community involvement and collaboration): 1 2 3 4 5

Field visit to Kandota 1 2 3 4 5

Maintenance (water committees): 1 2 3 4 5

FRIDAY

Entertaining summary: 1 2 3 4 5

B. Please answer the following questions as fully as possible:

1. What have been the most positive things about this workshop?

2. What have been the most negative things about this workshop?

3. What one thing stands out as important to you in this workshop?

4. What comments do you have about the amount of time spent in the classroom as compared to the amount of time spent in the field?

5. What comments do you have on the amount of time spent on working in small groups, as compared to full group discussions?

6. What comments do you have about the hand-outs?

Annex B

Results of the answers given by the participants on Monday and on Friday, on the question:

'What do you see as important about protecting a spring?'

The table shows the number of participants that mentioned one or more of the 5 important aspects, or the 5 stages of the process of spring protection. (Note: aspects and stages were never mentioned at the same time).

MONDAY

	Number of aspects mentioned					5 Stages mentioned
	1	2	3	4	5	
Africare	8	3	-	-	-	-
Water Dep	6	-	-	-	-	-
Health	7	-	1	-	-	-
Comm Serv	4	2	1	-	-	-
TOTAL	25	5	2	-	-	-

FRIDAY

	Number of aspects mentioned					5 Stages mentioned
	1	2	3	4	5	
Africare	4	-	-	-	-	5
Water Dep	6	1	-	-	-	-
Health	3	1	-	-	2	-
Comm Serv	-	1	-	1	-	5
TOTAL	13	3	-	1	2	10

ANNEX C: The Program of the Workshop

MONDAY 15-6-1992

8.00 - 10.00 - Opening Ceremony

At the opening ceremony the Assistant District Commissioner of Ntcheu and the Country Representative of Africare/Malawi gave an opening speech. All resource people were present.

10.30 - 12.00 - Introduction on Workshop Content

- A brief introduction on the Ntcheu Protected Springs Project and on the program of the workshop.

- Getting to know each other: Getting to know the other participants and the trainers in an entertaining way (icebreaker) Then, getting a feeling of interdependency, in groups of 8-9 people. (icebreaker).

- Handouts: program and opening ceremony, participants list, short introduction on the project.

13.30 - 15.00 - Field visit to Chipusile

Visit to a protected spring near Ntcheu. Explanation on the different parts of a protected spring and its function, with use of a big diagram. Discussion at the site on field experiences and questions.

- Handouts: 2 diagrams of the protected spring.

15.30 - 17.00 - Introduction on protecting a spring

Introduction of the first workshop-headline:

- Answering individually the pre-evaluation question: 'What do you see as important about protecting a spring?'

- Small groups discussion (per department) on this question, presentation on flipcharts, discussion, remarks by the trainers.

- Handouts: 5 important aspects.

TUESDAY 16-6-1992

8.00 - 10.00 - Methodology

Introduction of the second workshop-headline, and attention for the involvement of the different departments in each stage of the process of protecting a spring:

- Short explanation. Small groups discussion on the questions:

'What are the different stages in the process of protecting a spring?' and 'Which parties should be involved in each stage?' Presentation on flipcharts, discussion, remarks by the trainers.

- Handout: the different stages.

10.30 - 12.00 - Kandota: Different parts of a protected spring

First visit to the Kandota spring (demonstration project), for a close look at the construction work and the location of the different parts of a protected spring. With use of the big diagram.

13.30 - 15.00 - Site selection

Explanation on the different factors concerning site selection and site survey, with special attention for the sanitary aspects:

- Short explanation. Small groups discussion on the questions:

"What information do you need to find out:

-is the flow adequate?

-is the flow reliable?

-is the water safe to drink?

-is the water convenient and accessible?

-is it technically feasible to protect the spring?"

Two groups (CDA and USA) discussed questions 1, 2 and 3; two groups (WTA and WDep) discussed questions 4 and 5. Presentation on flipcharts, discussion, remarks by the trainers.

- Introduction by Mr Steef on theory of physical characteristics of the location and on the importance of a catchment trench and drainage system.

- Handouts: lecturette notes, type of information needed, physical characteristics, drawing of drainage channels.

15.30 - 17.00 - Construction materials

Explanation on function, sizes and construction materials needed for the different parts of a protected spring. Special attention for the maintenance needs of each part:

- Introduction by Mr P. Zirenga on function, size and materials.

- Explanation, small groups discussion on: 'What are the maintenance needs for each part of the protected spring (as listed in the handout 'construction materials)?' Presentation, discussion, remarks by the trainers. Results listed to act as a handout for the maintenance-session on Thursday.

- Handouts: construction materials and drawings.

WEDNESDAY 17-6-1992

8.00 - 10.00 - Foundation, Discharge, Levelling

Explanation on foundations and on the theory of pressure-discharge relations, and the consequences for the relative heights of the different parts of the protected spring:

- Introduction by Mr Mwale on foundations.

- Introduction by Mr Steef on theory of pressure-discharge relations, explanation of a method to measure heights with a water hose.

- Demonstration of pressure-discharge relations with a water hose and an oil drum filled with water.

- Handouts: foundations, discharge versus pressure, implementing of pickets of the same heights with a water hose.

10.30 - 12.00 - Kandota: practical work

- For the watertechnicians (WTA and W'Dep):

Practice of installation of pickets at the same heights with use of a water hose. Explanation of the construction-guide: 'The slab of the storage tank should be 50 cm below the outlet of the wingwall, and the slab of the springbox should be 20-30 cm below the outlet of the wingwall.'

- For the CDA's and HSA's:

Practical work at a sanitary survey in Kandota.

One group looking at information needed about the protection of the spring (catchment area), one group looking at information needed about the users of the spring (for water committee).

The groups collected information (asking users of the spring, the village headman, making observations), followed by discussions and remarks at the spring site.

- Handouts: sanitary survey form and working guide.

13.30 - 15.00 - Community involvement

Creating awareness of the need for community involvement and collaboration:

- Introduction by Mr Mwase (Community Services) on collaboration and community involvement. Distribution of 2 handouts.

- Distribution of the case-study 'Ziasso - a village in Senegal'. Individual reading and thinking on the attached questions about this case (continuation at 15.30h).

- Handout: case-study Ziasso, with questions.

15.30 - 17.00 - Community involvement

Creating more awareness on the need for community involvement and collaboration. Giving some examples to discuss of possible mistakes and their consequences:

- Small groups discussion on the case study, and the questions about this case. Presentation, discussion, remarks by the trainers. Special attention was asked for the role of women, which was severely neglected by all groups.

THURSDAY 13-6-1992

8.00 - 10.00 - Water quality and Hygiene

Explanation of water quality characteristics of different types of springs, and on water-related diseases. Explanation on chlorination and on measures to guarantee good water quality in a protected spring:

- Introduction by Mr Kandaya (Min. of Health) on water quality characteristics and springs. Distribution of a handout.

- Introduction by Mr Abdul (Min. of Health) on water-related diseases.

- Introduction by Mrs Marian on chlorination and protective measures during site selection & survey, construction and use & maintenance, to guarantee good water quality. Main message: 'Regular chlorination of protected springs is nonsense'.
- Handouts: drawing on contamination of water, drawing on fecal-oral path, quality of water, care of the protected spring.

10.30 - 12.00 - Roles and tasks: Participation and Collaboration

Defining the tasks and responsibilities of both community and all other parties involved, in each stages of the process of protecting a spring:

- Short explanation. Small groups discussion on the questions: 'Indicate the role of the community in each stage: WHO should participate and WHAT should they do?' and 'Indicate the tasks and responsibilities of WTA, WTDep, CDA and HSA in each stage'. Presentation on flipcharts, discussion, remarks by the trainers.
- Handout: Community involvement and collaboration.

13.30 - 15.00 - Kandota: construction and care of a protected spring

Continuation of updating knowledge on site survey, construction, maintenance and care:

- Discussion at the spring site on the results of the practical work of Wednesday:
 - Information needed about the users of the spring, specially for training of the community and the formation of the water committee.
 - Information needed about the protection of the spring and its catchment area, and the drainage.
 - Construction-guide on relative heights of outlet wingwall, slab springbox and slab storage tank.
- Discussion and remarks on washing slabs, removable manholes and drainage ditches.

15.30 - 17.00 - Maintenance

Attention for the importance of maintenance and the need for good organisation of the maintenance. Special attention for the role of the water committee and the selection of its members:

- Introduction by Mr Nkhana on the need for maintenance and maintenance needs. Distribution of a handout.
- Explanation on: 'Regular maintenance, minor repairs, major repairs'. Small groups discussion on the questions:
 - 'Who is responsible for maintenance/repairs, as listed in the handout 'technical maintenance needs' (results discussion Tuesday)?'
 - 'Composition of the water committee: WHO should do WHAT, and which skills/qualifications do those water committee members need?'
 - 'How should the materials for maintenance be made available?' (question on the introduction by Mr Nkhana)

FRIDAY 19-6-1992

8.00 - 10.00 - Entertaining summary

Summary of the issues discussed in the workshop, in an entertaining way:

-A game, played by 5 groups of 3-4 people (2 play boards), following a path with obstacles. Each obstacle is a question that has to be answered. In case of a wrong answer, return the path 4 places. The group that arrives first at the end, the protected spring, has won the game. (See questions and explanation at Friday - handouts).

10.30 - 12.00 - Evaluation and closure

- Evaluation of the workshop by all participants:

1. by answering individually the same question as posed on Monday: 'What do you see as important about protecting a spring?'
 2. by filling out an evaluation form, indicating the degree to which they found the different sessions interesting and informative (scale 1 to 5)
 3. by answering questions on the working methods.
- Field visit to Kandota, to have a last look at the construction work, and a last discussion.
- Closure at the Red Cross Hall.

ANNEX D: Handouts

Monday B

WORKSHOP on PROTECTED SPRINGS, Ntcheu district
AFRICARE, June 1992

PROGRAM OF THE WORKSHOP

Monday 15-6-1992 - Friday 19-6-1992

<u>Monday</u>	8.00 - 10.00	-Opening Ceremony
	10.30 - 12.00	-Introduction on Workshop content, getting to know each other.
	13.30 - 15.00	-Field visit to Chipusile
	15.30 - 17.00	-Introduction on protecting a spring
<u>Tuesday</u>	8.00 - 10.00	-Methodology
	10.30 - 12.00	-Kandota: different parts of a protected spring
	13.30 - 15.00	-Site selection
	15.30 - 17.00	-Construction Materials
<u>Wednesday</u>	8.00 - 10.00	-Foundation, discharge, levelling
	10.30 - 12.00	-Kandota: practical work
	13.30 - 15.00	-Community involvement
	15.30 - 17.00	-Community involvement
<u>Thursday</u>	8.00 - 10.00	-Water Quality & Hygiene
	10.30 - 12.00	-Roles and tasks: Participation and collaboration
	13.30 - 15.00	-Kandota: construction & care of a protected spring
	15.30 - 17.00	-Maintenance
<u>Friday</u>	8.00 - 10.00	-Entertaining summary
	10.00 - 12.00	-Evaluation & Closure

Monday B

WORKSHOP on PROTECTED SPRINGS, Ntcheu district
AFRICARE, June 1992

OPENING CEREMONY

15-06-1992

AGENDA

08.30 - 08.40 AM	Introduction of delegates	P. Zirenga
08.40 - 08.50 AM	Brief Welcome	Steef Kruitwagen Workshop coordinator
08.50 - 09.10 AM	Opening Speech	P. Jones, AFRICARE Res. Representative
09.10 - 09.30 AM	Speaker	Martha Chiumya UNDP Official
09.30 - 09.55 AM	Speaker	Mr. Mpanyula (JOC chairman)
09.55 - 10.00 AM	Thanks Remarks	Steef kruitwagen Workshop coor.

WORKSHOP on PROTECTED SPRINGS, Ntcheu district
AFRICARE, June 1992

PARTICIPANTS LIST

Participants from the Water Department:

- D. Mponda
- C.D. Lemesi
- K.D.M. Phiri
- Bunga
- F.Z. Kombi
- H. Chipanga

Participants from Community Development:

- M. Mankhusu
- Mwachitete
- Mkhondia
- S.D. Litchungu
- E.D. Haji
- Kanyumbu
- Bankama

Participants from the Min. of Health:

- Mrs. Makunganya
- H. Tembo
- L.M. Katsekera
- C. Bonongwe
- M. Musichili
- Mtinga
- Ms. F.B. Twaibu
- R. Kasamba

Participants from AFRICARE:

- G. Mabedi
- M. Kanyenda
- B. Chowamba
- Z. Kalua
- H. Laher
- D. Mahata
- T. Tanganyika
- F. Chadza
- M. Mwale
- P. Zirenga
- M. Kanjewe
- J. Makocho

Participant from Water Department Lilogwe:

- R. Wengawenga

TRAINERS

- Steef Kruitwagen
- Marian Marseille

Monday B

WORKSHOP on PROTECTED SPRINGS, Ntcheu district
AFRICARE, June 1992

A SHORT INTRODUCTION

Spring protection programme

The aim of this programme is to protect natural springs. In doing so the communities will obtain clean water from their springs, which means water free from pollution. By building a tank of 2000 liters they also obtain a (night) storage and thus more water.

The programme operates by the same principle of Gravity Fed Water schemes as those done by the rural water supply: the water flows from the spring downwards to the storage tank where the population will get their water using taps.

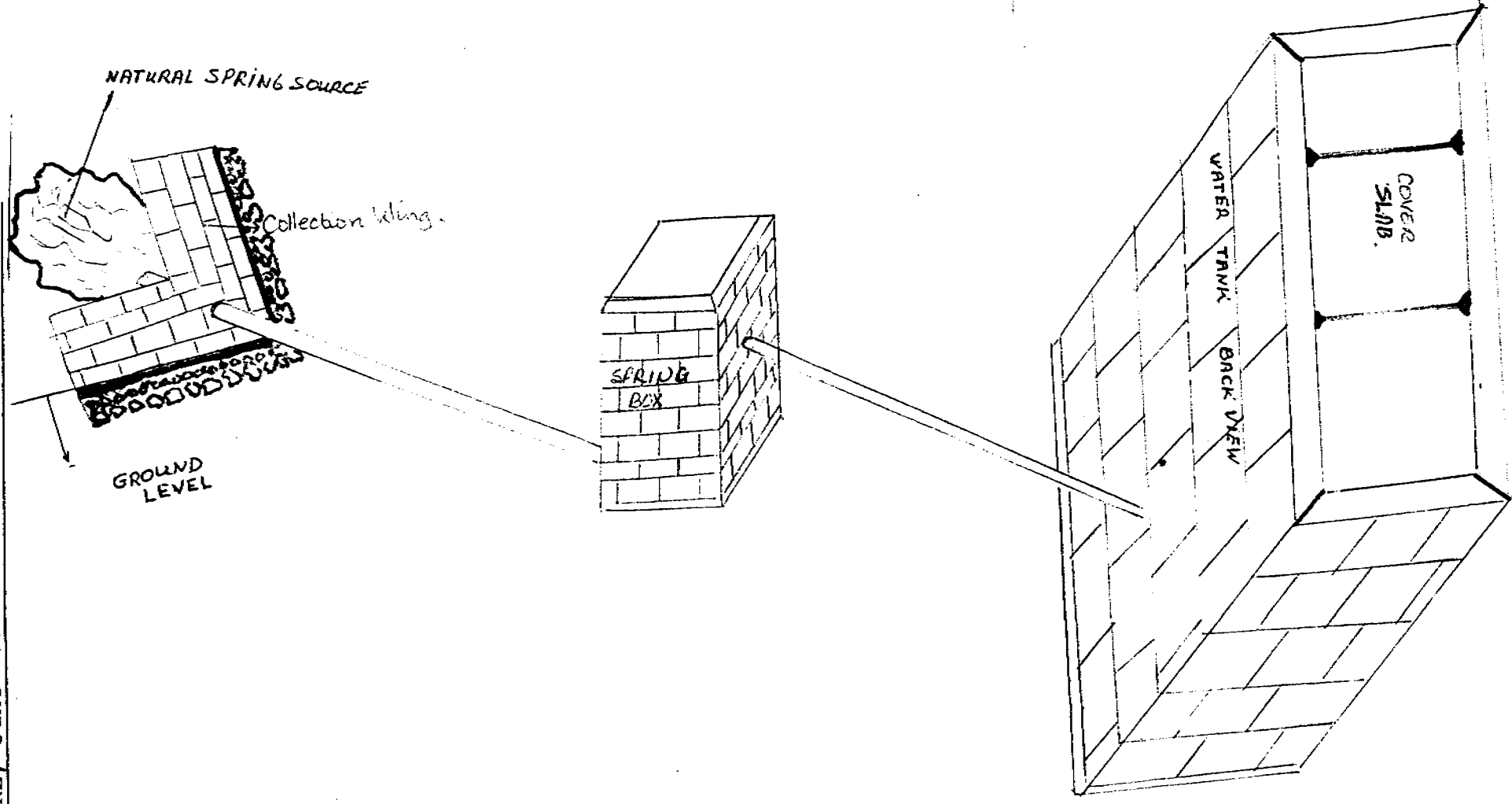
The funding for this program comes from UNDP. The implementing agency is AFRICARE (a NGO from the USA). All is done within close coordination with the Water Department. It is the Water Department to who the protected springs are handed over after completion.

This program aims at protecting 100 springs, and will be completed by the end of August. The program is based on earlier experiences: In 1987, a pilot project was started in Chiradzulu District with donations from Lions Club of Blantyre and other Missionaries. The pilot project proved to be successful. Later the project was extended to Ntcheu District where 63 springs were protected between 1989 and 1990.

The field personnel for this project includes a field supervisor, water technicians and builders. Each construction team has one water technician, one builder and two assistant builders. Also some manual labour should be provided by the community on a self-help basis.

Monday C

WORKSHOP on PROTECTED SPRINGS, Ntcheu district
AFRICARE, June 1992



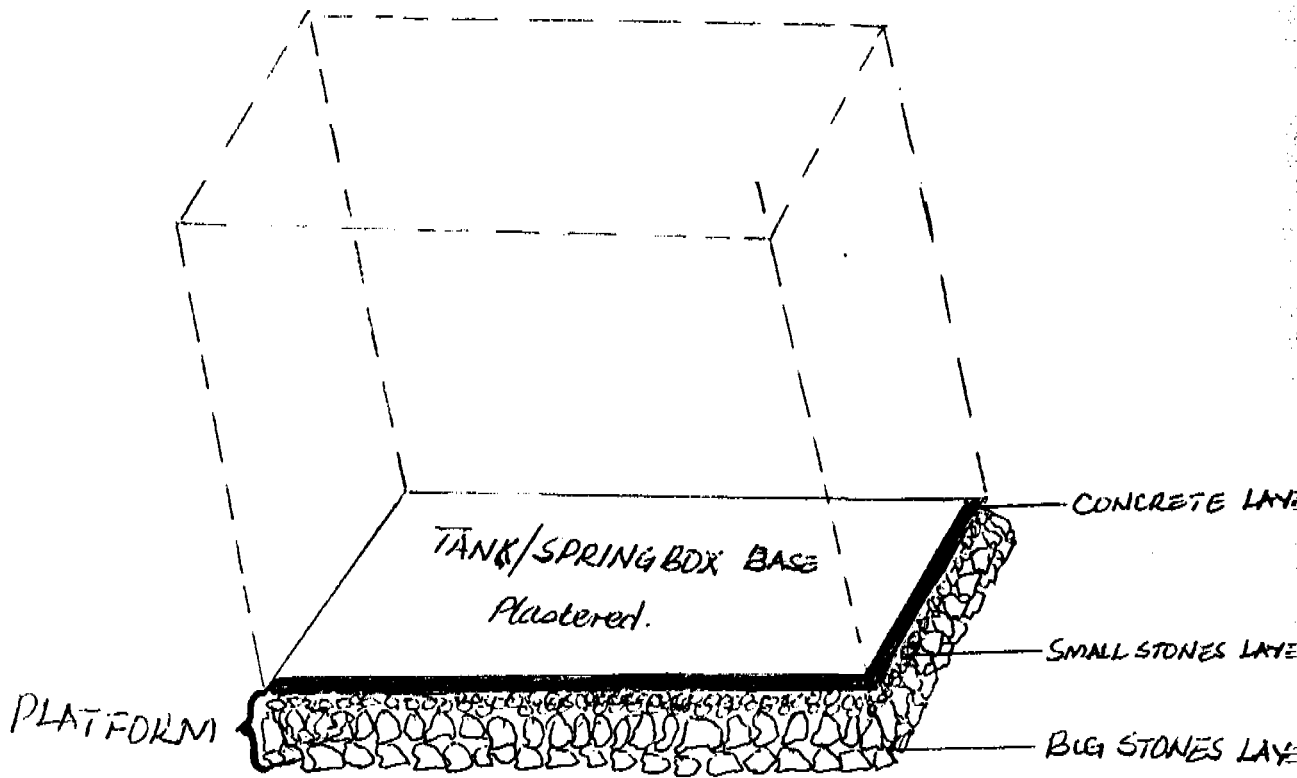
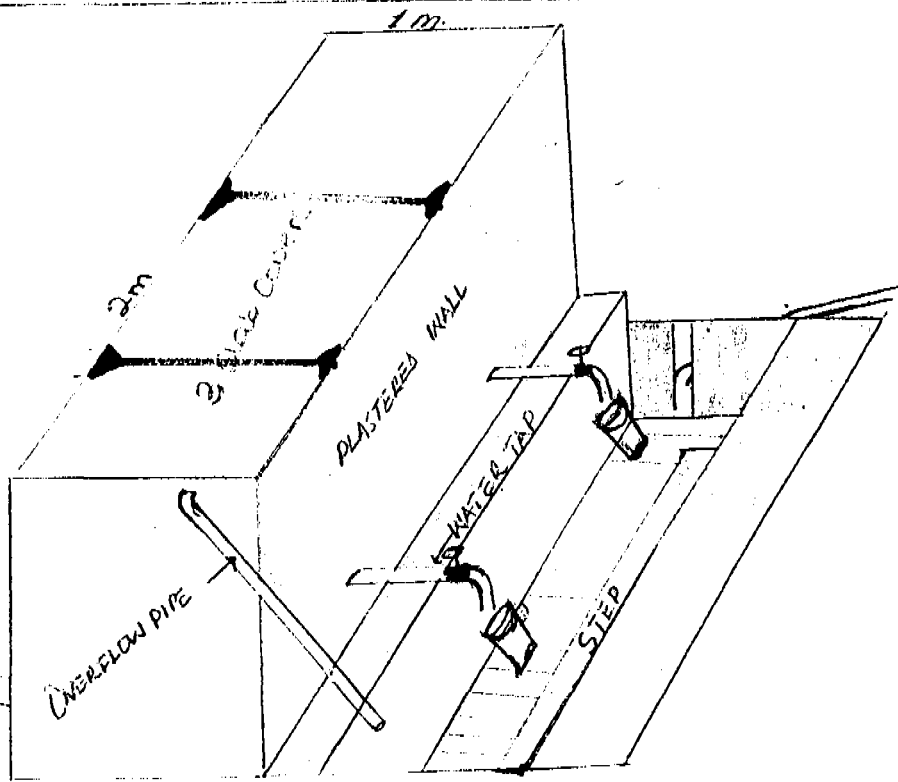
Monday D

WORKSHOP on PROTECTED SPRINGS, Ntcheu district
AFRICARE, June 1992

What are the important aspects, when making a protected spring?

When protecting a spring, the following aspects are important:

- * The construction of the protected spring has to be made properly.
- * There must be a good cooperation and coordination between the different entities involved.
- * The participation of the community is essential.
- * Health education on hygiene and water quality is important.
- * Maintenance of the protected spring, after construction is finished, must be well organized.



Tuesday A

WORKSHOP on PROTECTED SPRINGS, Ntcheu district
AFRICARE, June 1992

The DIFFERENT STAGES in the process of making a protected spring

Making a protected spring is a process, in which different things have to be done, one after the other. In this process, 5 stages can be distinguished:

- 1 - INTRODUCTION of the project to the community, and getting to know the community and the site of the spring
- 2 - PREPARATION of the construction work and formation of the water committee
- 3 - CONSTRUCTION of the protected spring
- 4 - HANDING OVER of the spring to the community
- 5 - USE of the protected spring by the community, CARE for the spring and MAINTENANCE when necessary

In each of these stages, different persons have some special task: the water technician (WT), the health surveillance assistant (HSA), the community development assistant (CDA) and the technician of the water department (WDep).

Indicate in which stages each of them should participate:

	WT	CDA	HSA	WDep
INTRODUCTION				
PREPARATION				
CONSTRUCTION				
HANDING OVER				
USE, CARE & MAINTENANCE				

Tuesday C

WORKSHOP ON PROTECTED SPRINGS, NTCHEU DISTRICT

AFRICARE, JUNE 1992

LECTURETTE NOTES ON SELECTING CRITERIA FOR SITE SELECTION

1. Is the flow adequate? The spring has an adequate flow if it can provide enough water for at least the drinking water needs of the user group or village. Steps for determining this are to measure the flow of the spring to arrive at the total volume produced in one day and divide this by the number of people to be served by the spring. By measuring the flow you obtain the number of liters available for use per person per day. Then compare this amount to the minimum standard of 15 liters per person per day to determine if the spring flow is adequate or not.

In many cases, measuring the flow or yield of the spring will not be possible. If so, determine the yield of the spring by asking (elderly) women about spring flow characteristics.

2. Is the spring flow reliable? A spring flow is reliable only if it is constant and adequate through both wet and dry season for many years.
3. Is the water safe to drink? Remember that spring water is often the best quality nature has to offer. It is continuously flowing from a source underground which has been purified by slowly filtering through many meters and layers of soil. However, it must be uncontaminated by pit latrines and other sources of human waste, livestock, fish ponds, food processing, bathing, washing, surface water runoff and flooding.
4. Is the water convenient and accessible to the users? A spring should be as close to the users as possible to minimize the daily work required by the women and children to collect and haul water. Difficult and hazardous crossings should be avoided, for example, roads, log bridge, or infested waters.
5. Is it technically feasible to cap the spring?

In determining if it is technically feasible to cap a specific spring, there are several factors to be considered.

- a) A spring should have an adequate slope for proper drainage.
- b) It should have protection from flooding and diversion of watershed runoff.

- c) The slope of the site should be steep enough so that the spring box and the storage tank can be placed below spring level.
- d) It should be possible to build a good foundation for the structure. Drainage of the site should be possible also.

Tuesday C

WORKSHOP on PROTECTED SPRINGS, Ntcheu district
AFRICARE, June 1992

TYPE OF INFORMATION NEEDED FOR EACH SELECTION CRITERIA

1. Is the spring flow reliable?
Measure or estimate the spring flow
Determine the number of users
Ask which other sources of water are available, and which source is used for what purpose by which part of the community.
2. Is the flow reliable?
History of the spring flow
Seasonal flow variation
3. Is the water safe to drink?
True origin or source of the spring
Sources of contamination
4. Is the water convenient and accessible to the users?
Distance
Slope
Can the water be brought to a place more convenient to the users (position of the taps)?
5. Is it technically feasible to cap this spring?
Are people willing to participate at this moment in protecting this spring? Are they willing to help with labor force and lodging?
Drainage possibilities
Protection from flooding
Is the slope adequate?
Is the underground good?

Tuesday C

WORKSHOP on PROTECTED SPRINGS, Ntcheu district
AFRICARE, June 1992

Physical Characteristics of
the Location

Springs. Springs can provide a very good source of water for a community supply. Generally, water from springs can be used without treatment if the source is adequately protected with a spring box. Not all water from springs is free from contamination. A sanitary survey of the spring site will help determine whether contamination is likely.

The first step in a sanitary survey of a spring site is to determine the physical conditions above the point where the water flows from the ground. If there are large openings or fissures on the bedrock above the spring, contamination of the spring from surface runoff may occur. Surface runoff enters the ground through the fissures and contaminates the spring water underground.

Find the true source of the spring. Many times, a small stream disappears into the ground through a fissure and emerges again at a lower elevation. It appears to be a spring actually may be surface water that has flowed underground for a short distance. The water is generally contaminated and may flow only during the wet season.

Determine if there are sources of potential fecal contamination. Livestock areas, septic tanks and other sewage disposal sites are sources of contamination. If they are located

above the source or closer than 100m to it, contamination may occur and disease-causing bacteria can enter the water.

The second step in a sanitary survey is to study the area at the spring site. The type of soil may indicate that contamination is likely. Filtration may be poor if permeable soil deeper than 3m is within 15m of the spring. Water passes quickly through coarse soils and impurities are not filtered out. If this condition exists, or if there is any suspicion of contamination, a water analysis must be done.

A spring flowing from limestone or highly fractured rock may be subject to contamination. Earth movements create fissures and cracks in limestone allowing surface run-off to enter the ground rapidly with little or no filtration of impurities. If a spring flows from a limestone bed, check the water after a heavy rain. If it appears turbid, suspect surface contamination and either analyze the water or choose a better site.

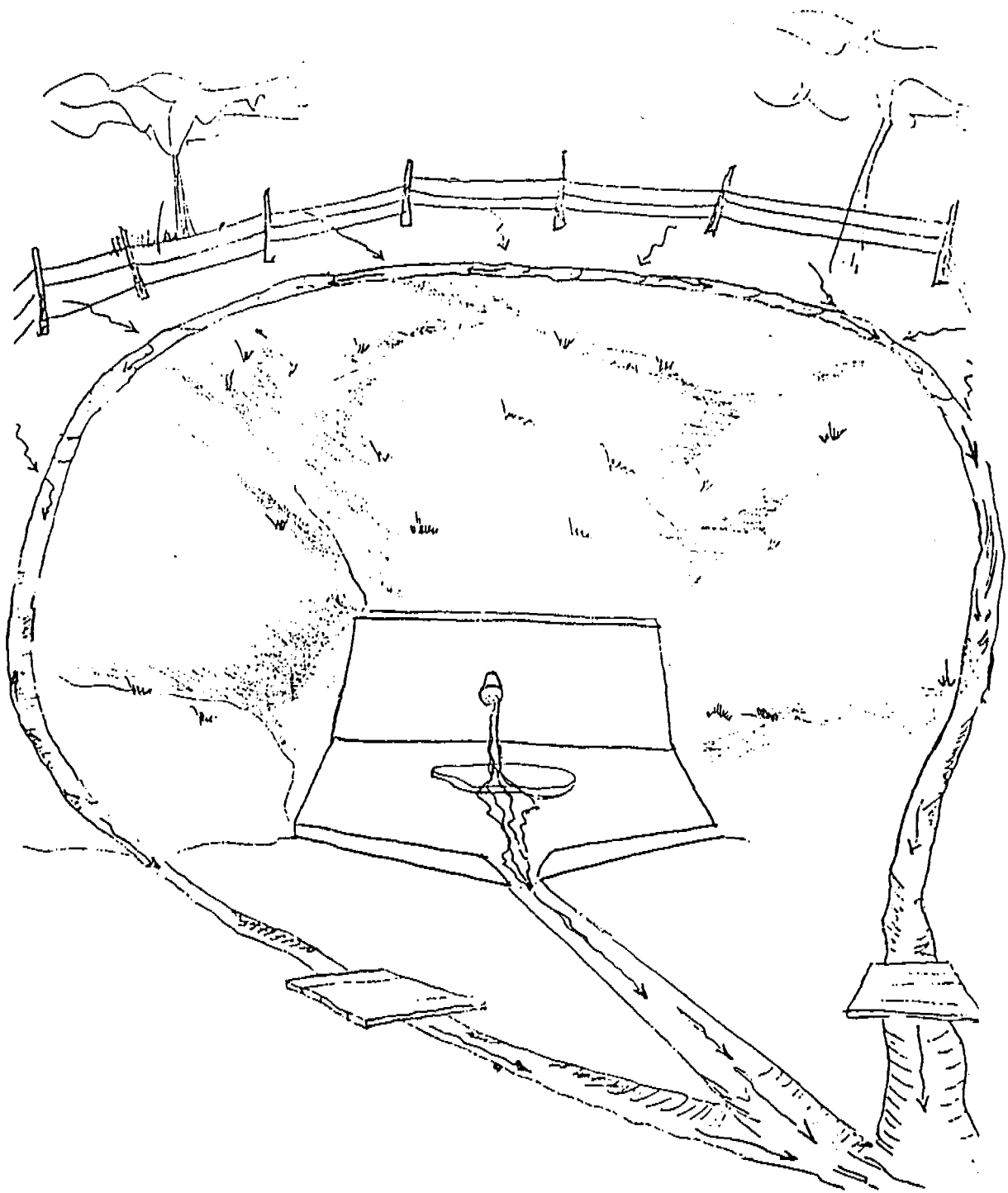
Community members must always be consulted during a sanitary survey. Information from local people should be added to the information collected through observation. They will know about spring yields and reliability and about other local conditions.

*Taken from Water For the World - Conducting Sanitary Surveys to Determine Acceptable Surface Water Sources. Technical Note No. RWS. 1, p. 2.

Tuesday C

WORKSHOP on PROTECTED SPRINGS, Ntcheu district
AFRICARE, June 1992

DRAINAGE CANALS



Tuesday D

WORKSHOP on PROTECTED SPRINGS, Ntcheu district
AFRICARE, June 1992

by Mr Zirenga

DIFFERENT PARTS OF A PROTECTED SPRING AND ITS CONSTRUCTION MATERIALS

Wing walls and its foundation

Seize: thickness - 230 mm (1 brick) or 340 mm (1.5 brick)
length - upto 2 meters each
height - 1 to 1.5 meters

Materials: bricks - ±450 pieces
sand - ±1 tonne
quarry stones - ±2 cu m
cement - 9 bags of 50 kg each
sandstone for rockfill - 1 cu m
(10 - 30cm diameter)

Springbox and its foundation

Seize: inside diameter - 230*230 mm
thickness of walls - 230 mm (1 brick)
depth - ±70 cm

Materials: bricks - ±130
sand - one quarter tonne
cement - 2 bags of cement of 50 kg each
quarry stone: ±0.5 cu m

Storage tank + reticulation walls + floor and steps

Seize: 2m * 1m * 1m (volume is 2000 ltrs)

Materials: bricks - ±1600
sand - ±4 tonne
quarry stones - ±5 cu m
cement - 21 bags of 50 kg each
wire mesh - 6 meter of a roll

Pipes and taps

PVC-pipes: diameter - 50 mm
length - 6 meter each of which you need 3 to 6 pipes

Taps: 2 pieces of galvanized pipes with a length of 500 mm.

At each pipe a gate valve is attached. Diameter

Catch Water Trench (around the whole structure)

Seize: 0.5 * 0.6 meter

Drainage (at the storage tank)

Seize: 50 cm width, depth depends on site

Surrounding

Seize: 5 meter around the storage tank, planted with grass

ANNEX F: References

AFRICARE/Malawi (1991). Ntcheu District Protected Springs Project (MLW/90/B01) - First Quarterly Report, July-September 1991. Blantyre, Malawi.

AFRICARE/Malawi (1992). Ntcheu District Protected Springs Project (MLW/90/B01) - Second Quarterly Report, October-December 1991. Blantyre, Malawi.

Boot, Marieke T. (1991). Just Stir Gently - The way to mix hygiene education with water supply and sanitation. IRC, Technical Report Series, no.29. The Hague, The Netherlands.

Gormley W., a.o. (1984). A Workshop Design For Spring Capping - a training guide. WASH, Technical Report no.28. USA.

IRC (1988). Community Participation and Women's Involvement in Water Supply and Sanitation Projects. Occasional Paper Series, no.12. The Hague, The Netherlands.

- Hence, disturb the inletpipe, because now you have to dig ditch a bit more to connect the inlet at the proper height.
- At the outlet the pipe should remain undisturbed.
- Lay three more layers of bricks, so you have now 5 layers and the inlet connected on top of the second layer.
- On top of the fifth layer you connect the outlet.
- Continue untill you reach ground-level.
- Add two more brick layers and put the cover slab on top.

N.B. In constructing the springbox, the height of the pipe is not disturbed at the outlet!

ABOUT THE CATCHMENT TRENCH

A catchment trench should always be made all around the catchment area. The distance from the wingwall should be at least 8 upto 15 meters. Depth should be 60 cm, width 50 cm. The soil coming out can be used to form a heap at the inner side of the trench.

The ends of the trench should conduct the surface water to low fields.

A PROTECTED SPRING CAN NEVER BE HANDED OVER WITHOUT A CATCHMENT TRENCH.

The digging should be done by the community.
The work should be conducted and supervised by a water technician.

THE CONSTRUCTION

order of construction of wingwall, ditch with pipe, springbox and storage tank and their relative heights

1. Determine the height at which the outletpipe of the wingwall should be implemented. This is at or just below the eyes of the spring, which is normally at the bottem of the spring-pond.
2. From this height, you should dig untill you reach hard soil. But dig always at least 50 cm.
3. Construct now the foundation + wingwall. Install the outletpipe at the determined depth. The height of the wingwall is about 50 cm above the level of the water in the pond.
4. Before doing anything, dig the ditch upto the site where the storage tank will be constructed and put the PVC-pipe into it. The ditch and the pipe should go slightly downwards.
5. The end of the ditch, should be at least 50 cm lower than the outlet of the wingwall. And so will be the laid down pipe.
6. The top slab of the storage tank should always be 50 cm lower than the outletpipe of the wingwall.
7. In moderately sloping areas as at Kandota and Chipusile, at the end of the ditch you are indeed only 50 cm lower than at the outletpipe of the wingwall. So, here you have to dig 1.3 m down to garantee that the top of the tank will be 50 cm below the outlet of the wingwall.
8. After digging to the right depth, you can construct the foundation slab of the tank and build the storage tank.
9. Now the inletpipe of the storage tank has to be connected. Deepen the last few meters of the ditch untill the inletpipe can be connected at the desired height (\pm at 30 from the bottom). For this reason, the pipe should be slightly bend.
10. Only now, after the tank is ready, you will construct the springbox. Determine where you want to build the springbox.
11. The laid down pipe determines the height of the outletpipe of the springbox. So, don't disturb the pipe.
- 12- From the undistured pipe, dig 50 cm.
 - Construct the floor-slab.
 - Start constructing the walls of the spring box.
 - After two brick layers, you connect the inletpipe.

22. 'According to Mr Mwase, the Community Services are ready to participate in the Africare project'
Yes or no?
23. 'Discharge depends on gradient'
Is this right or wrong?
24. 'Discharge depends on the pressure'
Is this right or wrong?
25. You are looking for some member of the water committee, to show you the way to the spring.
You find out, there is no water committee in this community.
Go back 4 places to inform the different parties involved about this situation.
26. You see that some cattle broke in to the catchment area of the spring, through the broken fence.
Go back 4 places, to inform the water committee about this.
27. You are approaching the protected spring, and you see that the drainage channel is blocked with garbage.
Go 4 places back to find someone with a hoe to clean the place.
28. You forgot a jar or a bucket.
To remind you that it is not proper to drink directly from the tap, go back 4 places.
29. As you are approaching the storage tank, you see that women are washing clothes on top of the cover slabs.
You immediately go back to inform the HSA.
So go back 4 places.

Entertaining Summary - Questions (NOhandout).

1. Mention at least 4 parts of a protected spring
2. What is the use of a trench ditch?
3. Mention at least 3 criteria for site selection
4. Mention the 5 different stages in the process of protecting a spring
5. Estimate how many bricks you need to protect a spring
6. Estimate how many bags of cement you need to protect a spring
7. Mention at least 5 activities/sources that can contaminate your spring
8. Mention the 3 different types of springs
9. What type of spring do you find most in the Ntcheu district?
10. Is regular chlorination of a spring useful?
11. Define 'CLEAN WATER'
12. Mention 3 water-borne diseases
13. What should be the difference in height between the outlet of the wingwall and the slab of the storage tank?
14. In one village the water comitte was elected AFTER the construction work was finished. Is this good or wrong?
15. Which parties should participate in the sanitary survey?
16. Mention at least 4 resource people of this workshop
17. How many people are living in Ziasso?
18. What is the family name of the workshop coordinator? Spell and pronounce
19. What are the 3 different types of maintenance needs?
20. 'Major repairs are a task of the community' Is this right or wrong?
21. 'Men are the drawers of water in Malawi' Is this right or wrong?

Friday A

WORKSHOP on PROTECTED SPRINGS, Ntcheu district
AFRICARE, June 1992

ENTERTAINING SUMMARY

Imagine you are thirsty, you had a long journey. You are approaching a village from which you know there is clean and healthy water, because the village has a very well protected spring. Only you forgot the exact way to the tap.....

So start at zero with your empty bottle and throw the dies. Go ahead as many steps as the dies indicates. If you end up at a red step, first answer the question (the top one on the pile). If you fail to give the right answer at once, you will have to go six positions backwards.

There is one big danger: that is the shallow well at your route. If you fall into that one you are completely wrong: an open shallow well doesn't produce clean water. To remind you of this, if you hit the number indicating the shallow well (number 23), you stay there three turns without going ahead!!!

Get started now!!!

Thursday D

WORKSHOP on PROTECTED SPRINGS, Ntcheu district
AFRICARE, June 1992

THE TECHNICAL MAINTENANCE NEEDS AS A RESULT OF GROUPS DISCUSSION
ON TUESDAY

The maintenance need of a protected spring can be divided into:

1. regular maintenance
2. minor repairs, which might be necessary and is normal to happen.
3. major repairs, necessary in case of bad luck or just construction mistakes

For each part of a protected spring, the different maintenance needs are listed according to the above mentioned order:

a. wing walls

1. regularly: none
2. minor repairs: none
3. major repairs: sealing of connection between pipe and wall, repairing of cracks upto complete rehabilitation

b. spring box

1. regularly: inspection, removal of sedimentated material
2. minor: none
3. major: skinning of inside, cracks repairing

c. storage tank a.o.

1. regularly: cleaning of drainage ditch
2. minor repairs: cleaning of the storage tank in case of coloured water coming out of the tap
3. major repairs: cracks, floor breakage etc.

d. pipes and taps

1. regularly: gate valve washer replacement
2. minor repairs: none
3. major repairs: sealing of connection points, replacement of pipes/pipe sockets

e. catch water trench

1. regularly: cleaning
- 2 and 3 : none

f. surrounding

1. regularly: cleaning and maintaining grass and flowers

Thursday D
by Mr Nkhana

WORKSHOP on PROTECTED SPRINGS, Ntcheu district
AFRICARE, June 1992

MAINTENANCE

by Mr Nkhana

Maintenance is a very important task for every water system, since water is life. Water caretakers should be well trained in spring management. Africare should make a small provision for 6 months for maintenance.

1. Protected zone of the catchment area

- Do not encourage clearing and cutting trees from the catchment area, but maintain fire boundaries around the area.
- Special attention must be given to hair roots entering the catchment, if they are not removed they can cause a blockage in a short period.
- Inspect the overflow and drainages, and the grass around the spring must be cut short. Water levels should be taken whenever necessary and after heavy rains.
- Inspect and clean the collection- and inspection-chambers twice a year. Check damages or cracks in slabs, chambers pipes etc.

2. Minor repairs

- Before any repairs are undertaken, the community has to be informed in advance. Minor repairs include leaking pipes, cracked slabs, replacement of rubber washer on taps and gate valves.

3. Major repairs

- All repairs which cannot be handled by water caretakers and the community, must be reported to Water Department Staff as soon as they are discovered. Therefore all maintenance work should be done regularly, including the upkeep of spring surroundings.

3 - CONSTRUCTION

4 - HANDING OVER (handing over of the spring to the community)

5 - USE, CARE & MAINTENANCE

Thursday B

WORKSHOP on PROTECTED SPRINGS, Ntcheu district
AFRICARE, June 1992

COMMUNITY INVOLVEMENT and COLLABORATION in the DIFFERENT STAGES
of the PROCESS OF PROTECTING A SPRING

Protecting a spring is a process, in which different things have to be done, one after the other. In each of these stages, different persons have some special task: the water technician, the health surveillance assistant, the community development assistant and the technician of the Water Department.

In each of these stages, also different community members have to be involved.

- INDICATE:
1. The role of the community in each stage:
 - WHO should participate?
 - and WHAT should they do?
 2. The tasks and responsibilities of WT-Africare, CDA, HSA and WT-WaterDep in each stage.

1 - INTRODUCTION (stage of site selection and site survey, introduction of the project to the community and getting to know the community)

2 - PREPARATION (stage of preparation of the construction work and formation of the water-committee)

Thursday A

WORKSHOP on PROTECTED SPRINGS, Ntcheu district
AFRICARE, June 1992

CARE OF THE PROTECTED SPRING

1 - Insure that there are no sources of contamination:

- Has anyone built a latrine nearby?
- Is livestock coming to the spring?
 If necessary the spring should be fenced and the
 fence regularly checked.
- The drainage channel should be regularly cleaned,
 so that: the water keeps flowing
 and plant growth and dirt are removed
- Pot holes should be filled, to avoid places with
 stagnant water

2 - Use the spring in a proper way:

- Is anyone washing clothes or utensils near the spring?
- Children and newcomers should be educated on how to
 use the spring
- The slab and drainage channel should be regularly
 cleaned
- After collecting water, it should be carried home and
 stored in a proper way
- Flowers could be planted near the tabs, to make the
 spring a nice place

Bacteriological Quality of Water

Good quality water must be available to ensure the health of the people in a community. The bacteriological quality of water is especially important. Water used for drinking must be free from disease-causing fecal contamination. Fecal contamination can be prevented by the protection of water sources, by the removal of sources of contamination, and by the treatment of water. A thorough sanitary survey must determine the potential sources of contamination of a water source so that measures to protect the source can be developed.

An untreated water source should be as free from bacteriological contamination as possible. The greatest and most widespread source of such contamination is human and animal wastes, which is called fecal contamination. A sanitary survey determines the degree to which water sources may be subject to fecal contamination.

Equipment for testing water may not be available and water analysis may be impossible. If so, observation can reveal characteristics that indicate bacteriological contamination. If there is a layer of scum on the water surface, suspect contamination. If excessive algae are growing in a pond or lake, there are organic impurities which may indicate the presence of fecal matter in the water. Speak to local health officials and village leaders to find out if there is a large number of cases of diarrheal illnesses. Many cases of diarrhea, especially among young children, may be an indication of contamination in the water source.

By simple measures such as removing obvious sources of contamination from a catchment area, fecal contamination can be controlled and eliminated. If contamination is not reduced, then the water source should be considered unacceptable.

Physical and Chemical Quality of Water

The bacteriological quality of water is the most important factor in determining the acceptability of a source. Many times, though, water is bacteriologically safe, it has physical or chemical characteristics that make it unpleasant or unattractive to the users. To determine the exact physical and chemical quality of water, laboratory analysis must be done. An evaluation of physical and chemical conditions can be made by doing a sanitary survey. A thorough sanitary survey can detect turbidity, color, odor and tastes and help determine the acceptability of the water source.

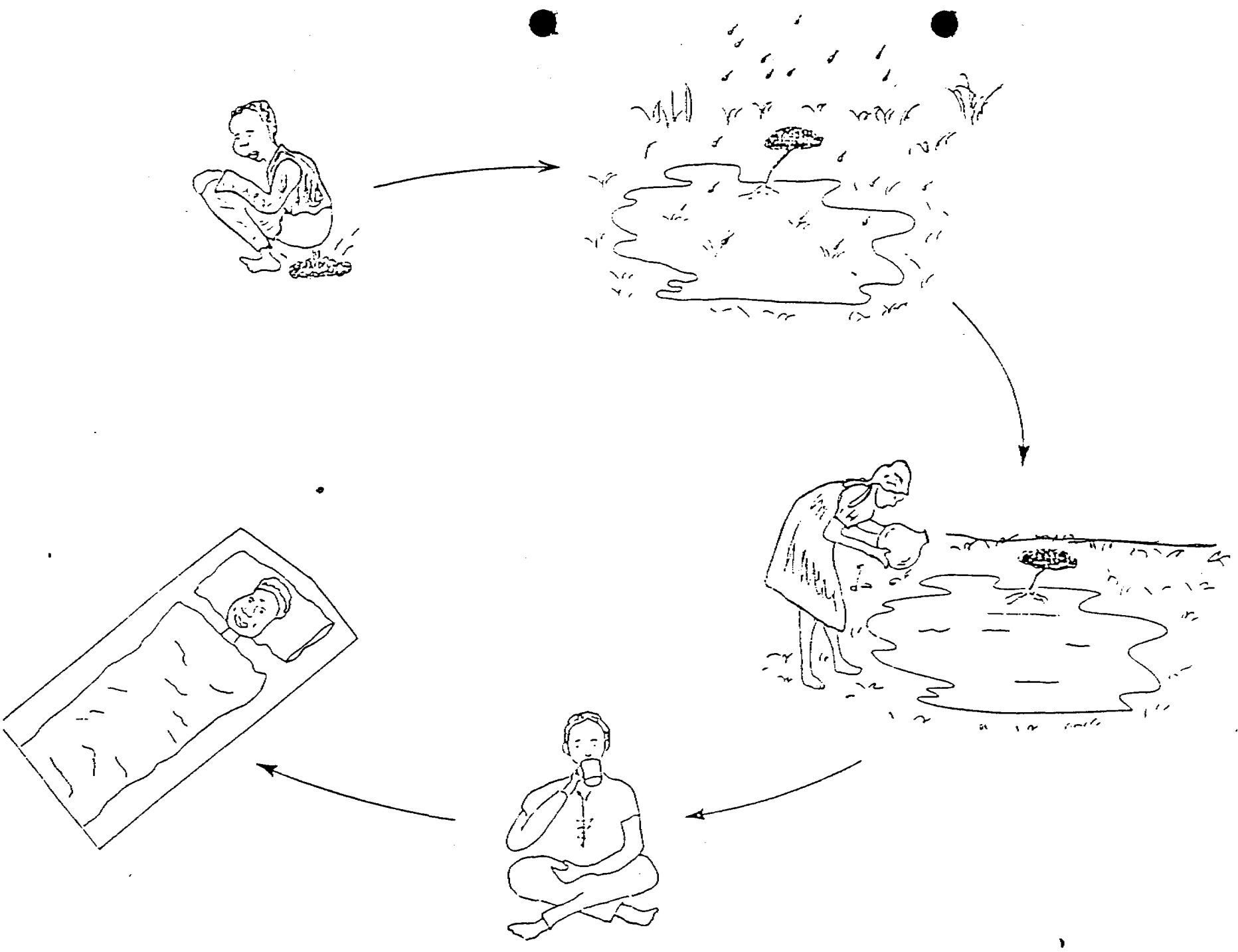
Turbidity. Turbidity is the presence of suspended material such as clay, silt, organic and inorganic material which clouds or muddies water. Turbid water may be potable but often it is aesthetically unacceptable to users. Turbidity may also indicate contamination. A laboratory analysis should be done, if possible.

Color. Dissolved organic material from decaying vegetation and some inorganic material cause color in water. An excessive algal growth may cause some color. Color in water is generally not harmful but it is objectionable and may cause users to drink the water. Highly colored water needs treatment.

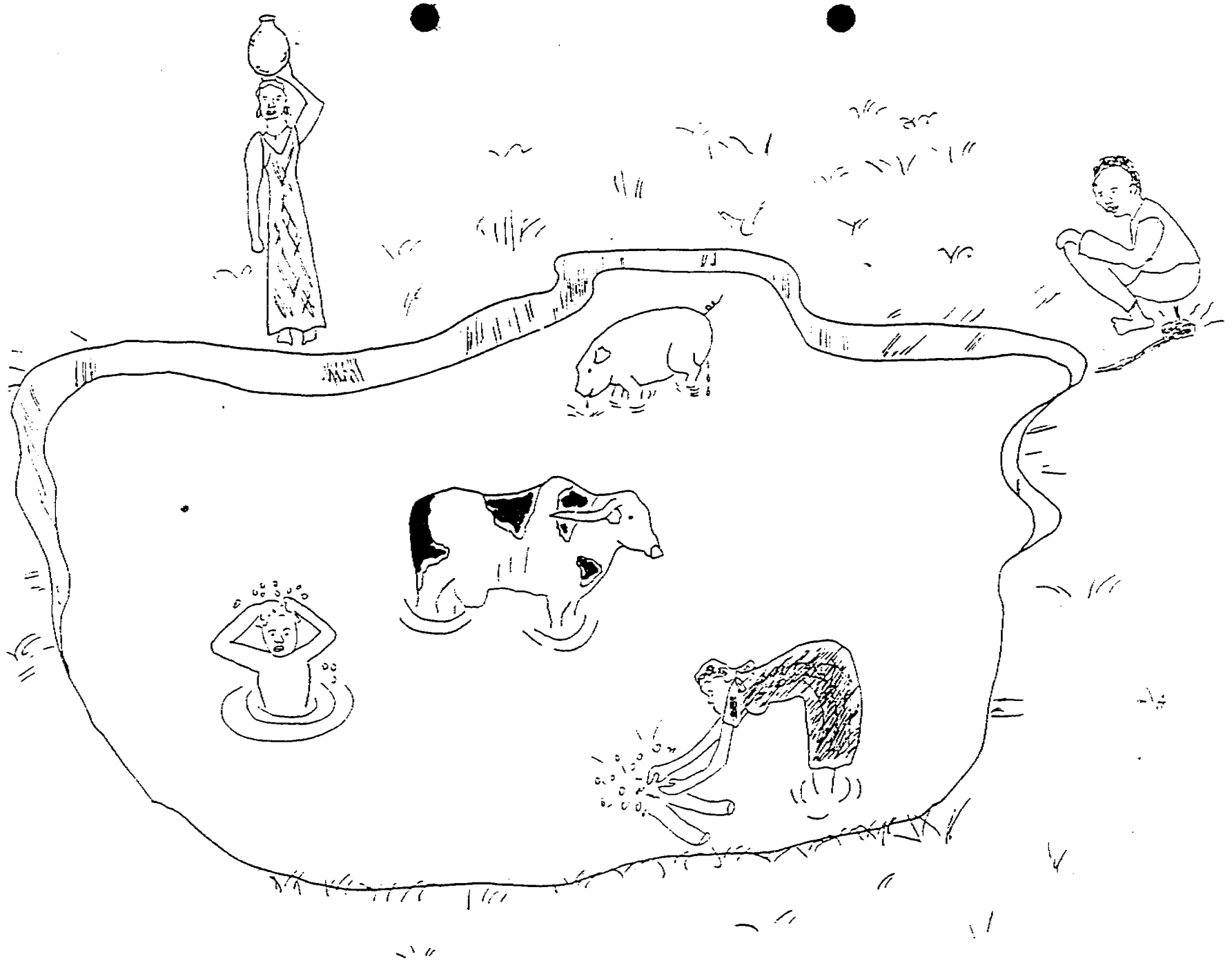
Odors and Tastes. Odors and tastes in water come from algae, decomposing organic material, dissolved gases, salts and chemicals. These may be from domestic, agricultural or natural sources. Water that has a bad odor or a disagreeable taste will be rejected by a community for a different source.

Thursday A

WORKSHOP ON PROTECTED SPRINGS, NTCHEU, AFRICARE JUNE 1992



FECAL-ORAL PATH



ILLUSTRATIONS OF WAYS WATER IS CONTAMINATED

AFTER that, you can chlorinate the tank and the springbox if chlorinated lime is available.

-NEVER should this be done by the community.

-The only moment when chlorination of a tank is useful, is AFTER a cleaning to remove sand and dirt.

* Measures to improve the protection of the spring:

-If the water is contaminated, you should improve the protection of the spring, by:

-Site selection and site survey as discussed before.

-A proper construction like a good catchment trench around the spring and a proper sealing at the wingwalls

-Care and proper use, see handout.

Thursday A

WORKSHOP on PROTECTED SPRINGS, Ntcheu district
AFRICARE, June 1992

Notes on Water Quality and Chlorination

* What is chlorination?

- It is a chemical process, with an aggressive powder like chlorinated lime.
- The chlorinated lime attacks both bacteria and other disease-agents (=desinfection) as well as organic matter, like little rests of plants.

* 2 ways of using chlorine:

- for continuous treatment of water
- for cleaning

* Continuous treatment of water

- This is done in large water systems of cities like Lilongwe and Blantyre.
- The treatment has to be done under control of a laboratory, with skilled people and the right equipment.
- The doses of chlorine depends on the quality and turbidity of the water. Turbid water needs more chlorine. The final chlorine-level of the water has to be 0,2 mg/l. This has to be checked with water analyses every day.

* Cleaning with chlorine

- When cleaning the storage tank of a protected spring, you have to remember it is only a 1-day measure: If you pour the chlorine solution in the tank, it will stay there for 1 day. The next day this chlorinated water will flow out and other water from the spring will flow in and fill the tank. So:
 - if the spring-water is clean, no further chlorination is necessary
 - if the well-water is contaminated, you have to find the source of contamination, and improve the protection of the spring. You cannot resolve this problem by regular cleaning with chlorinated lime.
- When cleaning a storage tank with chlorinated lime, you FIRST have to remove all dirt and sand from the bottom and the walls. IF NOT, the chlorine will be consumed completely by the dirt, and the bacteria will survive, so there will be no desinfection.

So: Regular chlorination of a protected spring is nonsense.
You should clean the storage tank and springbox before sealing them: removing all sand and dirt from the bottom and the walls.

Action

Take chemical samples when you are starting a completely new spring and take history if it is an existing or used spring.

3. Artisan springs

This is underground water which could be from second but more often the third impervious layer and comes out to the ground through a weak point or crack. The crack comes about due to conditions happening to the earth's strata e.g. earth tremors or quakes.

This water might chemically be spoiled and sometimes is poorly aerated.

Characteristics are in "2" but should the water be very much poorly aerated then the water might be hot.

Action as in "2"

H.G. Kandaya
HEALTH INSPECTOR

WATER QUALITY

Before a spring is protected, it is necessary to ensure that the water is of acceptable quality, chemically as well as bacteriologically. Good drinking water should have the following qualities:-

- be bright, sparkling and well aerated.
- be tasteless, odourless and colourless.
- be free from harmful bacteria.
- be free from harmful matter in solution.
- be free from suspended animal and vegetable matter.

Simple assessment of spring water

Springs are of three types and the quality of water is usually affected by the type of the spring as follows:-

1. shallow/land spring

The underground water flows on top of the first imperious layer and comes out at a certain point. The usually is made up of rain water that penetrates the ground. The water as it flows underground is filtered, and the longer the distance it covers before coming out, the more purified the water becomes. If the course taken pass through underground contaminating bodies, like pit latrines and refuse tipping pits, cementaries etc, the water comes out heavily contaminated, with bacteriological bodies.

Characteristics:

The contaminated water will usually present with the following characteristics:-

- cloudy in appearance
- suspended vegetable or animal matter.
- could be ~~colourless~~ ~~colourless~~
- could have a bit warm temperature.

Action

Bacteriological samples should be collected before any attempts are made to protect such a spring.

2. Deep springs

The underground water flows on top of the second imperious layer and comes out usually at a cut or slope. This water in most cases is bacteriologically safe. Contamination usually is immediately done above the out-crop by rain water. Depending on the topography of the area, this type of spring, might chemically be spoiled by natural elements.

Characteristics:

- Water might have a queer taste.
- Fails to form a curve in a half-filled and a down in a filled jar.

acti...

2/.....

⋮

QUESTIONS on the case-study 'ZIASSO - a village in Senegal'

1. Look for the different stages in this Ziasso-project, as we discussed them on Tuesday.
List the people (community-members and others) that were involved in this Ziasso-project.

2. List the problems that arose in this village,
and discuss what could have been done to avoid them.

3. What is the role of the women in this Ziasso-project?
Do you feel it is alright like that?
If not, what should be changed, and why?

4. As a summary, what are the most important recommendations you would like to give to the people involved in this Ziasso-project?

When the building team came, the work began., but with great difficulties, because no one was interested to come and help. They had to ask for help every day and there were problems with the food. But finally, the construction work was ready and the pump could be handed over to the village. The project promoter came again and asked for 3 men to be in the water committee. The men that were indicated, were shortly informed on how the pump should be maintained and repaired.

Using the New Well

In the beginning there were some problems; some people refused to drink the water of the pump, because they said it had a bad taste. Also the Peulh - families made trouble; they had not helped with the digging, but wanted to use the water. Not only for drinking, but also for their cattle. The pump turned into a dirty place.

After sometime, the pump began to make a strange noise when the women were getting water out of it. But, as the men of the water committee had other things to do, no one looked at it. Then the pump broke down. Unfortunately the only person with the tools needed for the repair, had gone out for some months on a family visit. No one knew how to repair it.

Then there came a rumor that a project promoter should come back and repair the pump, as it was his project that had brought it to the village. So the pump was not repaired, and the women went back to the old wells to get water.

Wednesday C+I

WORKSHOP on PROTECTED SPRINGS, Ntcheu district
AFRICARE, June 1992

Ziasso - A village in Senegal

The Village

Ziasso is a village of 400 people. The village is about 100 years old. At 2 hours walking there is the big village Bassana, where there is a big market, and a hospital. In that hospital, children can get vaccinated, and an environmental health assistant teaches the mother about hygiene, latrine making and healthy food. The people of Ziasso don't go often to Bassana. No one has a car, only 2 men have a bicycle.

In Ziasso, the women get water from two shallow, open wells.. also many years old, at some distance from the village. There is also a river nearby. There are two ethnic groups: the Marka, the biggest group, lives in the centre of the village and the Peulh. only 5 small families live at some distance, and only joined the village about 20 years ago. The Peulh have a lot of cattle, the Marka don't. They are mainly producing maize, some cotton to sell and some peanuts and beans.

Recently the community had build a school, with the help of some project that provided most of the materials. Now, the government had sent a teacher and many children could go to school.

The Wells

One day, the project promoter of a deep wells-project, financed by a foreign donor agency come to Ziasso. After talking with the village headman, he did a technical feasibility study and decided that it was possible to make a deep well with a hand pump, on a place just near the village. He promised that the deep well will give water all year around, that it will be nearer to the village than the other two wells and that the water will be of good quality, not contaminated.

As the hospital was a bit far away, and the project promoter had difficulties in arranging transport, he didn't contact the environmental health assistant.

He asked the village Headman to arrange a meeting with the whole community. But, unfortunately on the day he himself showed up only very late, and almost every one had already gone out to the fields, as it was harvest time. He spoke with only a few men, besides the village headman. He explained about the project and the community responsibilities. Then the village headman assured him that the village was very interested in having a deep well with pump. Recently several children had been very sick, and in hospital they had been told it was because of contaminated water. The project promoter told them, the community had to collect sand, help with the digging, and provide food and lodging for the building team.

(3) The Sub Committees of Village Action Committee is:

- water Tap Committee
- Functional Literacy Committee
- Home Economics Committee
- School Committee
- Bridge Committee
- Health Committee

Area of Discussions

- (1) In which ways can we collaborate with NGOs.
- (2) what problems do you face in collaboration and how can you solve such problems.

R. M. MASE
R. M. MASE
DISTRICT COMMUNITY DEVELOPMENT OFFICER
NIGHEU

AMM/brk

The Role of Community Development

The department run four programmes eg.

- Local Leadership Training or Training of local Leaders.
- Community Construction projects or self help Projects.
- Functional Literacy Programme
- Home Economics Programme

The above mentioned Programmes are delivered to rural people by Community Development Assistants, Homecraft workers and local leaders. Therefore collaboration among ourselves is a MUST. In addition to this we should also collaborate with field staff from other Government departments and Non Governmental Organizations.

These Non Governmental Organizations are supplementing Government Programmes. Therefore as Community Development Assistants we should work hand in hand with the mentioned organizations and their staff members.

All Community Development Assistants and Homecraft Workers wherever they are working are bound to know NGOS Objectives, principle and programmes. Therefore this will strengthen collaboration.

Collaboration with Existing Organizations

To have effective and efficient programmes Community Development Assistants should work through existing structures or organization in order to achieve tangible results. Fact finding should be the first priority in knowing such local organizations:-

- District Development Committee
- Area Action Committee
- Village Action Committee
- Camp Committee

Apart from the above mentioned committees we have sub committees both at District, area and village levels like.

- (1) The Sub Committee of D.D.C. is Area Action Committee, and District Technical PHC Sub Committee.
- (2) The Sub Committee of Area Action Committee is Village PHC Committee and village action Committee.

3/.....

Wednesday

MINISTRY OF WOMEN AND CHILDREN AFFAIRS AND
COMMUNITY SERVICES

by Mr Mwas

COLLABORATION WITH OTHER AGENCIES AMONG COMMUNITY DEVELOPMENT
ASSISTANTS, HEALTH ASSISTANTS AND WITH EXISTING ORGANISATIONS

COLLABORATION: Is working with others in different development activities in a joint and coordinated manner.

Rural Development Programmes were established by the Government to ensure that good services should be given to rural people. This required good collaboration among government Departments and Non Government organizations personnel.

(1) Government Departments

Community Development
Forestry
Veterinary
Agriculture
Water
District Administration
Health
Education
Fisheries

(2) Non Governmental Organizations (NGOs)

Africare
UNHCR
Malawi Red Cross Society
Christian Council of Malawi
Christian Service Committee
Concern Universal
Norwegian Refugee Council
Save Children (UK)
Save Children (USA)
American Reseve Committee

The ministry of women and children affairs and Community services is committed to improve the standard of living of the ordinary people in the villages. This is achieved through training and proper use of available resources.

(8) Work Through Existing Organizations

(i) Area Action Committee

The membership of Area Action Committee shall be as follows:-

Chairman : TA or STA

Members : Community Development Assistant
: Health Assistant
: Forestry Assistant
: Field Assistant
: Chairmen of school committees
: group village headmen or village headmen
: Councillor or Councillors
: Area chairman MCP
: Area Secretary MCP
: Area Treasurer MCP
: Area chairman LMA
: Area Secretary LMA
: Area Treasurer LMA
: Area Chairman LMY
: Area Secretary LMY
: Area Treasurer LMY

(ii) Village Action Committee

The membership of Village Action Committee shall be as follows:-

Chairman : Village headman

Members : Branch chairman secretaries and Treasures of MCP,
LMA, and LMY.
: Heads of Primary Schools
: Chairmen of School Committees
: Community Development Assistants.
: Field Assistants
: Health Assistants
: Forestry Assistant
: Chairmen of project Committees.

Conclusion

It is very important to involve as many people as possible in any self help project in order to strengthen maximum participation, motivation and coordination.

(Signature)
A.M. MYASE
DISTRICT COMMUNITY DEVELOPMENT OFFICER
NTCHU

(4) - Special effort should be made to discover these people and arouse their interests such as:-

- : Farmers
- : Businessmen

- : Teachers
- : Retired civil servants
- : Traditional healers
- : People who have lived and worked outside their home Community.

(5) - Encourage Inter-village visits

These visits will make people to discuss community problems.

They will have desire to do something about one or several of these problems.

They can share the problems and find the solutions.

(6) - Hold Public Meetings

A Public meeting provides the opportunity for:-

- Putting across information
- Stimulating interest
- Making a joint resolution that something must be done about a particular problem.
- Showing people that they can share their own feelings concerning local problems.

(7) Share responsibilities

If the decision to do something is made in a meeting, this will be a good start.

- Small committee can be formed to plan self help activities and give feed back to main committee.
- responsibilities in the committee should be shared widely.
- Individuals and small committees are given clearly defined responsibilities and know exactly what is expected of them, their interest and involvement in the project will remain strong.

Wednesday C

MINISTRY OF WOMEN AND CHILDREN AFFAIRS AND COMMUNITY SERVICES
MAXIMUM PARTICIPATION IN SELF
HELP PROJECTS by Mr Mwase

Introduction.

It is important that members of Community should be involved in planning, implementing, monitoring and evaluation of any self help projects like spring protection, road and bridge construction, school postal agencies and clinics, just to mention few.

The more people are involved, the more results will be valued and achieved by the people.

In community development the way the project is initiated and carried out is more important than the nature of the project. This means that local communities should be practically and technically involved in carrying out any project on their own. Community Development assistants who advise people should work at peoples pace, in order to win the confidence of the people whom they work with

IN ORDER TO INJECT MAXIMUM PARTICIPATION
AND EFFICIENCY, WE SHOULD FOLLOW THESE STEPS

(1) Fact finding

Before you introduce change, know real needs and felt needs of the community. Know social structure and social systems.

Moreover know economic, physical, and natural resources of the area.

(2) Contact Influential people in the Community Before Anything is done like:

- Chiefs
- Political Leaders
- Religious Leaders
- Councillors
- Potential Leaders - these may have skills and experiences.

They may become active supporters of self help project (spring protection) and may provide some of leadership.

(3) Discover Potential Leaders in the Society. These are :-

- Various individuals in the Community who could make special contribution to any self help project.
- These individuals may have special knowledge and skills to any self help project or they may be people whose examples others may follow.

Wednesday B

WORKSHOP ON PROTECTED SPRINGS, NTCHEU DISTRICT

AFRICARE, JUNE 1992

SANITARY SURVEY FORM

1. Name of the village

2. Describe the location

3. Name of the spring

4. Location of the spring (distance from users).....

5. Number of households using the spring

6. Number of people using the spring

Average water consumption is 15 ltr per person per day

Amount of water needed = 15 x = ltrs.

7. Quality of the water:

During dry season

During wet season

8. Sources of contamination around the spring and
upstream from the spring.....

9. Type of soil upstream from the spring and around the spring
.....

10. Conclusion on contamination hazard.
.....

Wednesday B

WORKSHOP on PROTECTED SPRINGS, Ntcheu district
AFRICARE, June 1992

Two groups have been working with the sanitary survey form in Kandota (all CDA's and HSA's). In doing so, the trainers felt the need to pose the questions in more detail. This resulted in the following:

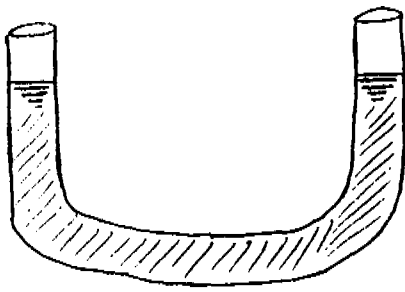
1. About the protection of the spring:
 - answer question 7, 8 and 9 of the sanitary survey form
 - where should the drainage trench and a fence be made?
 - where should the drainage water go to? any use?
 - history of the catchment area?

2. About the users of the spring:
 - answer question 4, 5 and 7 of the sanitary survey form
 - are there any different groups of users (to be involved in the water committee)?
 - what other water points are used by this community?
 - do the users of this spring use other water points/streams?
 - do the women/users have any questions or remarks? do you see any need for giving more information or training?

WORKSHOP ON PROTECTED SPRINGS, NTCHEU, AFRICARE JUNE 1992

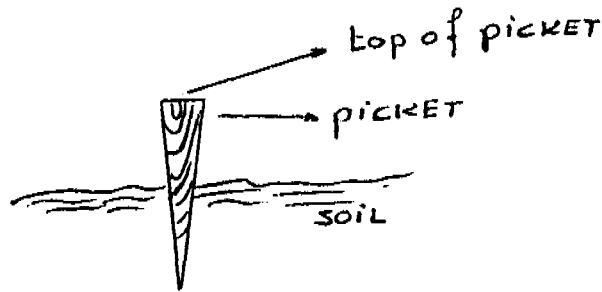
IMPLEMENTING OF PICKETS OF THE SAME HEIGHT WITH A WATER HOSE

1



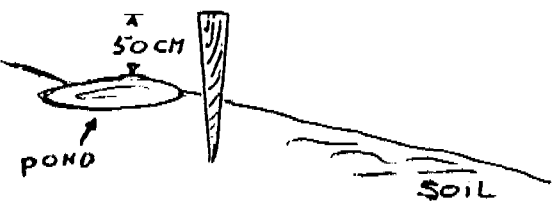
THE WATER LEVELS IN BOTH ENDS OF THE HOSE PIPE WILL ALWAYS BE THE SAME

2



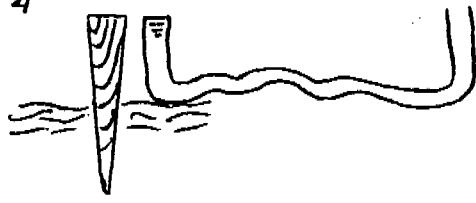
TOP OF A PICKET CAN INDICATE A CERTAIN HEIGHT OR LEVEL AS LONG AS THE PICKET HAS BEEN WELL DRIVEN INTO THE GROUND

3



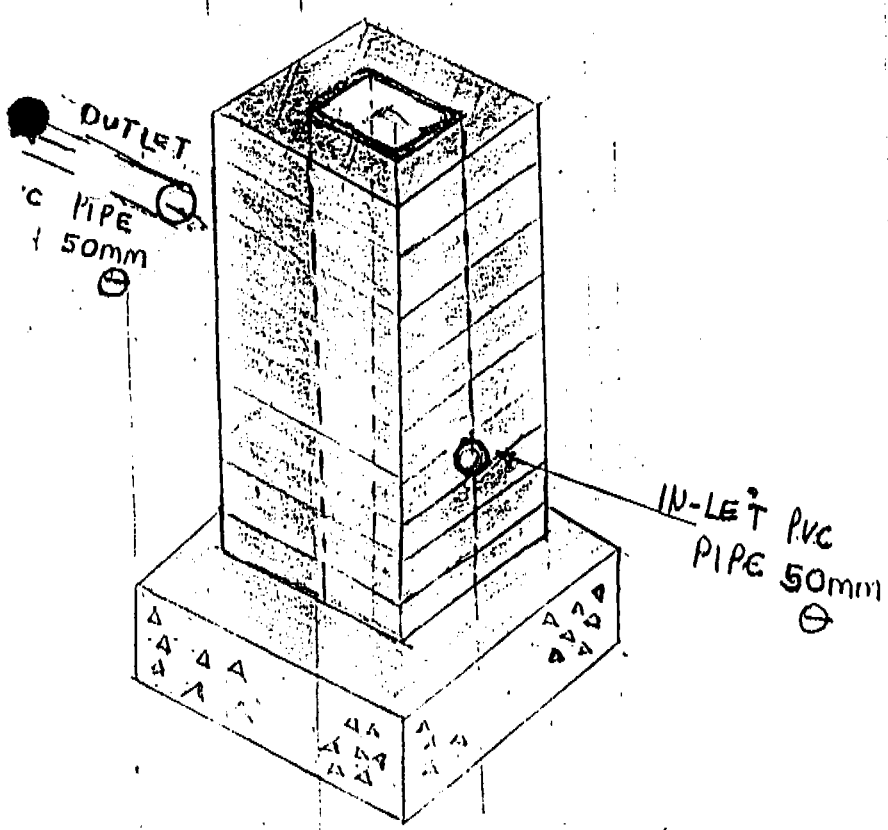
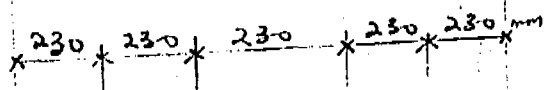
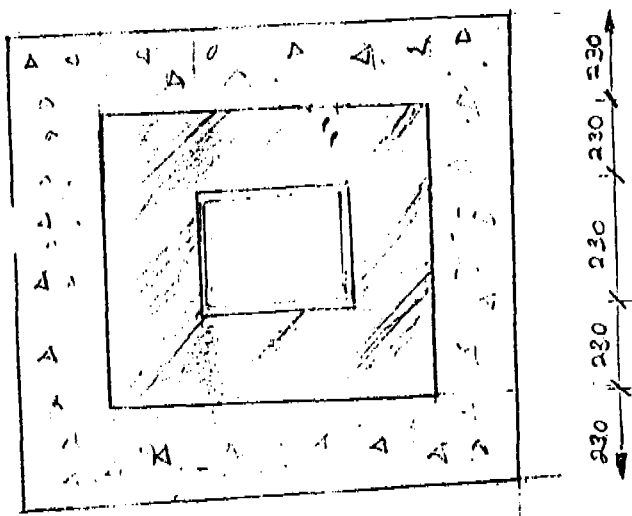
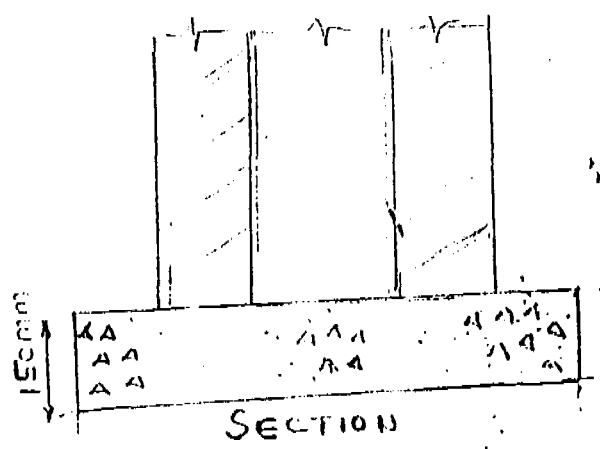
DRIVE A PICKET INTO THE GROUND, THE TOP SHOULD BE 50 CM HIGHER THAN THE LEVEL OF THE WATER OF THE POND

4

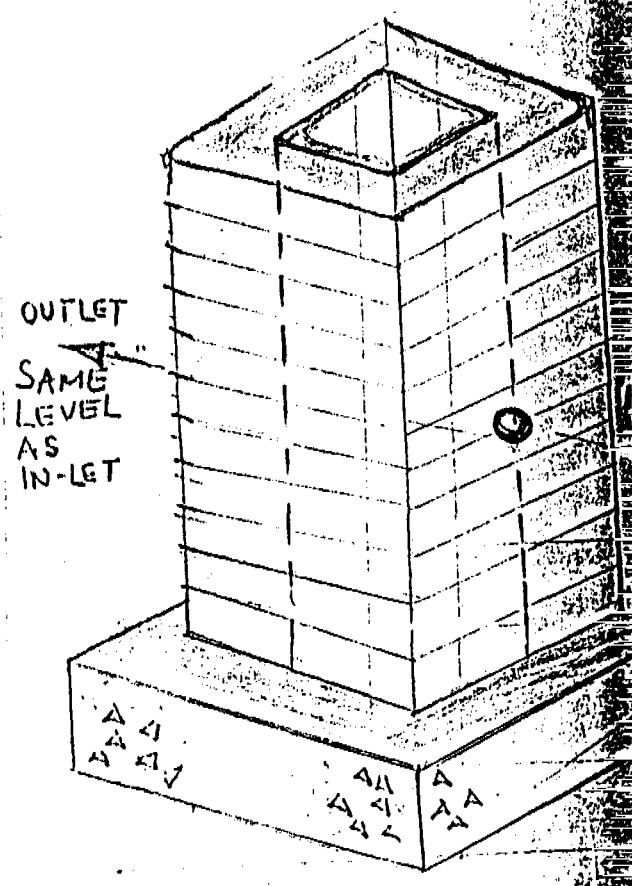


KEEP THE HOSE PIPE WHICH IS FILLED WITH WATER AT THE TOP OF THE PICKET. MOVE THE OTHER END OF THE HOSE TOWARDS THE DIRECTION WHERE THE STORAGE TANK WILL BE IMPLEMENTED. MOVE THE HOSE UP AND DOWN SO THAT NO WATER COMES OUT AT THE END OF THE POND SIDE. READ THE WATER LEVEL IN THE HOSE PIPE AT STORAGE SIDE AND DRIVE A PICKET IN THE GROUND. THE TOP OF THE PICKET SHOULD BE AT THE SAME LEVEL AS THE WATER IN THE HOSE P.

SPRING BOX / SAND TRAP



ISOMETRIC VIEW OF A SPRING BOX

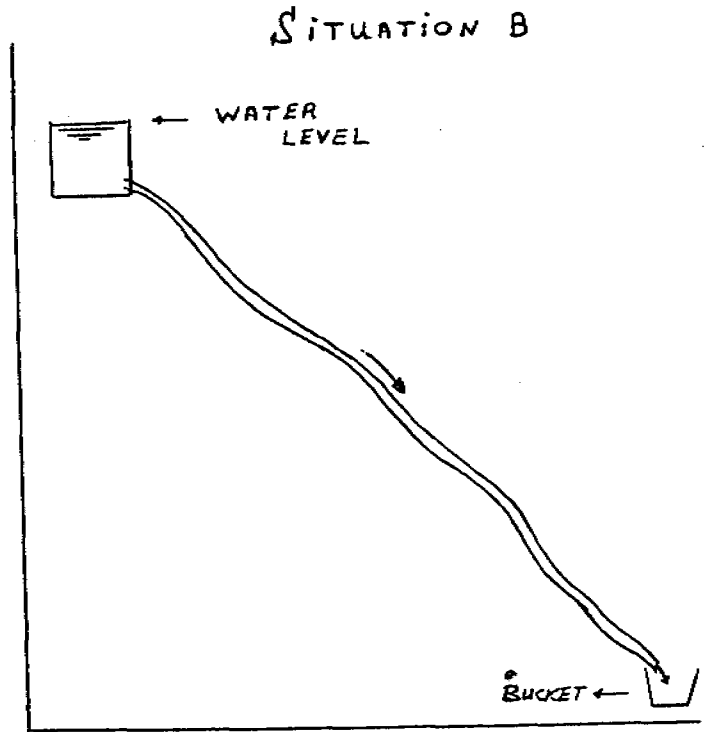
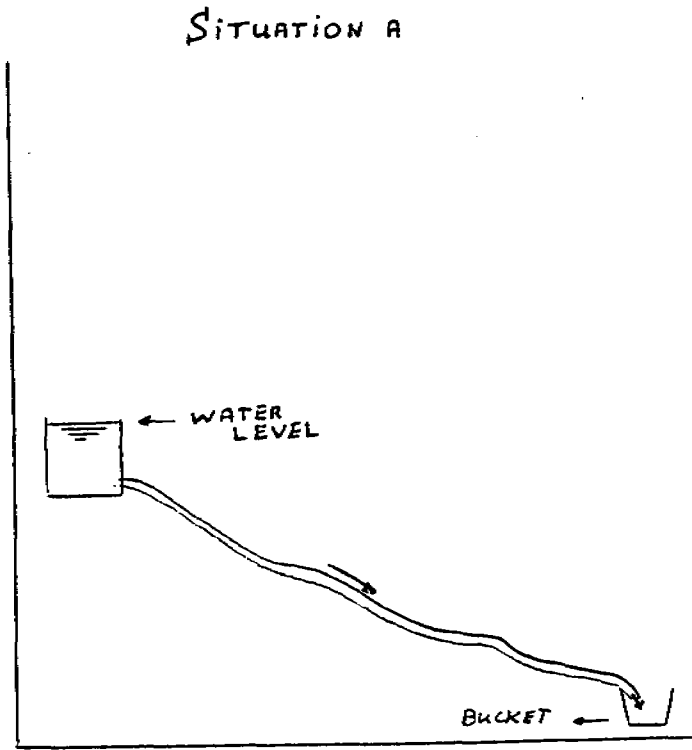


ISOMETRIC VIEW OF A SAND TRAP

Wednesday A

WORKSHOP ON PROTECTED SPRINGS, NTCHEU, AFRICARE JUNE 1992

DISCHARGE VERSUS PRESSURE



IN WHICH OF THE TWO SITUATIONS A & B WILL THE DISCHARGE BE THE HIGHEST

length and one set must be placed in the width of the platform, thus forming a mesh which you tie together with small pieces of wire. The reinforcement bar mesh must be placed 2 cm from the ground (the reinforcement must have a cover of concrete of 2 cm at all sites). The rest of the construction is as with a simple platform.

(C) Jetty Platform

A Jetty Platform is a platform suitable for weak textured soil and soils which permits water seepage. This platform is also recommended at places where the water table is high. This platform is made by putting two types of platforms together: one platform of only stones and one platform of reinforced concrete.

The first is done by building stone walls 15 cm high, their length is the width of the tank which is 1 m, and their width is e.g. 40 cm. Between the walls a space of 5 cm should be left open. Then another layer of stones is placed on top of this structure hence, creating tunnels of 5 cm width from the back of the tank to the front.

On top of all this a reinforced concrete platform will be placed. The stone walls will act as a base upon which the reinforced platform sits and as such cannot sink into the soft soil. The tunnels will drain the excess water from under the tank and take it to an outlet drain.

LECTURETTE NOTES ON FOUNDATION

Site Topography

When siting your storage tank, care must be taken to note the site topography. The tank must be at the lower part of the site. If the storage tank has to be sited on a steep piece of land, it is necessary to level the site. Care must be taken that the tank is not built on loose ground.

Soil Texture

The soil texture must also be taken into consideration. Determine whether the soil is gravel, clay, loam, sand or rock. The soil texture will influence your decision on what type of foundation or platform (platform and foundations means the same) you need. You must also be sure that the same texture continues all over the site. Sometimes a weak patch of land may exist in a belt form from one end to the other. In this case you will have to use a platform which will be suitable for both textures.

Water table

In some areas the siting of a storage tank becomes a problem because the water table is very high (only a few feet deep). A suitable platform has been devised for this case as well.

Different platforms or foundations

After siting a spring, excavation work can begin. During this time always be aware of changes in soil texture and level of the water table. By the time you decide upon where to construct the different parts, you will be able to decide on what kind of a platform should be used and at what depth they should be installed. Note again that a foundation should never be made on loose soil. Commonly used platforms are discussed below:

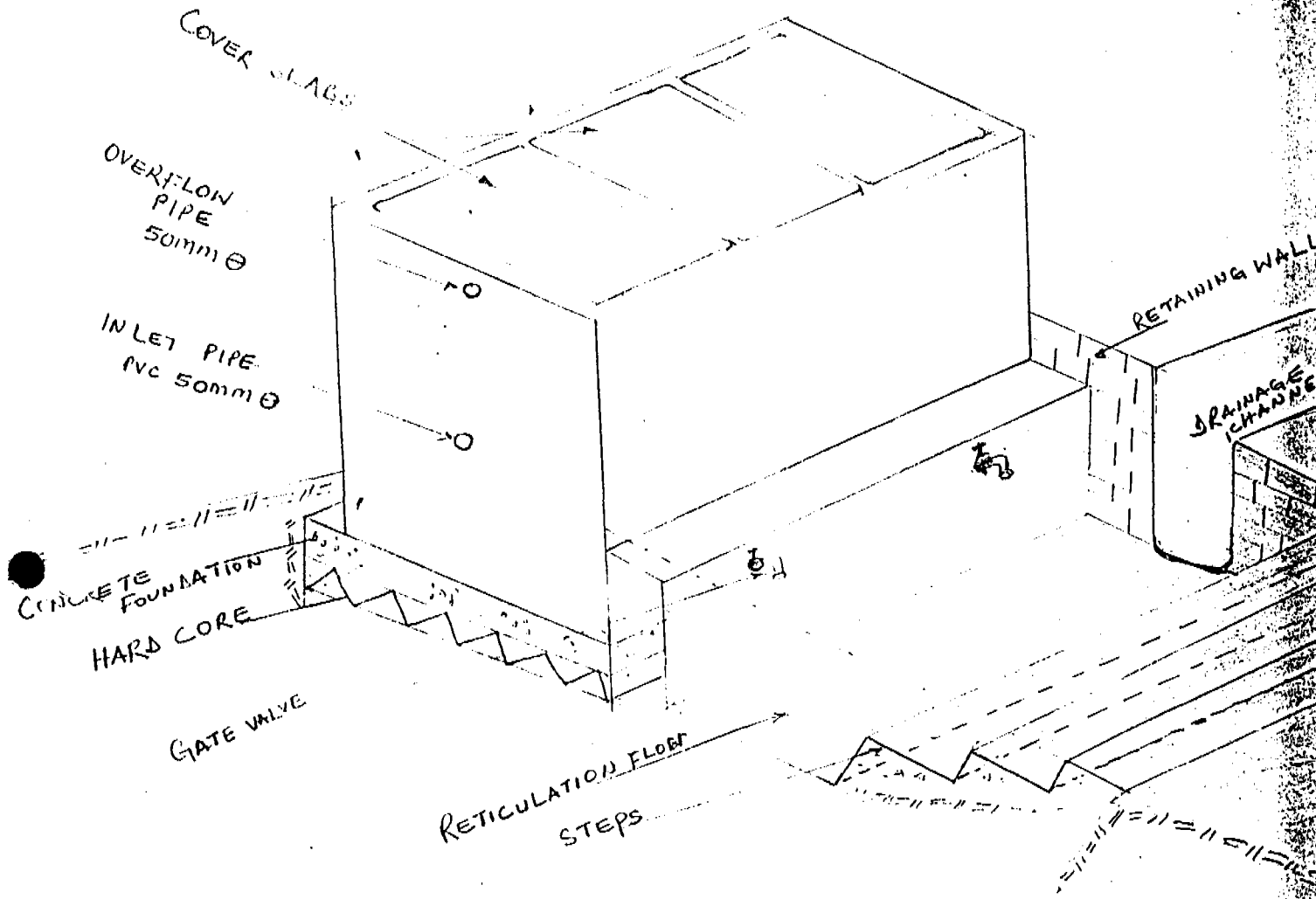
(A) Simple platform

A simple platform is used on stable grounds with clay or gravel soil. All you need is a frame which can be made of planks or bricks. Prepare your concrete in the required ratio and pour it into place. Give it enough ramming to settle the stone chips and remove as many air bubbles as possible. Its thickness should be about 7.5 cm.

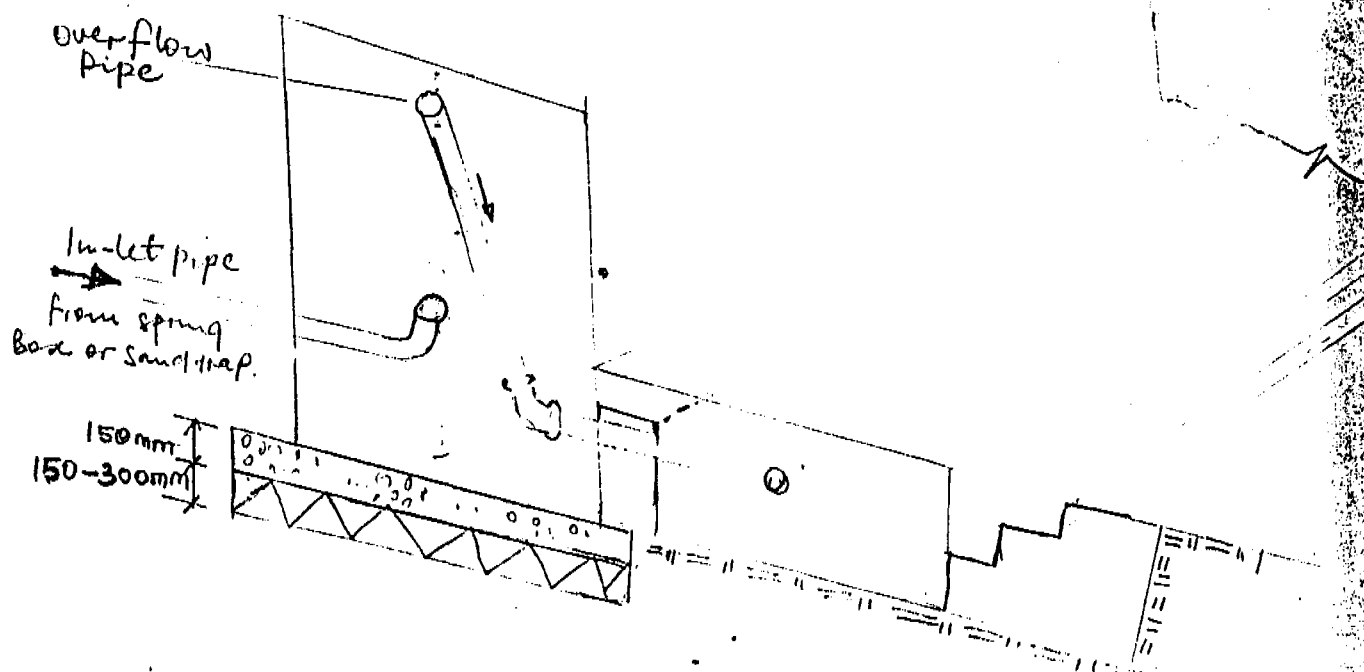
(B) Reinforced concrete platform

This type of platform is ideal for weak soil textures which are not affected by High Water Table problems. Reinforcement bars must be placed 15 cm apart. One set must be placed in the

PROTECTED SPRINGS WORKSHOP



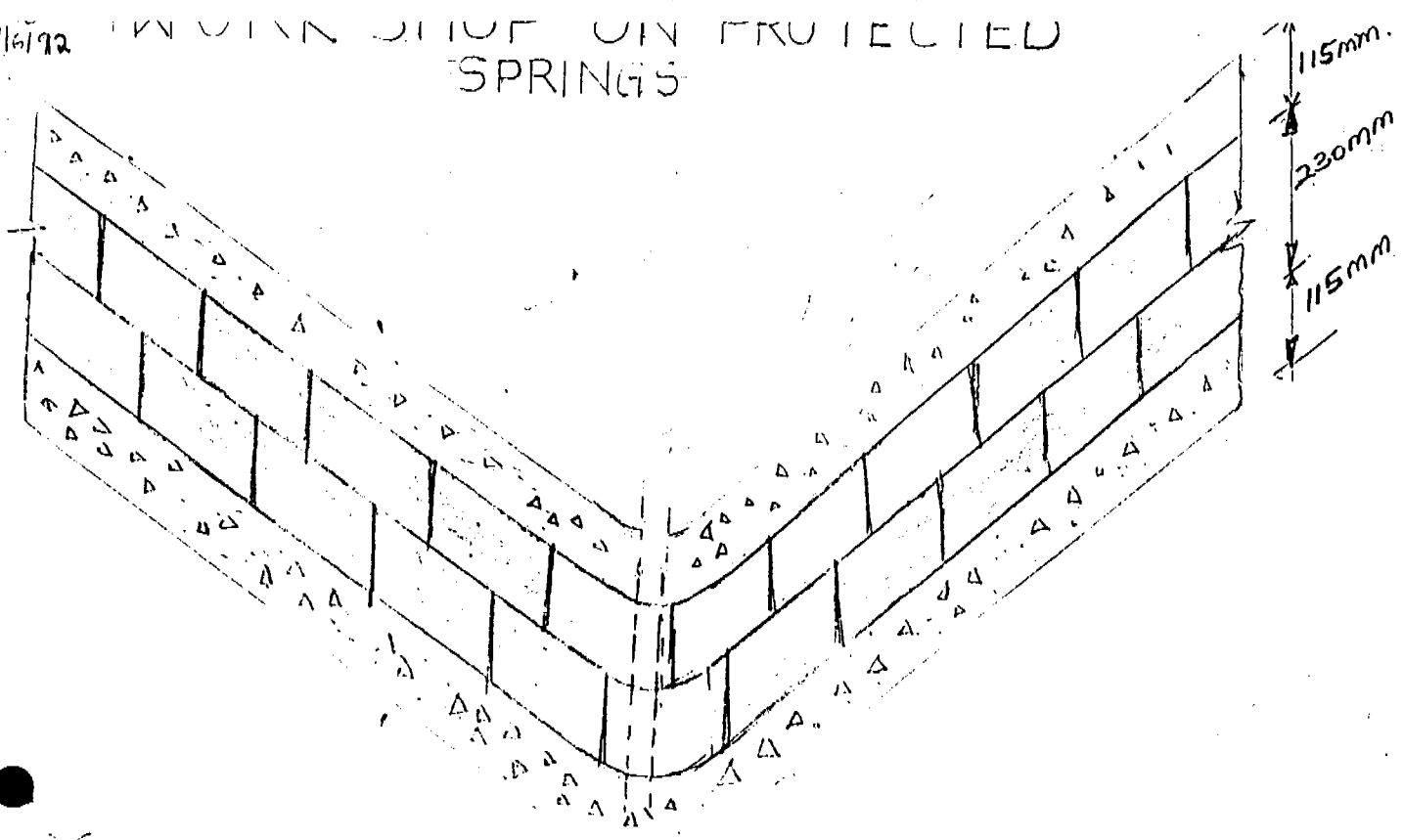
STORAGE TANK, RETAINING WALLS, FLOOR E.S.



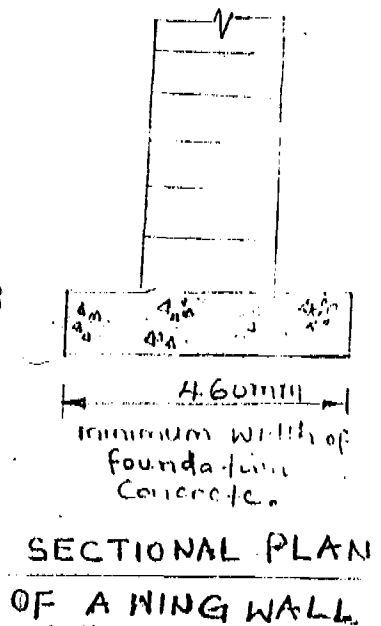
DETAIL OF IN-LET & OVERFLOW PIPE

7/6/92

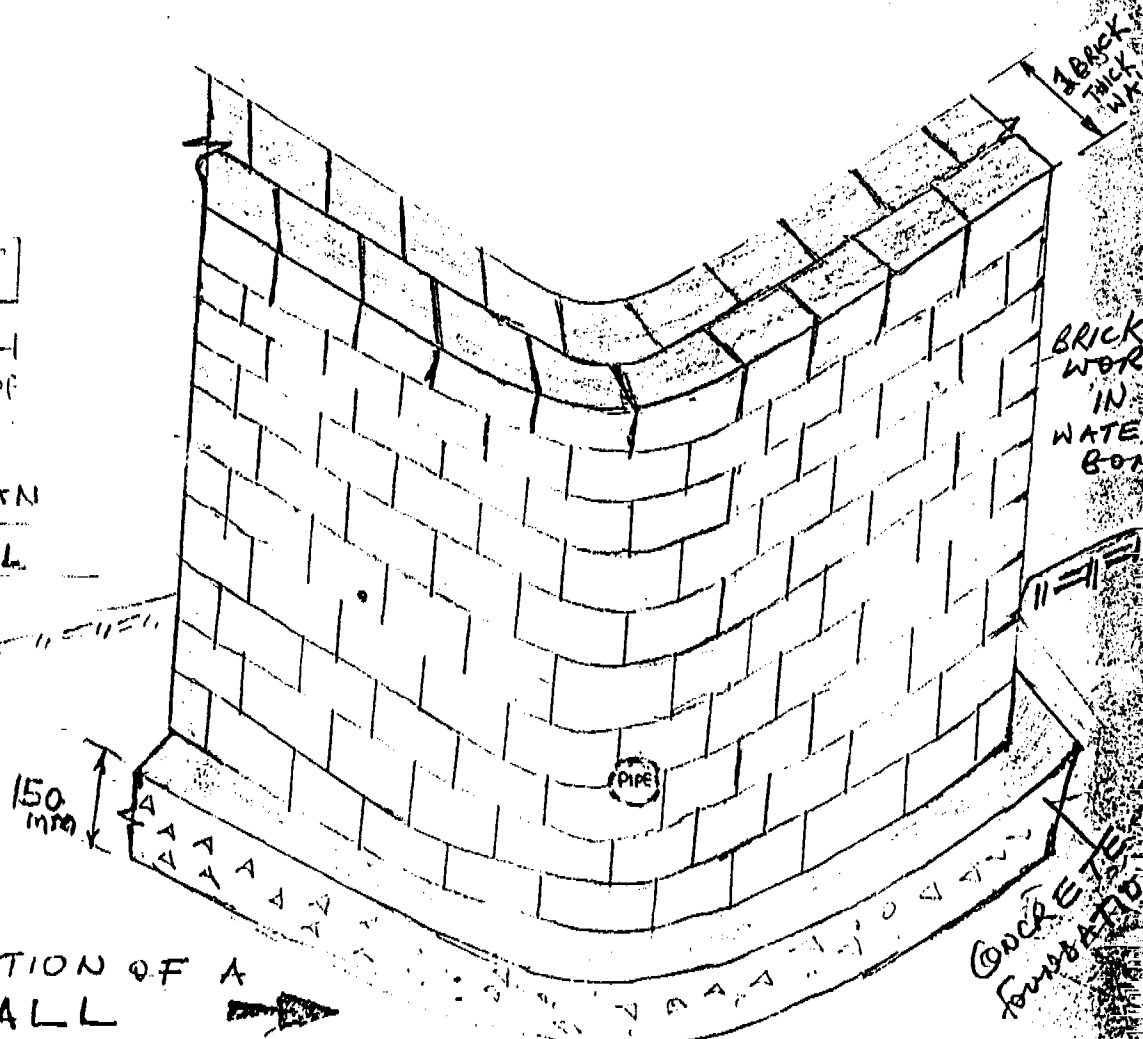
PROTECTIVE SPRINGS



ABOVE — PLAN OF FIRST COURSE OF WING WALL



SECTIONAL PLAN OF A WING WALL



FRONT ELEVATION OF A WING WALL