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THE KWEMAKAME DRINKING WATER PROJECT  
IN TANZANIA

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## PREFACE

This report is going about our survey on the Kwemakame Drinking Water Project in Tanzania. It brings a group of small villages clean drinking water. The construction of the project was finished in the month of May in 1989.

This report is a result of an investigation, which we have done in July 1989 on request of Mr Kees Kempenaar and Mrs Els de With, both working in drinking water projects in the Tanga Region of Tanzania supported by Cebemo in service of the diocese of Tanga. They both supervised the Kwemakame Project during its execution from May 1987 until July 1989.

In chapter 1 we give a short introduction about the drinking water situation in Tanzania. In chapter 2 we try to give a impression of the technical aspects of the Kwemakame drinking water project. Chapter 3 tells about the functioning and the impact of the project, just after the implementation, in the month of July. Chapter 4 gives the conclusions of our survey.

We did this study in order of our graduate course at the Agricultural University Wageningen in the Netherlands.

We want to thank the following people for their help and hospitality: the inhabitants of Kwemakame, the Mwenyekiti of Kwemakame, the Father and the Nuns of the mission of Kwai, the Diocese of Tanga, and Mrs Els de With and Mr Kees Kempenaar.

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In nearly every developing country, in line with the aspirations of the International Drinking Water and Sanitation Decade, the government has set up a target year to supply safe water to all its people from improved sources. The target year for Tanzania is 1991 (this date is recently (1990) postponed to the year 2000). But the available data indicate that a sizeable proportion of the population still obtain their water supply from unimproved sources. According to design criteria, in use by the Tanzanian authorities, the rural population in Tanzania is supposed to enjoy improved water supply from public taps, each one serving between 200-400 people. (Gondwe, 1986)

Accessibility of the water supply is a good measure of the efficiency of water supply. Data from 1982 and 1980 from the regions Mtwara and Morogoro show that only about 20% of the population in the two regions had their water source within a radius of one kilometer. The radius of reasonable access to the supply point of water is given as 200 meters by the World Health Organization (Gondwe, 1986).

In Tanzania a rate of water consumption for different purposes is estimated by the Tanzania water authority as being 25-30 liter per person per day in the rural areas. The rate of water consumption for one livestock unit per day is given as 25 liters at an average and is given as 45-75 liters for high grade dairy cattle in Tanzania. So the rate of water consumption of the rural population is about the same as the rate for livestock units. (Gondwe, 1986)

It is important the water must be safe to human health. The water quality of the source has an impact on any water supply system. Frequently the water quality of rural water sources in Tanzania is far below internationally accepted standards. If these standards were to be strictly followed a number of sources would have to be closed. For example it was investigated that 45% of the water sources in Arusha region had a fluoride content of 1.5 mg/l (Bardecki, 1974) while the international accepted limit is 0.8 mg/l. While the economic situation of Tanzania doesn't allow many improvements in the actual water situation, Tanzania set, like many other countries, their own temporary limits for domestic water quality. The budget of Tanzania is half below the required amount if they want clean water for everybody in the year of 2000 (Kassum, 1981).

A lot of schemes fail shortly after their commissioning. Many times this is due to the used technology in the project. They often import the technology and the materials from the western world. When something breaks down there are no technicians or there are no spare parts available to repair the pump or tap. Other factors, like not paying attention to the organization of maintenance structure, institutional framework are also important reasons for the failure of projects.





Participation of the people involved in the project is very important. People have to be informed. If for example the water pipes passes the property of somebody or a group of people without giving them water, there is a risk they will work against the project. It is also very important people can decide themselves where they want to have the tappoints etcetera. Because they are the users of the system.



2.1 KWEMAKAME VILLAGE.

Kwemakame is a village situated in the Tanga region in Tanzania. It has got one village council but the population is living in different concentrations each with a village sub name. At total there are six of those sub villages; Dindira, Kileti, Kimunyu, Kwemakame, Luago and Tambwe. The sub villages of Kwemakame is situated in the center of the sub villages. Kwemakame has got a population of 3620 inhabitants (1988). Every friday there is a very busy market.

Up in the mountains nearby the sub village Dindira, the Dindira spring feeds a stream in the valley of Kwai. According to measurements from the regional water engineer office in Tanga town this spring carries 1.05 liter a second at the end of the dry season. So the people of the sub village Dindira can always have quite easily rather good water. Downwards it is far more difficult to find clean water in the dry season, because many streams are drying up or are polluted in the valleys. So people have to walk long distances to get some clean water. Distances from 2 up to 7 kilometers with a level difference up to 200 meters occur in Kwemakame. The people from Kwemakame village have to walk about 1.5 kilometer to find water in the wet season. In the dry season this is far more because this stream always dries up and the people have to walk up to 6 km. Also in the rainy season the situation is bad due to the muddy water and due to the cattle from Kwemakame, who are using the stream for drinking water and are making the place dirty and muddy. Also people are washing upstream. This all makes the water quality for about 80% of the population unreliable (the other 20% are taking water more upstream).

In 1983 there has been a cholera epidemic in Kwemakame and the nearby surroundings. People were not allowed to leave Kwemakame, the village was closed by militaries. Many people were very seriously ill and about 100 persons died. One of the main causes of this epidemic is probably the shortage and bad quality of water.

Around this time the parish priest of the Catholic Church in Kwai applied for financial support in order to start a gravity water supply project, which had been designed already some years ago by the government water department. In 1986 this project was agreed upon by the Dutch Catholic organization for joint Financing of Development Programmes CEBEMO.



## 2.2 THE KWEMAKAME WATER PROJECT

The construction of Kwemakame project was started in 1987. Since the month of may 1989 all the sub villages of Kwemakame are getting water from the project. With an exception of the sub village of Kileti, because Kileti is situated too high up in relation to the Dindira stream, so it could not have been supplied by gravity. The project was designed to supply this group of sub villages with clean and sufficient water, by using the Dindira spring as water source. This spring was originally used for drinkingwater, washing etc. by the people of the sub villages of Tambwe, Kimunyu and Dindira, it was also used for irrigation, mainly of tomatoes.

According to the Regional Water Engineer Office the Dindira spring has a capacity of 1.05 l/sec at the end of the dry season. In 1987 the total population of the project area was estimated to be about 2300. The used consumption for rural water supply is estimated to be 30 liters a day in Tanzania (Gondwe 1986). So there is a need of 69000 liters a day. The total daily capacity of the spring is 90720 liters a day at the end of the dry season so this is for this amount of people at this moment enough, supposed that the people do not water their cattle with the water from the project because then the amount of water will be to less. The Dindira spring gives 39.44 liters a day a person at the end of the dry season. The Regional Water Engineer Office is expecting twice as much inhabitants within 20 years. This means that after those 20 years only 19.72 liters a day is available for each person. This quantity is really low for a safe and hygienic water supply. But that will still be much better than the situation without the project.

The Dindira spring feeds two main streams, flowing down in an area with grass fields and water plants just along the stream. The spring is mainly fed by rain water which infiltrates in the topsoil of the hills. At present parts of those steep hills are used for cultivation. Because trees are cut and sometimes there is no crop at all on the fields, the direct runoff can increase and thus this decreases the total amount of water in the spring.

Over a long distance the streams are fed by water slowly flowing out the stream banks. There are two main streams each with several branches, the streams are coming together just below Dindira village. Already above this joining point the spring is used as a drinking water point for people and cattle. Just below the joining point the farmers are using the stream for irrigation. The water quality is said to be good.

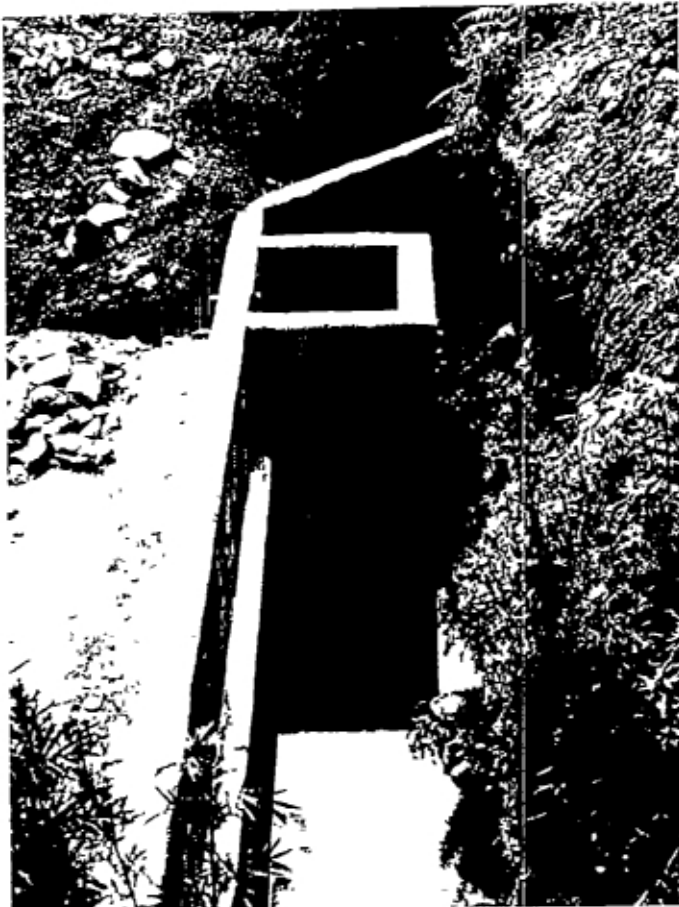
According to the original design a dam should be constructed about 150 meters below the joining point. Behind this dam some water should be stored which could help to bridge the dry period. From this dam the water could be transported to the sub villages of Kwemakame by gravity only. Later it has been decided not to



build a dam due to the danger of pollution. This pollution is mainly caused by cattle which is using the water upstream, but also caused by the people of Dindira who are for example washing their clothes upstream. It was decided to build an intake upstream which is probably more expensive but the quality of the water will be better.

The construction of this intake is as follows:

Nine big holes have been dug in the ground just above the different places where the water was seeping out of the ground (spring captation), so the water should flow into those holes. The holes are about 2 till 4 meters deep the length is about 10 till 20 meters and the width is about 1.5. In the holes a wall has been build over the total length. This wall doesn't allow the water to flow further into the ground or to escape sideways (see picture). The water thus flows into plastic drainage pipes laid behind the wall. Again at the lowest point from those holes an outlet pipe has been made in the wall to transport the water out of the hole into the direction of the big tank. In front of the point where the pipes had been placed, an inspection box was build with many holes where the water seep through so it will lower the entrance resistance and prevents choking the pipe. The inspection box is build in order to check the outflow of the water at any time. The holes were being filled up by stones, gravel, sand and soil. And it was planned to plant trees around the complete intake area. later on this will prevent the intakes against the entrance of cattle.



one of the nine holes of the intake structure





From the intakes the water is transported through pipes and small tanks to the store reservoir. The springs are situated on different levels therefore the small tanks are constructed as break pressure tanks to prevent the water to flow from one intake to another one. At all places where the pipes are jointed such a small tank with an overflow is build (five in total).

From one of the intakes the water is flowing directly to the sub village of Dindira but passing a tank first. This tank is build to make a storage to supply water during the peak hours. In Dindira there are five drinking water points one of which with a washing table. From the other eight intakes the water is transported to the big storage tank first. This tank has got a capacity of about 20000 liter.

After this tank the water flows by gravity only into the direction of Kwemakame village. Before it reaches Kwemakame it has got several branches; one at the sub village of Kimunyu and two at Kwai mission. After Kwemakame the water continues to flow to the last sub village connected on the pipeline, Luago. In total over a length of about 9 kilometers pipes have been laid. This means that over that length a trench has been dug from about 1 meter deep till about 0.5 meter width through a mountainous area with often many stones. The pipes inside and just below the intake area are all D.I. pipes, laid above the ground.

In Kwemakame a water tank has been build to store water. Tambwe and Kimunyu have got small break pressure tanks. In Kimunyu at the dispensary and at the mission earlier rainwater reservoirs are now integrated in the project and store some water.



the tank of Kwemakame



In total there are made 27 drinking water points (for the drawings of the drinking water points see appendix I). This means at average one drinking water point for about 90 people. With an exception of the mission of Kwai and the dispensary no private connections were made due to a possible shortage of water. In front of the mission a meter has been installed so the amount of water the mission uses will be recorded and it can be decided to have them pay for it. The dispensary gets free water.

The places where the water points are located were pointed out by the water committee and the "mabalozı" (the leaders of ten houses) with the help of the supervisor. The water points are always close to houses and on central points so people can easily look after it, and for instance prevent children from playing with the taps. In choosing locations they also paid attention to the possibilities to drain the wasted water.

At seven drinking water points a concrete washing table was made (for the drawing of the washing table see appendix I). Each project sub village is having such a washing table. In Kwemakame and Kimunyu it was decided to build two washing tables because of the big number of people who are living there. The washing tables are designed with the help of the women of the water committee. To come to a good design one of the supervisors took the women of the committee to a place where already a washing table existed and showed the women several drawings and pictures of different washing tables from which they came to the final design.



## 2.3 THE ORGANIZATION OF THE KWEMAKAME WATER PROJECT

The Kwemakame villagers were participating in the project, not only by telling where to put the taps, but they were also involved in the organization of the construction of the project (see for this organization table 1).

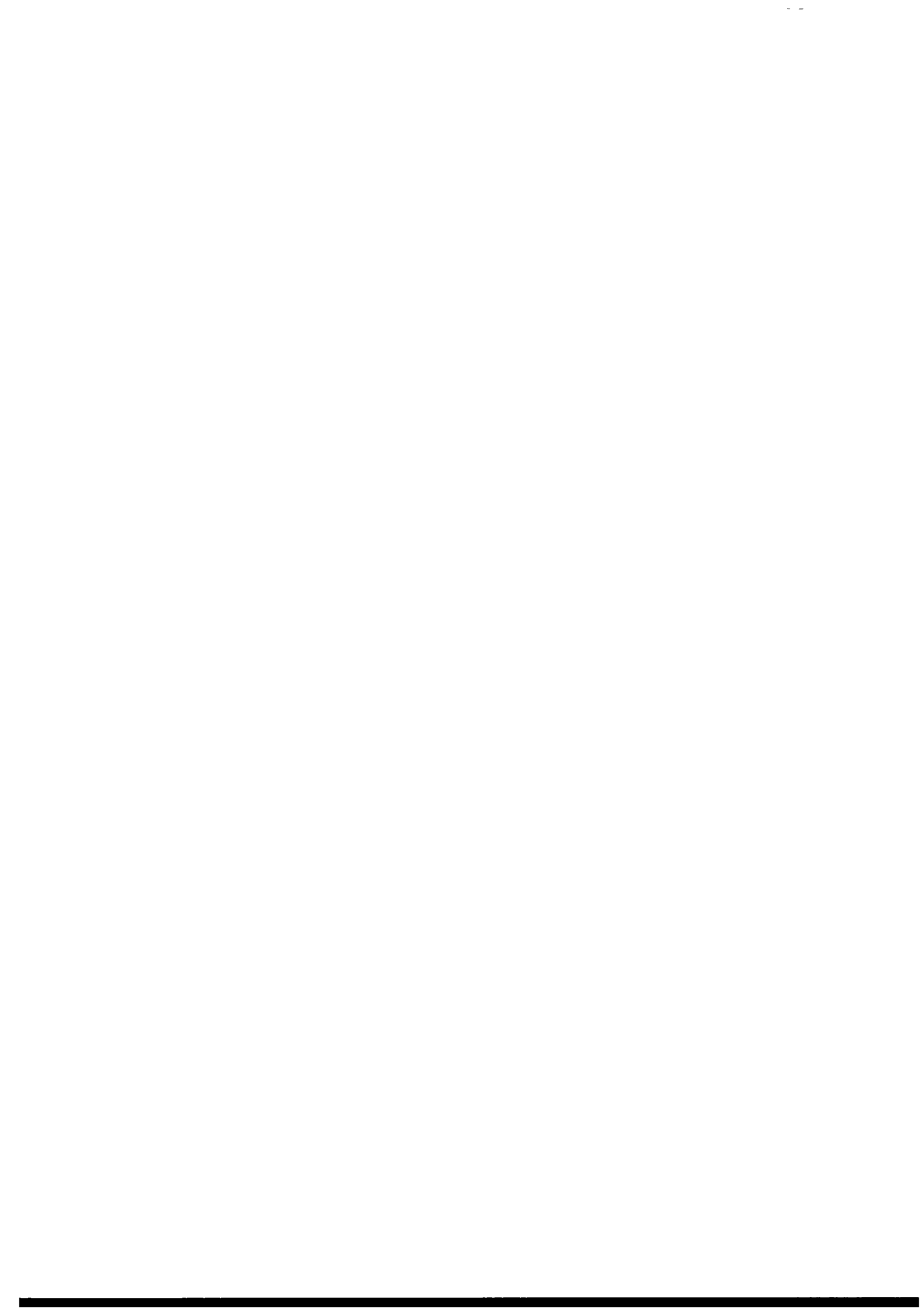
The official head of the organization is the "Mkurugenzi wa wilaya". This is the executive director of the district, he is appointed by the government. He represents the "Idara mbali mbali", these are ministry departments at District level, and the "Viongozi mbali mbali", these are the official CCM party leaders and heads of the department (CCM is the name of the Tanzanian political party). One level below the "Mkurugenzi" you find the "Mwongozi paroko" and the "kamati ya utendaji na utunzaji".

In the Kwemakame water project the Mwongozi was an Irish parish priest in service of the Diocese of Tanga region. He helped the villagers to ask Cebemo to finance the water project by sending them a proposal and he also signed the contract for the water project with Cebemo.

The "kamati ya utendaji na utunzaji" is a committee of 40 persons mainly chosen by the villagers; every sub village had to choose some representatives, both male and female. The mwenyekiti (mare of the village chosen by the people) is the chairman of the committee. The katibu (secretary of the village chosen by the CCM party), a nun of the mission and a school teacher are participants as well.

The committee was responsible for the organization, the planning and the execution of the project. During this phase the committee had meetings every month. With the 14 women of the committee there were several special meetings, for example to pay some attention to a safe and hygienic use of water or to come to a good design of for example the washing table. Also on the primary school in Kwemakame the teachers gave some special attention to a better use of drinking water.

Besides the water committee and the parish priest stands the "Mtaalam" or the supervisors. The supervisors are Kees Kempenaar and Els de With, they are selected by Cebemo, because of their knowledge of technical and social aspects of water projects. The parish priest and the committee supervise the "mafundi" and the "mabalози". The mafundi are the technicians who are constructing the pipeline system and masons and bricklayers. As far as possible they are selected from the local people, only two of them are not originally living in the project area. The mabalози or the "ten houses leaders" are the spokesmen representing their part of the village (10 houses). They are chosen by the villagers they represent. Those spokesmen were made responsible for the voluntary workers who are at the base of the organization.



The mabalozzi had to take care for enough volunteers. From Monday up to Thursday there should be volunteers working in the project, each day these volunteers were people out of another sub village. Thus every male adult had to work 2 till 3 hours each week in the project, as well as every female adult. In average there have been working about 120 men and 80 women at the project every week. They had tasks like digging trenches or filling up trenches, making roads or collecting stones for foundation works of the project.

By the end of the construction period a maintenance committee was chosen out of the "big" water committee. This committee has at least one representative of each sub village, amongst them are three women. They will be responsible for the operation and maintenance of the whole system, i.e. supervise the work of the village technicians who were trained during the execution phase, and the work of the village caretakers. The village technicians have to check the whole system once a week. These technicians are paid by the villagers of the project area.

For every public tap two caretakers have been chosen, their tasks and responsibilities were discussed and trained. Their tasks are dealing with the upkeep of hygiene around the tap, early recognition of problems and stimulating other users to adopt new habits of safe transport, storage and use of water at home.





TABLE 1 The organization of the Kwemakame Drinking Water Project

"IDARA MBALI MBALI" (department)		"VIONGOZI MBALI MBALI" (leaders)	
	"MKURUGENZI WA WILAYA" (head of the district)		
" MTAALAM" (supervisor)	"MWONGOZI PAROKO" (parish priest) "KAMATI YA UTENDAJI NA UTUNZAJI" (water committee)		
	"big" construction water committee		
	maintenance water committee		
"MAFUNDI WAASHI" (bricklayer)	"MAFUNDI" (maintenance technicians)	"MAFUNDI BOMBA" (pipe layers)	
	"MABALOZI" (ten houses leaders)		
	"GUNDA" (voluntary workers)		
"J'TATU" (monday)	"J'NNE" (tuesday)	"J'TANO" (wednesday)	"ALHAMISI" (thursday)



### 3.1 Introduction

In the beginning of July 1989 on request of Els de With and Kees Kempenaar a short investigation was done by us on the Kwemakame water project. The request was a result of a visit from Els de With to the 27 water points of the project in May 1989, a few weeks after the project started functioning.

Mainly she paid attention to:

- patterns and quantity of water drawing.
- (changing) habits of clothes washing.
- situation and functioning of water points.
- upkeep of water points and surroundings.

At each water point she tried to contact and talk with tap-care takers and to talk with and observe water drawing and clothes washing women.

After her visits her main conclusions were:

- The state of hygiene around the tap differs from place to place: more clean at neighbourhoods further from public roads, more dirty at central places where many people pass.
- The dug drains by the taps were in most cases very quickly dug, a lot of waste water was forming muddy and dirty little pools.
- Fences were not yet built in many places, hedges were not yet planted.
- Taps are used correctly, and closed after drawing water.
- The cement structure around the tap was not used as a support for raising the full bucket. Women continue using their knee for it.
- The washing tables as well as the taps weren't used very intensively.
- Sometimes the washing-tables weren't used correctly, e.g. women washing on the floor.
- The quantity of water used per household is at the most doubled compared with the water use before the project, but still below the available 20 liter a person per day.
- Consciousness of the scarcity of water available is wide spread.
- Habits of water fetching do not seem to have changed considerably, habits of clothes washing seem to change in the direction of more frequently spread over the week, up till every day for mothers with small children; instead of once or twice a week, as it was before.
- Quite some dug drains bear the risk of being used for irrigating fields, and in some cases they lead to or pass by cow-standing places so having the risk of being used for animal watering.



Out of these conclusions as been made by Els de With, she listed the following questions that still needed to be investigated:

- Why are the washing tables not frequently used ?
- Are two taps at one standpost necessary ?
- Are the bucket supports necessary ?
- How are habits of animal watering changing ?
- Do quantities of water used per household have the tendency to go up ?
- Water pattern use of restaurant owners: how much did they use before and after the project started, and at what price ?
- How is the pattern of irrigation in the dry season. Do farmers who irrigated before think there is less water available in the stream ?
- Are there any signs of irrigating fields by means of waste water drains ?
- Reactions of women who used to carry water for others for money. Are they having other work ? Do they blame the water project for loss of income ?
- Time use of women. Do they feel they gained time ? How are they going or planning to use it ?

Afterwards we want to give an answer to the following questions:

- Is the Kwemakame project functioning as designed (for so far) ?
- What are the effects of the project for the users of it ?

To answer these questions we decided to live for a while in Kwai and to interview and to observe the people in the project.

We made a questionnaire, we interviewed women, children and men who were coming to the water taps. We also observed people who were fetching water and washing clothes. We visited all 27 water points, but the main part of our observations we did at only a few water points. We have walked up the Dindira stream, of which the water for the project is taken, we interviewed farmers who used the stream to irrigate their fields. We also organized together with Els de With a meeting with the women of the water comity in order to discuss and verify our observations.

We didn't work with an interpreter, Jan talked with the people in Swahili. A problem was that a lot of women were too shy to talk freely with a white man.



### 3.2 TAPS AND THE BUCKET SUPPORT

At 19 places there is only one tap at a standpoint. At the other 8 places there were constructed two taps, which was considered to be necessary because of the number of people living nearby one standpoint and sometimes because there was a washing table at a standpoints. Our task was to look if the number of taps was convenient. After our visits we rather can't give a good answer on this question. A reason for this is the weather we had. The weather was rather bad, it was raining very often. This can influence the habits of washing clothes and fetching water. It can make the people come on other times or less frequent. The washing day in Kwemakame was on Saturday. This day there was no rush hour. Remarkable was that at noon only men were washing their clothes. The people of the sub village of Kwemakame were telling us that on busy washing days two taps were really necessary. On other days the caretaker even keeps one tap locked.

We never noticed more than one or two people waiting when they were fetching water. There is a quite high density of taps so we think there are enough taps, at some places two taps can be too much.



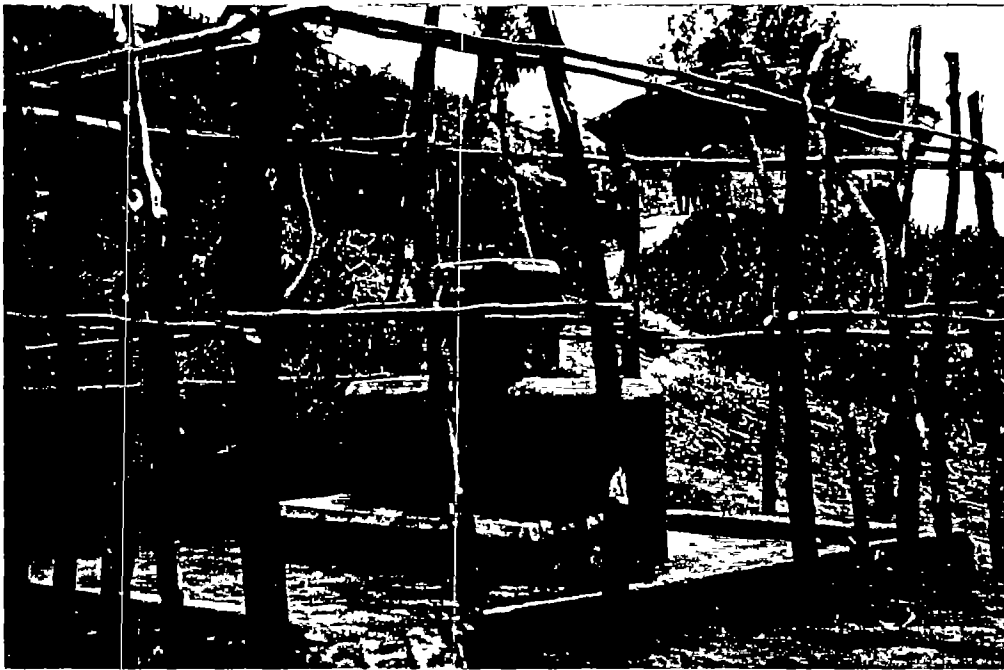
a drinking water point with two taps





We noticed that the bucket supports are seldom being used. We only met some women of the water committee who knew their users purpose. Most of the people didn't know what purpose they had. They only used them for putting clean pots on it. When they used it on our request it was very difficult for them to put the bucket on their head directly without the using their knee. Only one small boy used the highest part of the concrete part of the tap to put the bucket on his head.

At one point the people had made a fence for keeping the cattle out of the water point on such a way that it was impossible to pass this fence with a bucket on your head. The people couldn't use the bucket support at all; they had to put the bucket on their head outside the fence. (see picture below).

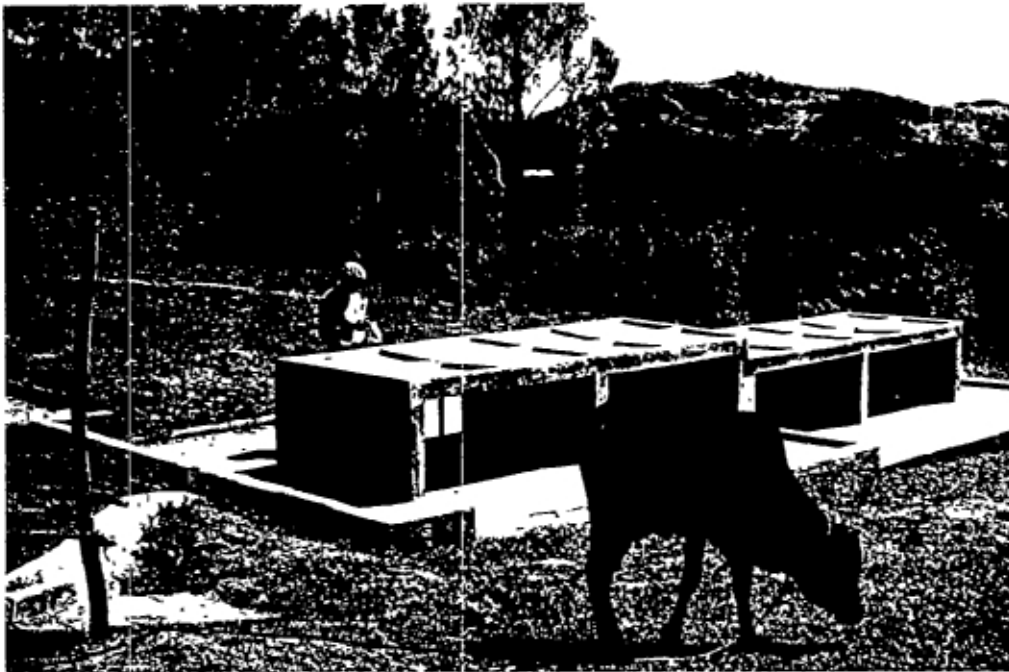


The fence around a tap point makes it impossible to pass with a bucket on your head



### 3.3 WASHING TABLES

The washing tables were made on proposal of the supervisors of the Kwemakame water project. It was designed with the help of the women from the water committee. This group of 14 women were chosen by the inhabitants of the villages. From each of the sub villages in the project area there were some women in the committee. To come to a good design Els de With organized several meetings with the women of the committee. She showed and discussed pictures and drawings from washing tables and she took the committee to an already existing washing table at Kwai mission center. This resulted in the final design of the tables (see picture).



the washing table in Kwemakame

During our visits we noticed that the tables weren't used frequently. Some women were even washing their clothes at the floor besides the table or the tap.



For washing on the floor we heard several explanations;

- some women told us that the tables were too high for some of them.
- others told us that washing at the table needs more soap compared with washing in a bucket. The table is too high to wash with a bucket on the table.
- some women didn't use the table because they didn't like other people seeing their dirty clothes.
- not everybody wasn't used to the table yet.

According to us all of these explanations are more or less correct. But the most important reason seems to be the height of the table. Children are often washing clothes, the table is too high for them. The table is also very high if you want to wash in a bucket in order to save soap. At one washing table we noticed some stones on the floor. Probably they were used to stand on by women. The washing tables in Dindira and Kimunyu (Kioski) seem to be a little bit lower than the other tables. This can be possible because the builders used less mortar between the stones, perhaps they used at the other washing tables too much mortar. The people of Dindira and Kimunyu were satisfied with the height of the washing table. A advantage of the height, they said, is that little children can't play on the tables because of the height.

At present the table is made so that the women can wash in front of each other. During our visit we never saw women or men standing in front of each other. We asked people about this point. They told us that dirty water from someone else's clothes can make your clothes dirty when you use tables in opposite of each other. But they said they liked the table in his present form. They didn't want one long table were you can only stand besides each other.

We mentioned a sink built in the washing table as an solution for the problems, but the people didn't want to wash the clothes in the same sink as the other people. To take a own bucket to the washing table is much cleaner they said. A lower part in the table were you can put you bucket is maybe a better solution.

Important to mention is that our presence influenced the washing habits. At the end of our stay much more people were using the tables to wash their clothes. It also happened that a boy was washing clothes in a bucket nearby the tap instead of on the table. After a while a adult came very angry to the boy to tell him not to wash over there and he had to clean the concrete floor and had to start washing on the table.



### 3.4 QUANTITY OF THE WATER USE

Important for the well functioning of the project is the quantity of water being used. Because it was quite clear from the beginning of the project that the total amount of water isn't very big. Especially in the end of the dry season there is a possibility of a lack of water.

At 25-4-89, just after the intake structure was built, (just before the rainy season) we measured the total amount of water as being 0.7 liters a second. A second time at 26-6-89 (at the end of the rainy season) when some little improvements had been made at the intake structure we measured about 1.2 liters a second. When each person uses about 30 liters every day this will be enough for 3456 persons according the measurements from 26-6-89. At present (1990) about 3000 persons are being served by the system.

During our visit it became clear that the quantity of water being used per household in the project area was tending to increase. Many people had heard that the overflow was still running at the break pressure tank nearby the sub village of Tambwe. So they thought there was plenty of water for every one. This resulted in another way of using water: on small scale people started to irrigate their crops with the water from the project while others started to give their cattle water from the taps instead of watering the animals in nearby streams. Also at home the people were taking less care about the quantity of water according some local information.

We think the people use roughly about 15 liters a person a day in the time we visited the village.

During the dry season problems may arise. Because the people will use more water because they have to wash far more as a result of dust and sweat. Also cattle will drink more water from the taps because many streams will dry up. When we asked about this they didn't worry about it yet, it was too far in the future. When the problem will appear then they wanted to think about solutions.





### 3.5 HABITS OF ANIMAL WATERING

In Kwemakame there are quite a lot of animals. A majority of cows but there are also some sheep. Before the waterproject the people used to water their cattle at a nearby stream. So every day little children or old people are bringing their cattle from their houses to one of the streams.

Actually it isn't allowed to water cattle in the streams according to the law of Lushoto District. Because the government doesn't allow people to walk with their cattle without a special permission on public roads due to the erosion they can cause. In fact in Kwemakame nobody worries about this law.

When people are using the taps from the water project on a large scale it can be dangerous for the total amount of water. Especially the amount which is able to reach Luago (especially in the end of the dry season), because Luago is situated at the end of the pipeline .



Watering a cow in Kwemakame



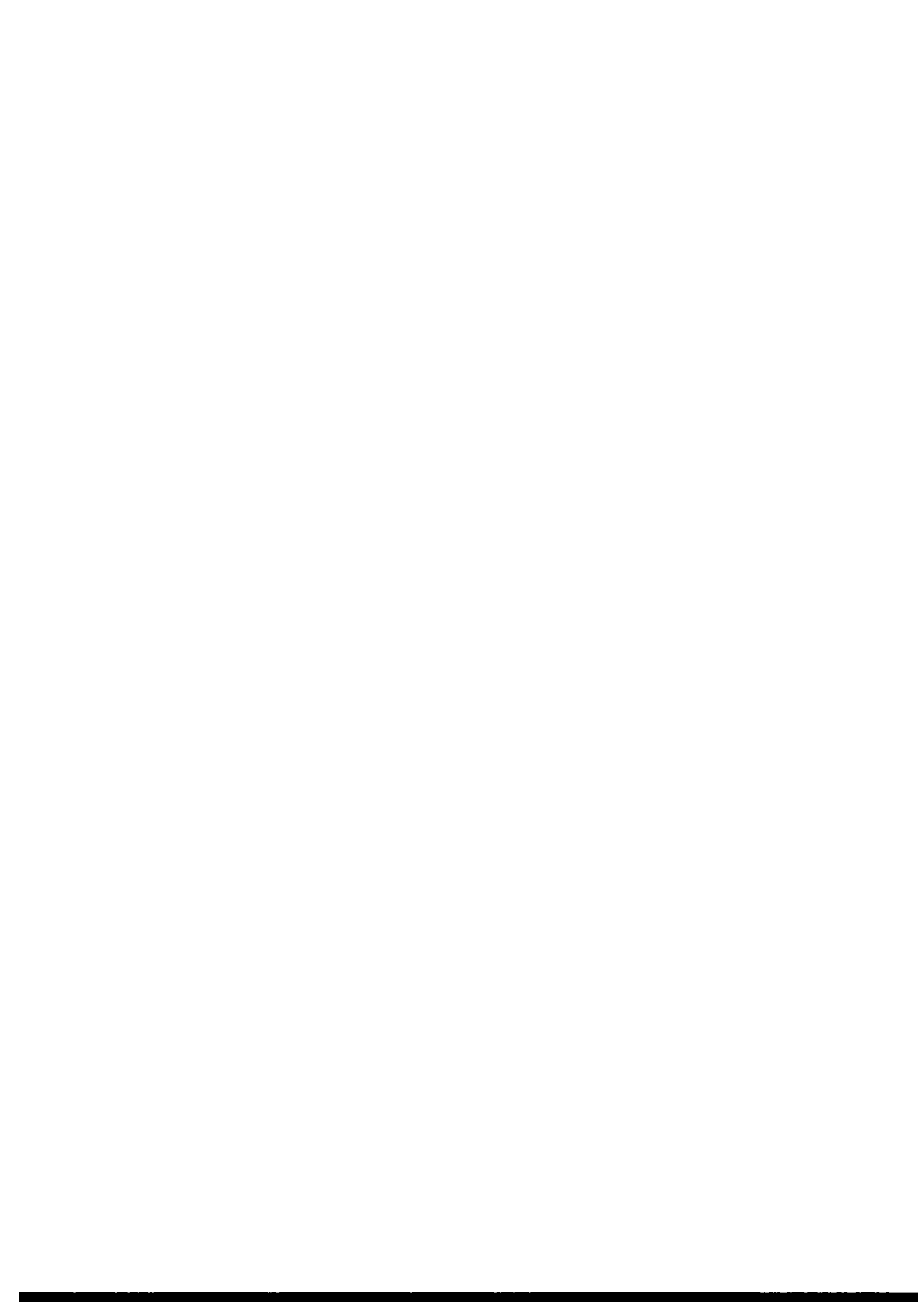
During our visit we paid special attention on changing habits of watering animals. Are the people still going to the same streams to water their cattle or were they going to the often far closer by drinking water points of the project ? We noticed that the watering pattern is different at each sub village and also depends on the amount of cattle someone has. If someone has only a few cows like two or three he or she has soon a tendency to water the cattle with the help of a bucket nearby the drinking water point. If one has got a lot of cattle this is probably too much work and he or she is still going to a stream. Especially in the sub villages of Kwemakame and Luago where there are many people with a lot of cattle, there seems to be a lot of people who are still going to a stream. In Luago about 20 cows are getting water at the water point, the remaining inhabitants of Luago are continuing to go to a hand dug well in a valley nearby.

In Tambwe we heard that no one was continuing with watering cattle at the stream. They were all taking buckets from the drinking water point to their home to water their cattle, there are about 40 till 50 cows in Tambwe. One cow drinks about 1 till 2 buckets each day this is about 20 to 40 liters, sheep are drinking a very small amount water.

There is a danger at the end of the dry season when many streams dry up there would be far more people watering their cattle at the drinking water points. Many people in Kwemakame and Luago are already saying that they are going to use the water from the project in the dry season and that they are not going to dig holes in to the silted bed as they are used to do before the project in Kwemakame started. But the people in the project area are saying that although it is difficult to say before hand they think that this kind of use of water would stop immediately when it results in too less water for human consumption in for example Luago.

### 3.6 IRRIGATION WITH WATER FROM THE DINDIRA STREAM

Many farmers nearby the Dindira stream are used to irrigate their crops with water from the Dindira stream. Those crops are mainly tomatoes and sweet potatoes meant for selling. Most of the farmers who irrigate are using small hand dug ditches to transport the water to the field. While some other farmers are taking the water from the stream with the help of a bucket and give their crop (mainly sweet potatoes) water with a bucket. Because the drinking water project is using the same stream as the farmers, there is a big danger that in the dry season there will be to less water left for irrigation. So some farmers will lose income or have to cultivate other crops if possible. During our visit it was impossible to give a final conclusion about the question whether irrigation is becoming more difficult. Because of the abundant rains in the dry season the Dindira stream was probably carrying more water than usual for that time of year.



We heard from the farmers working on their fields several different stories. Some told us that the stream was carrying less water while others told us that it was more or less the same. The farmers more down stream had a tendency to say that water has become far less. Some of them told us that they were now totally dependant on the rain. Other farmers upstream were generally saying they didn't see much difference between the amount of water before and after the start of the project. We still saw a lot of farmers irrigating their field, the majority with the help of hand dug ditches. The time will learn if the farmers can continue irrigating their fields in the dry season.

### 3.7 IRRIGATION WITH WATER FROM THE PROJECT

During our visit we paid special attention to the question if farmers were using water from the project to irrigate their crops. At the official meetings the project organized with the people who are living in the project area, it was agreed to be forbidden to use the water from the taps to irrigate crops. It was allowed to lead the drainage water from the taps into fields. At many drinking water places it was very easy to irrigate some fields with the drainage water from the taps, because often the drinkingwater points were located just uphill from a field and they led the drains straight from the public tap to a field. This of course made it difficult for us to see if the farmer was really only using the drain water or he or she opened the tap sometimes just for irrigation

In the sub villages we noticed a difference in attitude against irrigation with use of the water from the project. At one tap in Tambwe a farmer was so afraid that other people would say he was irrigating his crops, that he dug a trench crossing a public road instead of leading the drain into his field which would have been easier. At another public tap a farmer asked us if he was allowed to buy a hosepipe for irrigating his crops straight from the tap. He said it would save a lot of water compared with the use of dug trenches. At Luago a farmer downstream the tap had dug a trench parallel with the contour so the water could infiltrate slowly in his field. In Tambwe a little pond has been dug to store the drain water for the dry season.

We think at times it is clear that there is a shortage of water, the system should be checked regularly to prevent illegal irrigation. And it should be clear to everybody in the project area that it is forbidden to irrigate with water from the project (with the exception of drain water).



### 3.8 TIME USE OF WOMEN

#### The influence of drinking water projects on the position of women

Every human being needs water, for washing, cooking, drinking etcetera. In Tanzania only few people can obtain clean water by opening a tap in their house. The majority of the population have to walk long distances to find water. In a lot of cases this water is polluted and causes several diseases. Cattle is very often drinking water at the same places people are taking their water for consumption.

Probably all over Africa fetching water is women's work. Women are walking long distances with a heavy load on their head and very often a baby on their back. Women have a big responsibility for their family and have to do a lot of work. They have to work on the fields, do all the domestic work, fetching water and firewood, processing and cooking food, keeping animals, care of the children.

Children are a big help of their parents, after school many of them fetch water, take care of the cattle, elder children look after the little ones, etcetera.

Most of the drinking water projects do have two main goals:  
- to enlighten the reproductive work of women.  
- to increase the health of the population.

These aims can help to improve the situation of women, but there is a danger that these aims will confirm their worse position.

First of all women stay responsible for the household, and also for drawing water. Because the water is now clean and nearby the women will certainly gain time but they usually can't use it for themselves, they have to do other work.

Secondly very often women do not have control of the application of the used technology. The project will not ask where to place pumps or taps, or ask if they need washing places etcetera. The maintenance of the system is practiced by men, they do not have very much interest in it because they aren't the users. It is also possible the men don't allow the women to have any control at all of the system.

A broader and hidden goal of drinking water projects is the increase of the labour productivity. Women gain time when they have the water nearby, the people are more healthier when they drink clean water. Both will increase the labour productivity.

(Bruins & Vellema, 1987)





## The Kwemakame drinking water project

Contrary to what is said above, in this project the project supervisors discussed with the people of the villages where to place the taps. Els de With had as a special task the participation of the women in the project. She discussed with the women all kind of things important for them to know about the new system. Like for example the functioning of a tap. The Water Committee was composed of both male and female members. The female members formed a special group and discussed a lot of important issues with Els de With. They decided together about the places and the shape of the washing tables.

The women do have a certain control of the technology, they are members of the Water Maintenance Committee and can give instruction to the technicians to repair the system. At each tap a certain person, both male or female, is responsible. So it is not that difficult to have a tap repaired.

Important for the drinking water project is, whether the women really feel if they have gained time. This is also an important goal of the project. It is important that the women are free to spend the time they gained now the taps are nearby and are not forced to work harder for their husbands. And the project can have a contribution to the improvement of the position of women.

As could be expected we didn't get one clear answer on our question if they have gained time. Some sub villages were situated nearby a stream, they never spend much time on fetching water. But most women spend indeed considerably less time in fetching water. How do they use this extra time ? We heard the following answers:

- Going to cultivate. Many women told us they were spending more time with cultivating crops on their own fields, and the income of those fields were more or less for themselves.
- Going to get firewood. Also many women were spending more time in getting firewood than before the start of the project. Because of the clean water they used more water and firewood for cooking, they also used more firewood to keep their houses warm. And maybe they were building up some reserve to bridge the rainy season.
- Constructing and maintaining of houses. In the project area it was obvious that many women were busy with bringing new mud on the walls of their houses or on the floor in their houses. This can be because of the time they had gained or because of the presence of water nearby to make mud with. Some women told us they were planning to build a new big house because living in Kwemakame became far better now there was water. Also an other project for electricity would probably start soon.
- Resting, some women told us they were spending more time in resting; some even got up later.
- Visiting other people. This we also heard from many women they were spending more time with visiting relatives and friends in other villages.
- Other income generating work. Also many other jobs were done like selling firewood or making some kind of beer out of sugarcane.



We think it is too early to have a final conclusion about this point. First of all the time after the implementation of the project was too short. Use of the time gained and changes in the social family life aren't not yet crystallized. Secondly our time of investigation was too short. We recommend more research on this question to get a more detailed answer.

### 3.9 WATER USED FOR RESTAURANTS

An interesting question because of the hygiene and because of possible changes in income is how much water the restaurant owners are using and are there improvements and changes in prices for example tea ?

To answer those questions we visited two restaurants in Kwemakame nearby the market on the market day. They told us that they were using about twice as much water as before the project. Before the project the restaurants used to buy water from several women. They didn't buy it every week from the same women.

One bucket full of water from the polluted stream nearby Kwemakame cost between 2.5 and 5 shilling (about 65 shillings were 1 US dollar). At a market day they needed around the 15 to 20 buckets. Now they are going to the taps to get water by themselves. Although they have to spend less money to get water, the price of for example tea didn't decrease. The restaurant owners said this was because of an increase of the price of sugar.

The other side are the women who were used to sell water to for instant the restaurant owners or just to ordinary people on the market. Now the project is functioning those women has lost their income.

During our visit we didn't manage to speak with women who used to carry water for money. So it is difficult to give a good answer to the question what the women are doing now, did they manage it to get other work and if not do they blame the water project for a loss of income. But to the people who we asked about it, told us that those women could easily find other work like selling firewood or working on someone elses' field. Someone who told us that she used to buy water before the project said to us the same woman who carried water for her before, is now working on her field.



First of all it should be clear that we can only draw conclusions about the functioning of the project during the first months after implementation. Maybe after a longer period when people are more used to the project, things like habits of watering animals, can change.

At our time of visit the project was very well functioning, all the project villages were getting enough water to serve even the peak hours. The water seemed to be clean and the people living in the project area were very much satisfied about the project. We noticed a universal awareness about the use of the taps and washing tables. There was always somebody, who is living nearby, to take care of each tap (we were almost never being able to study a tap without someone of the water committee or an official care taker was showing up after a while). The places where the taps are located are always nearby a group of houses, we have no indication that the taps are located closer by the more rich or the more influential people. So in that way the water committee had functioned well.

Due to the weather during our visit it was difficult to say if two taps at one stand point were really needed. According to the people it was necessary at the points with a washing table during the washing day, but we never noticed that two taps were necessary. The bucket support was never used in the way it was planned. It was only used to put things on to prevent them from becoming wet because the water was spattering on the ground and making its direct surrounding wet. We agree that these bucket supports enlighten the uplifting of a bucket, but the people in Kwemakame think it is easier to use their knee. So we don't think the bucket supports are necessary.

The washing tables weren't frequently used, the main reasons were:

The tables were too high for many women and children. The people weren't used to it yet. The tables are not easy to use when you don't want to waste soap.

The quantity of water being used by the people was still increasing, the people had in mind that there was plenty of water and they started to use the water with less care and some people for example started to water their cattle at the stand points. Although most of the people with a lot of cattle were still going to the stream to water their cattle, many said they will water their cattle at the standpoints during the dry season when the stream will be dried up. They planned to dig no holes anymore in the dry bed as they did before the implementation of the project. This could mean a shortage of water in the dry season.



We also noticed a lack of awareness of a possible shortage of water by some of the people in the project area considering the subject irrigation. Although most of the people were not planning to irrigate their crops with the water from the project, one of them asked for a hosepipe and in another village we noticed that someone irrigated crops with the help of a bucket with water from the project. We noticed at many stand points signs of irrigation with waste water. On a few places there were hardly any possibilities of using the waste water, simply because the fields were too far away.

The irrigation pattern of the farmers using the same stream as the project will have to change. We think there will be less water available during the dry season, but the time will learn about the quantity of water in the stream. If there is less water available it will be more difficult to grow tomatoes and therefore a loss of income will occur.

The restaurants are using roughly twice as much water as in the time they had to buy the water from people. The prices of for example tea stayed the same, due to an increase of the price of sugar according to the owners.

The women carrying water for the restaurants and for other people found other jobs. Although we do not have very much prove of this.

Most of the women gained time because they don't have to walk long distances anymore. They told us they could spend this time in a way as they wanted it, by visiting friends, resting, working on their own fields etcetera. We feel our research period was too short to say anything sensible about this. We also think the time the taps are in use was too short to have big influence on this matter.

We think we can give a very positive answer to the question about the functioning of the project for so far. We didn't find big problems the population was dealing with. But we were considered to be representatives of the project, so it could be the people were too shy to give big comment upon negative effects.

Negative aspects are according to us:

- \* Will there be enough water available for the farmers nearby the Dindira stream to carry on irrigated agriculture.
- \* We are afraid the water quantity will be too less to supply the demand in the future, especially during the dry season.

For so far we can say the effects of the project for the users are good. They have clean and enough water nearby. We only noticed some little quarrels between people who are living in the project area and helped with the work for the project and the people who weren't involved in the work.

We think a second and deeper research is advisable to get a deeper insight in the issue.





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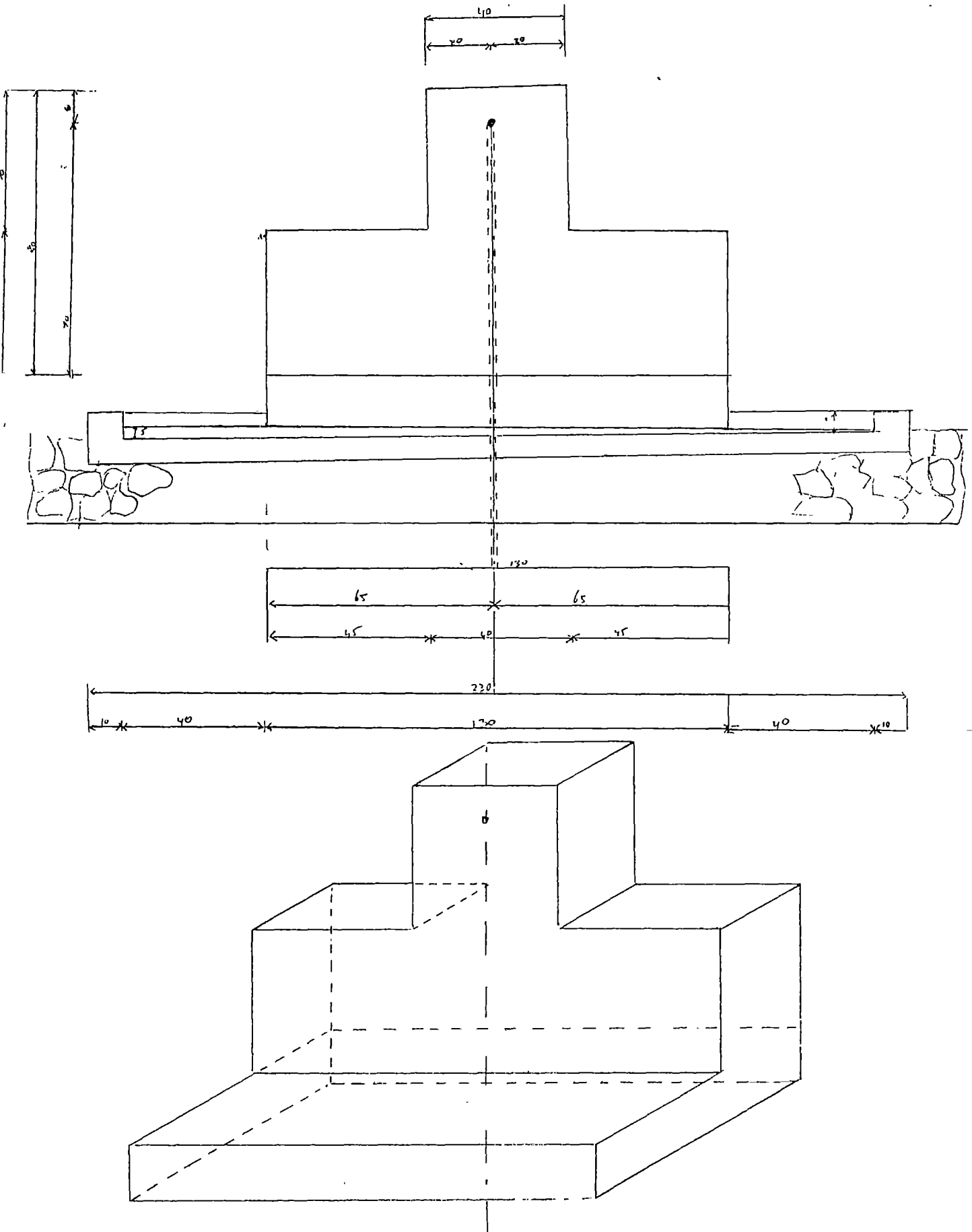
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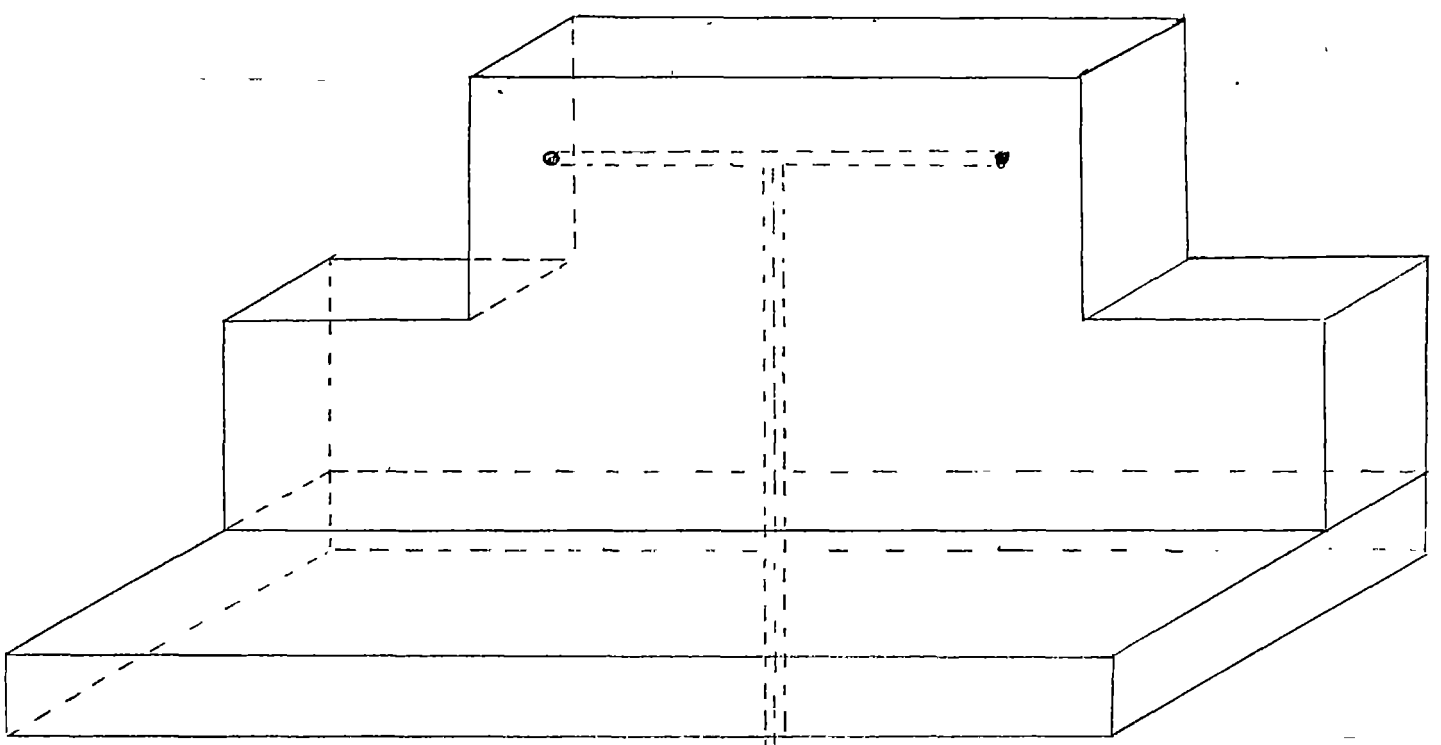
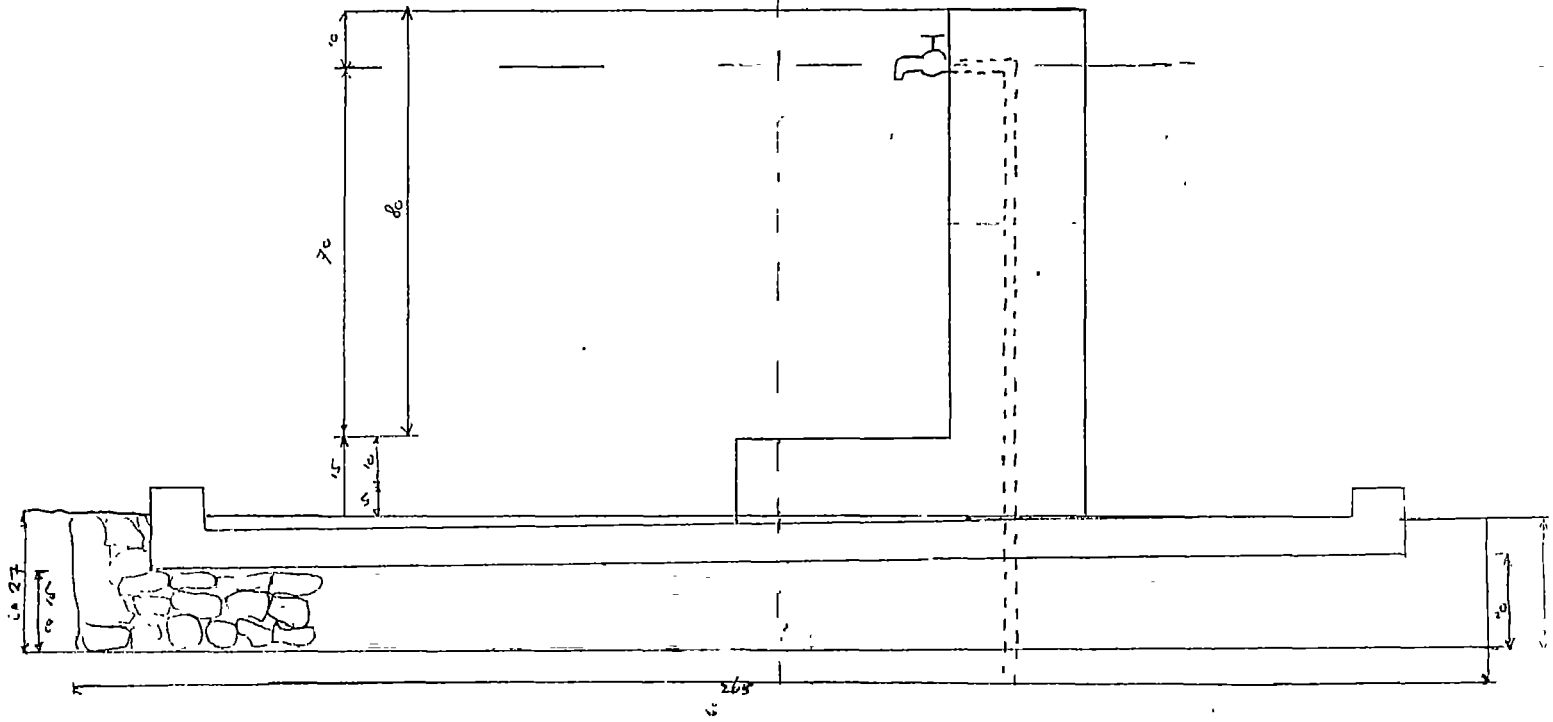
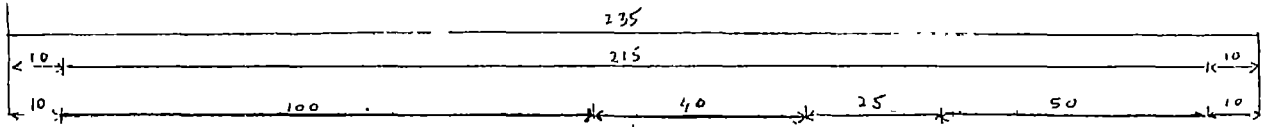
APPENDIX I

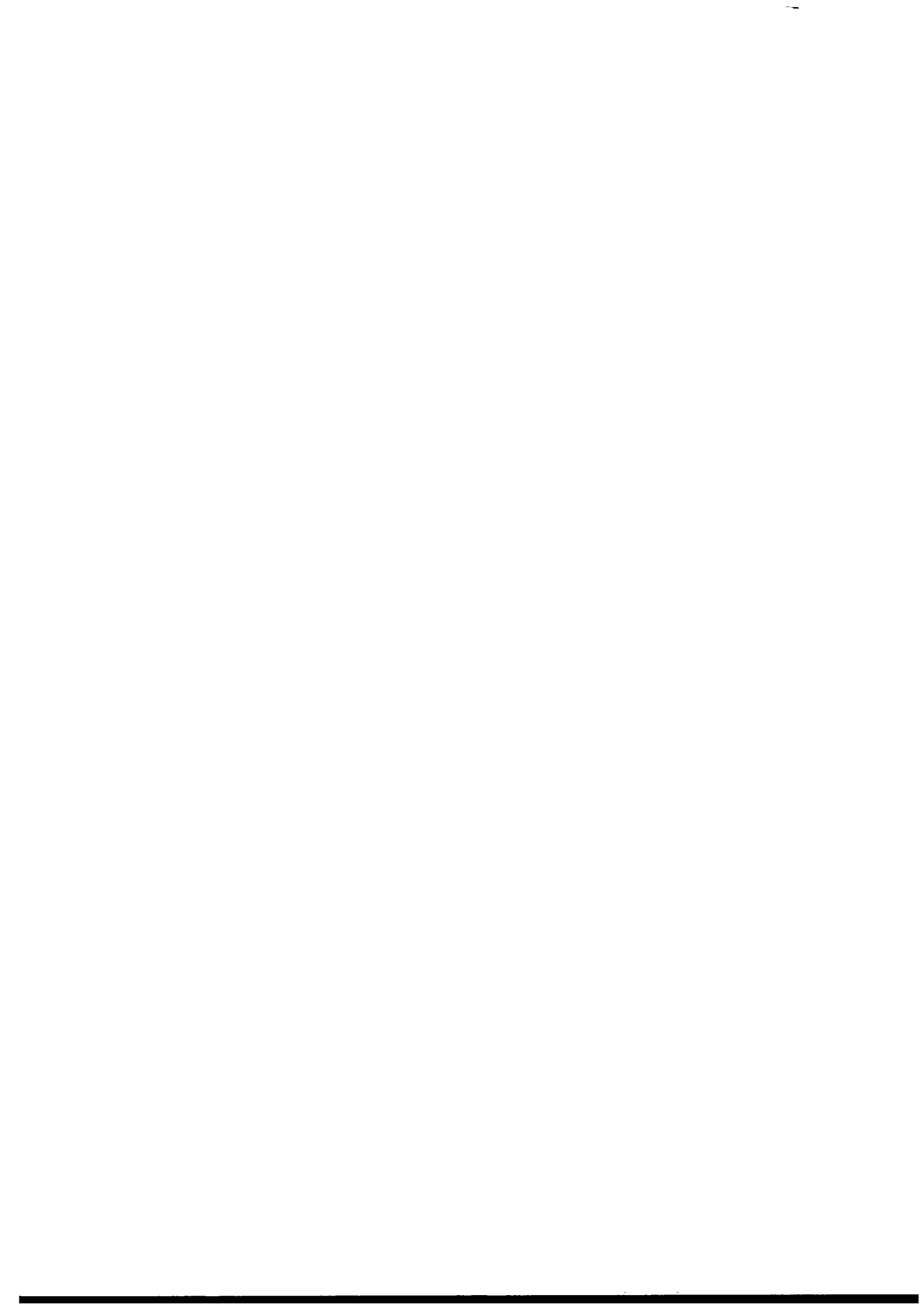
Standpoint with one tap



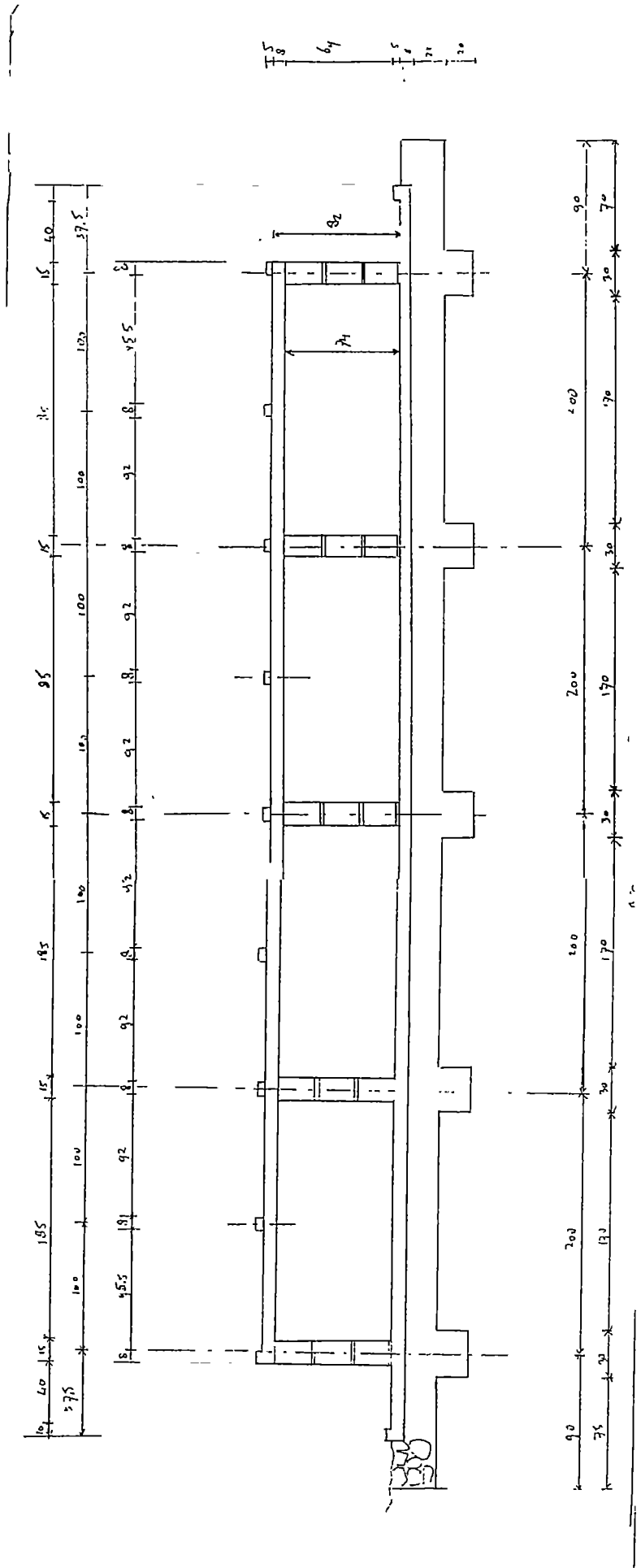


Standpoint with two taps





# The washing table



1992-1993





