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2013
WATER PROJECT MDABULO WARD

PUBLIC WATER SUPPLY IN THE VILLAGES
KIDETE | IKANGA | LUDILO | MLEVELWA

WATER - PROJECT START | PART 1

CONTENT

1. WARD MDABULO

Our project region Mdabulo is located in the southern highlands of Tanzania at about 1600 to 1900 meters above sea level. The Ward includes the villages Kidete, Ikanga, Ludiloand Mlevelwa. Currently about 10,000 inhabitants live there.

The villages are situated along hills. The reason lies in the moderate inclinations that are more favorable for house construction, or for the trail linkage, as the steep slopes.

The sloping hillsides are used mainly for agriculture and forestry. The water supply is currently made up of hundreds of small water bodies in the hollows. These sources are exposed and are primarily composed of surface water. Often the water points are 500 to 1500 meters from the houses, at a height difference of 80 meters to 100 meters.

Both the quality of the water, as well as the procedures to obtain the water by wearing on the head, are big problems for the population. In recent years, we have found that the water transport is transmitted principally by children. Every day you can see hundreds of children with 20 liters of water on their head - several times a day - need to move into the village

The headwaters of Ludilo is located in the northern part of the village on the hillside Ludilo the highest elevation of the entire region. In the northern part of this survey, there is a Y-shaped valley and at the lower end a creek rises. The area of the immediate source area covers approximately 35 hectares. The country of the source area is owned by the village Ludilo as a political body.
As part of the planning of water supply ownership was transferred on the Ward. One part of the source area was previously used for agriculture. Agricultural use is completely set with the end of the growing season in September. This has been established in writing with the current tenants.
According to the mayor in early April of 2013, the ownership of the headwaters of ownership structures and protection from agricultural use, is completely secured. The ownership structure of the source region is also coordinated with the District Administration.

2. WATERPROJECT MDABULO WARD

The water project Mdabulo supplies the villages Ludilo, Kidete, Ikanga, Mlevelwa with drinking water. From the headwaters northeast of Ludilo a 3km long supply line performs to the main tank in Ludilo. From this main tank a 5 km long main line toward Kidete performs to Kidete tank. This main line is then continued to the village Ikanga. From the main line branches lead to the villages distributed in such a way that the inhabitants must travel a path of max 400m from the village to the water points.

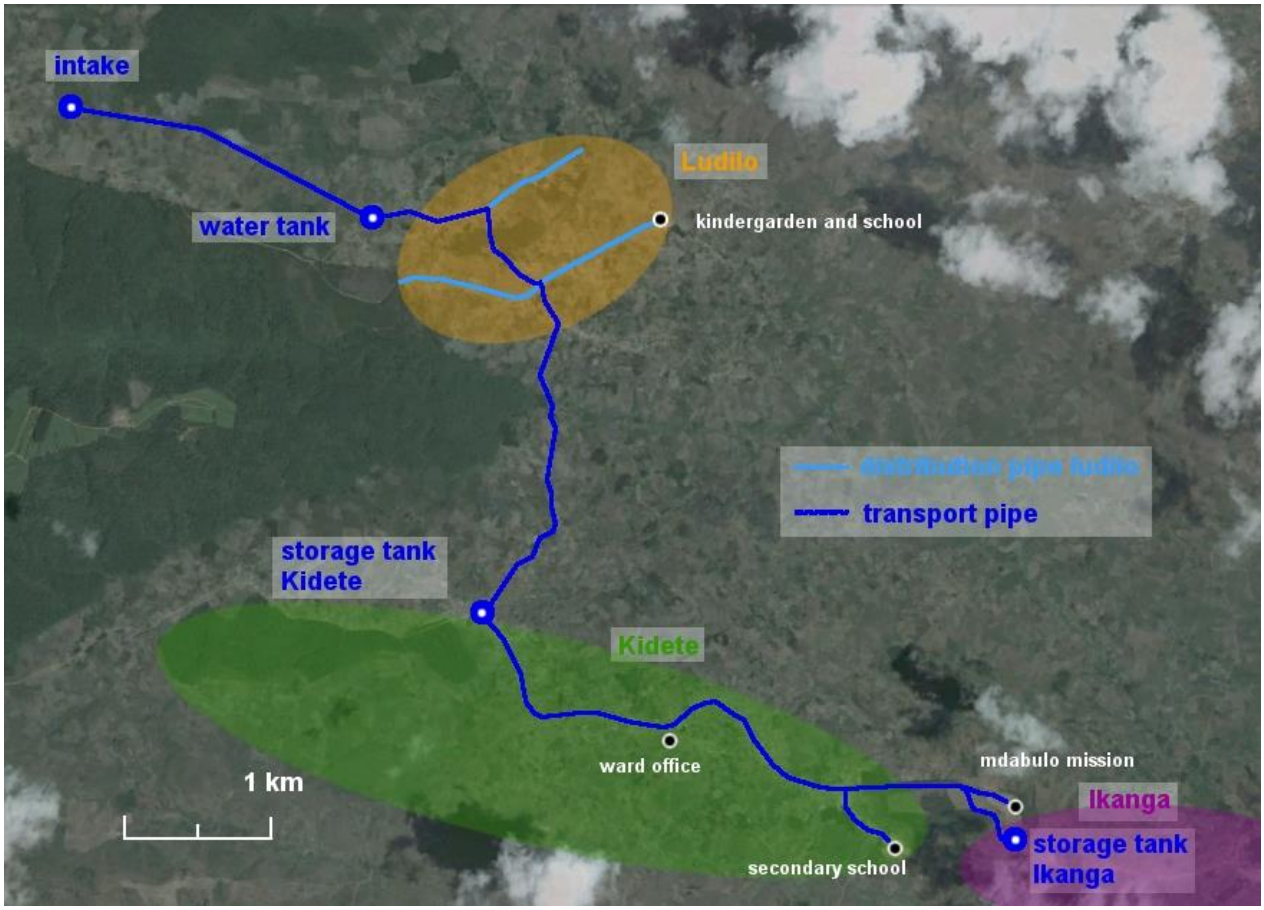


Fig. Plan of the water project Mdabulo Ward

3. HISTORY OF THE WATERPROJECTS

In 1999 there was a large planning of water supply to Mdabulo Ward. This planning was carried out by the Water Authority of the District Mufindi. Support was expressed for the Authorities by the Danish and Swedish development aid organization that sent the planning experts to the affected region to Tanzania. In 1999, the first Planning was completed.

The Danish and Swedish experts were impressed by the planning, and insisted on a rapid implementation. The government then promised the immediate implementation, but did not stick to their promises.

In another initiative by the Danish and Swedish experts planning was updated again in 2007. This was shortly before the elections and the government promised again the rapid implementation, but again nothing happened.

In this context it must be noted that the promotion of rural areas and especially in the highlands in southern Tanzania, the government had no meaning. The most important infrastructure funds were used in the extremely growing cities Dar Es Salaam, Mwansa, etc..

Furthermore, it must be said that the political representation in parliament from the region was very insignificant, and therefore only little support for the rural population could be expected from this side.

As part of the RDO development the problematic water supply has been addressed more vehemently by the village residents. With the first experiences in the village Ibwanzi, related to spring catchments and water supply, a change in consciousness has been achieved in the population, in terms of a viable small supply of certain

districts. .
Aware of the self-help options, which spread more and more through our project work, was finally resorted to the proposed water project . This was possible because an awareness for the RDO development organization was awakened within the population.

Through the initiative of the RDO the political representatives too saw a realizable possibility of this water supply. This was particularly visible by the planning authority was completely cooperative. The existing plans and also planning assistance are now asked and available for the RDO.
By working very closely with the planning authority it became clear to us that they did not know the technique of profound source version . Usually, a dam was built in the headwaters and the water that is largely surface water diverted into a pipe at mid-height.
From the experiences of the first source version in Ibwanzi the experts were very delighted, especially impressed by the very high water quality. The former water testing was conducted by the provincial authority in Iringa locally and classified suited for human use. Especially the bacteriological examination corresponded to the highest drinking water - requirements.

4. ESTABLISHMENT OF A WATER COOPERATIVE

The continuously newly developed water projects required the establishment of its own water cooperative. As part of the Rural Development Organization (RDO) a new sub - organization was founded: WATER ASSOCIATION (WATA).
This cooperative was incorporated into our project work in addition to AGRICULTURE, TRADE, and ORPHANS PROGRAM and KINDERGARTEN. WATA is part of the sub-organization INFRASTRUCTURE.
As with all other sub - organizations RDO the following objectives or principles are primarily:

- **SUSTAINABILITY**

There should structures be created, that not only ensure the construction of water supply facilities but especially the long-term preservation and maintenance of the systems

- **SELF-DETERMINATION**

Through the active involvement and choice of the committees of the future users of the drinking water "water - taps - Communities" beginning with the "village committees" up to the central "sub-organizing committee" of the water board, the future water users but also the local authorities are networked organized. This approach ensures that the water project is not as in many other projects, a government project or a project of a charity, but a project of the village population, and how in Mdabulo clearly seen - a joint project of several villages. This is a high level of identification of the local population with the project and - as has already been shown - achieved a great willingness to own work.

- **SOCIAL BALANCE**

On this principle, particular attention was paid in the design of these water projects - as a basic condition of the lenders - was, that all residents in the village should have access to this water. To create this social balance, 4 different membership categories were created to pay according to their income contributions to the construction, but especially for the servicing and maintenance of equipments.

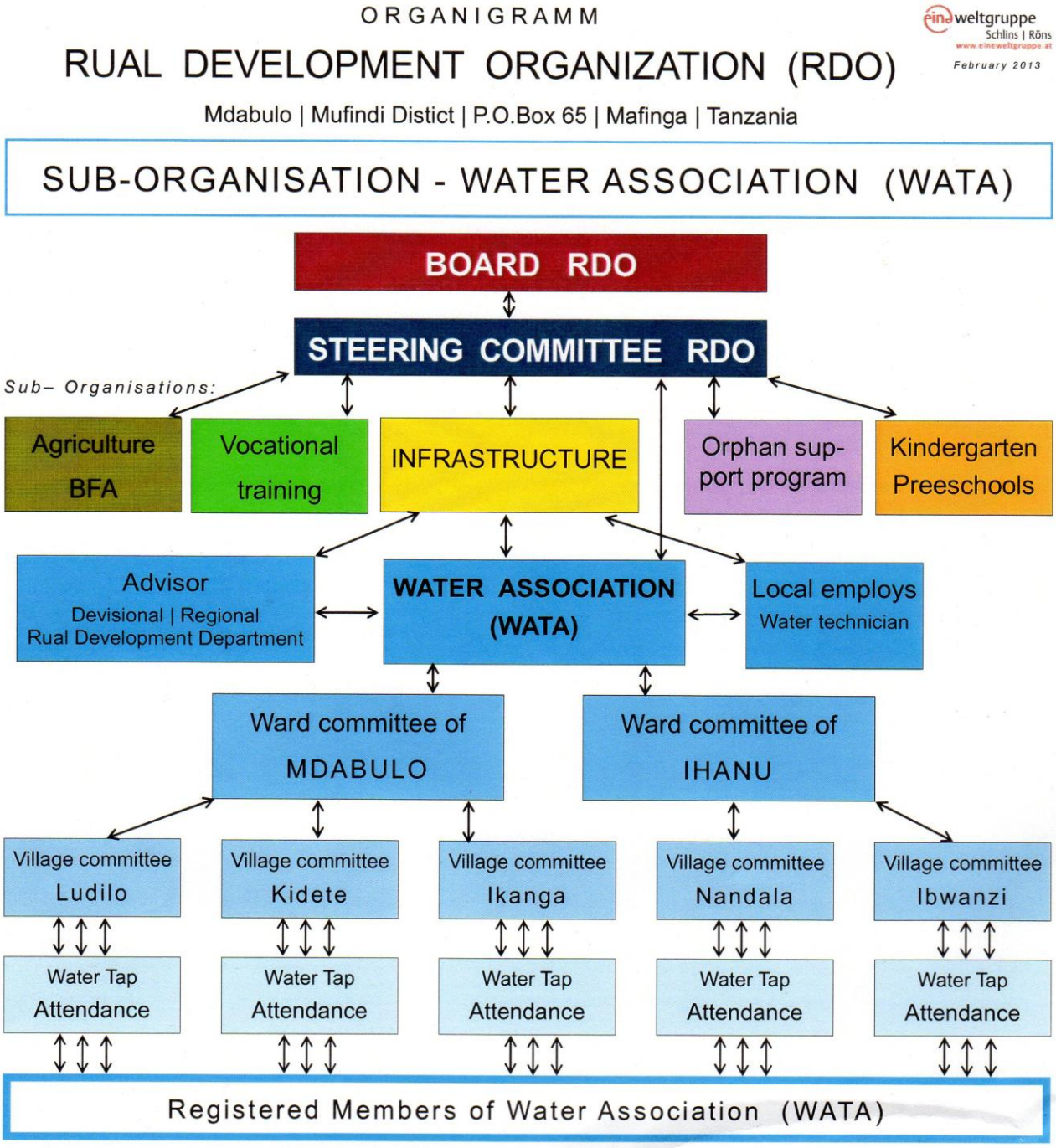
This social compensation should take place between the water projects in the different regions. Since the maintenance costs for equipment are significantly higher with pump operation. Accordingly it must be compensated.
Considered in the longer term, it is also intended that the water cooperatives have to "transfer payments" to sub-organizations of RDO who have no sources of income (eg, orphan support and kindergartens) to ensure their continued existence.

- **DETERMINATION OF WATER INTERES RATE**

Currently, three water points in the village Ibwanzi are in operation. Based on this experience, the maintenance costs can be elicited, further, the determination of the water rate of interest and the organization of collection will be evaluated. Planned are four price - Categories:
Category 1 Social tariff (orphans and destitute)
Category 2 Families
Category 3 Schools
Category 4 Business
In the long term there are also "transfer payments" scheduled by the water cooperative, to ensure sub-organizations of RDO who have no sources of income (eg, orphan support and kindergartens).

Fig Information meeting in theVillage Ibwanzi

5. ORGANIZATION OF THE WATER COOPERATIVE



Water Assotiattion | Sub-Organistaion Committee | mebers: Chairperson, Vice Chair/man/woman, Secretary, Treasurer (woman). Mebers of Ward Commitees elect Water Assotiation Committee among themself for 3 years. Appointed Mebers—Chairperson of Orphan Support Progamm, Kindergarten Sub Organisation + RDO Steering Committee

Ward Committees | members: Chairperson, Vice Chair/man/woman, Secretary, Treasurer (woman), one representative of eache village in the Ward. Apppointed members: Ward-Chairman. Mebers of ,village Committees elect Ward Committee among themself for a period of 3 years.

Viillage Committees | members: Chairperson, Vice Chair/man/woman, Secretary, Treasurer (woman).
Appointed mebers: Village-Cherman, member of Village Orphan Committee or Kindergarten.
Members elected : 4 members of WATA in the Village (2 women, 2 men) for 3 years.

Water Tap Attendance - Responsible person for one Water-Tap— elected for one year by all mebers who use water frokm this tap (rotation system)

Registered members: Only registered members of WATA ar allowed to use water from WATA Taps
Category of members:
A Ordinary members (family houses with income)
B Unable members, who can not work to get income (orphans, old people, handicuped people)
C Members who have a buisness (bar, market, workshop or have permanent enployment)
D Institutions, Organisations (schools, kindergarten, health centers, parish, village councel)

6. THE TECHNIQUE OF SOURCE VERSION

The source area consists of a Y-shaped valley head in length of 300 and 500 meters. At the end of the two arms of the valley there are the main water withdrawals. On the side arms there are several side outlets of water. They have to hewn out on the superficial water leakage as long as a clear exit point is found.
The exit point is usually made of an impermeable layer of clay on which a partly transparent clay gravel layer is placed. It has to be dug till a minimum cover of the terrain of 1,5 to 2 meters is available.

It depends on the terrain if there is any possibility to dig a 1 meter deep cave. Thus, the cover layer is up to 4 meters possible on steep terrain. On the impermeable layer of clay purified the perforated pipe source is attached. At the end of the perforation there is a barrier built of impermeable clay.
The entire source surface in the average extent of 1.5 to 3 m² is filled with coarse gravel at a height of about 30 - 50 cm. On the coarse gravel a construction felt is applied, which prevents the sediment exposure. The construction felt is subsequently covered with an impermeable 5 - 10 cm thick layer of clay sealed. Above the Clay layer laterite soil is put in for protection. On the laterite a nylon film is placed for protection of surface water. The source is then covered with the existing excavated material back over the nylon.






From the two main sources, source lines lead in the form of PE tubes, PN 10/75 mm diameter to the source chamber. These main ducts are interrupted by T-pieces, which are supplied by the side sources. The source chamber consists of a concrete shaft with steel cover.

The outlet is made of a PVC pipe with a diameter of 110 mm. The currently measured bulk quantity in the source chamber is 4 liters per second, which corresponds to an extent of 345 m^3 in 24 hours. This is sufficient for the present and future population of Mdabulo Ward.

Fig. Source Chamber

Fig. Spring discharge at port main line - 4 l/ Sek.

7. ENGINEERING DRAWINGS

WATER BODIES IN THE REGION MDABULO

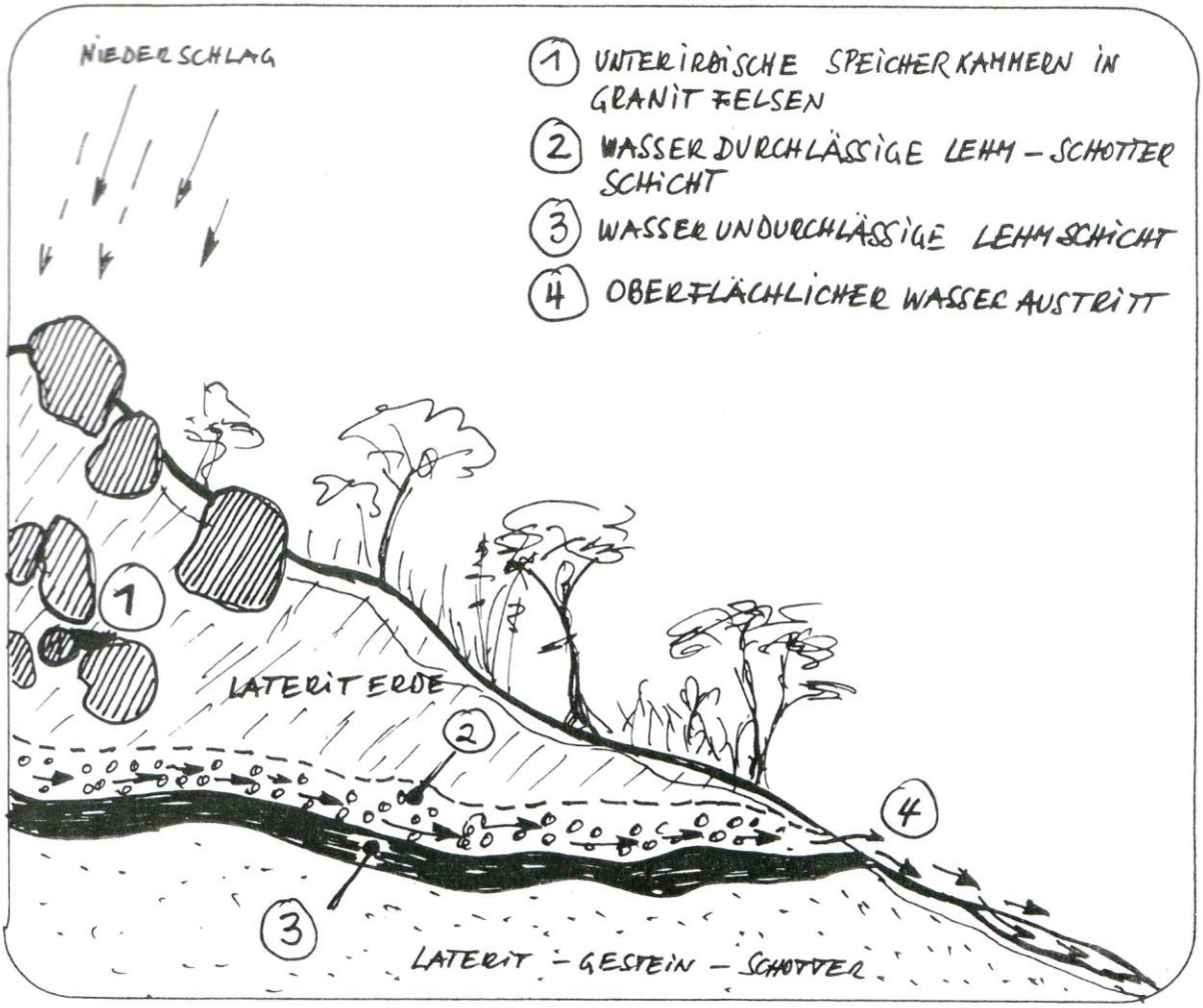


Fig. Illustration of the water bodies in the Region of Mdabulo.

Precipitation water (mainly strong thunderstorms) penetrates into the soil and stored in underground chambers between granite blocks.

On an impermeable clay layer in a thickness of 30-70 cm there is a water-permeable lateritic clay-gravel layer, so that the water from the chambers along this layer emerges slope upward superficial, and empties into small waters. For the source version there is year-round, even over several years water outlet of great importance. Older people in the villages have this knowledge of both quantity and quality of water on the basis of their observation.

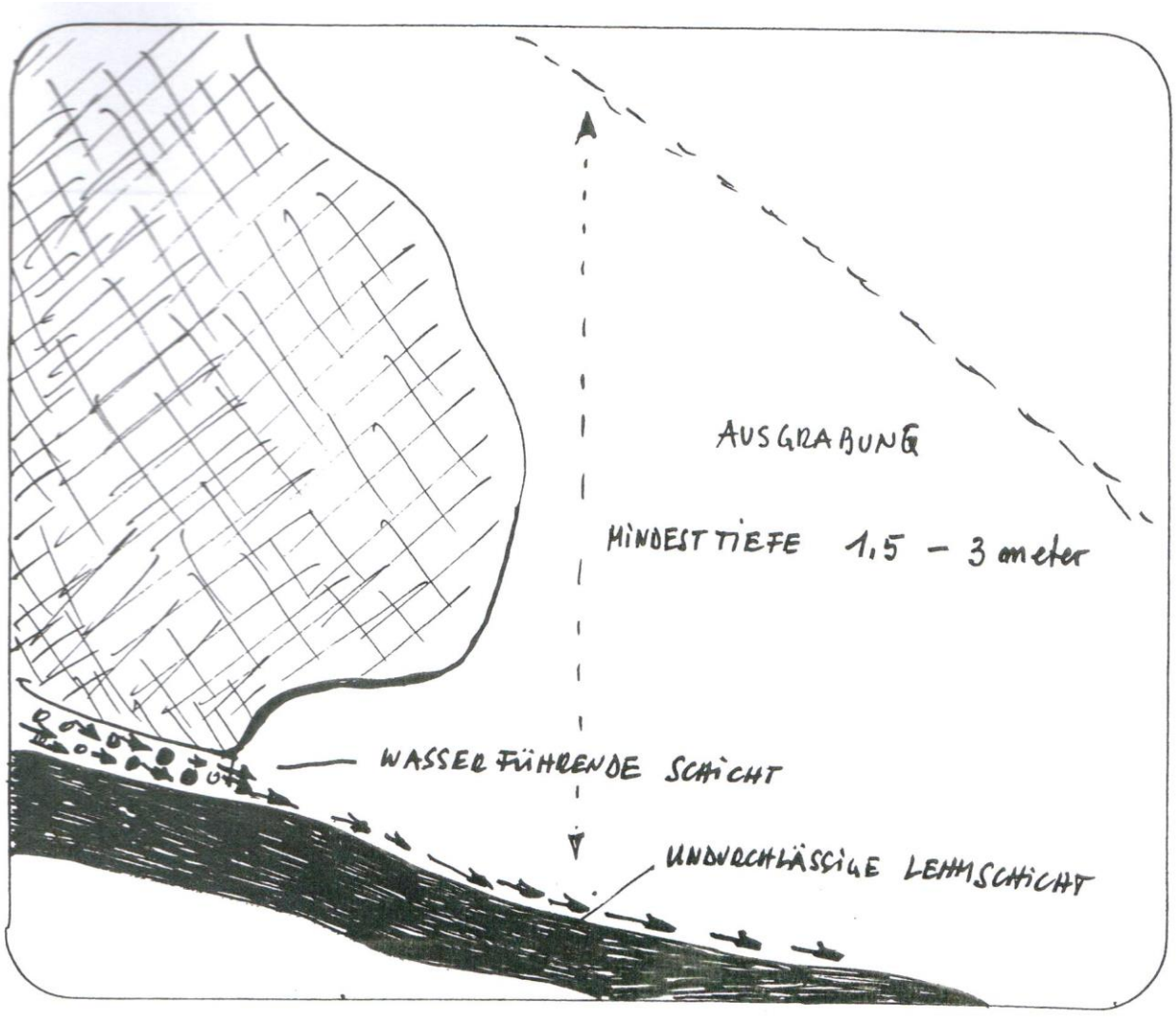


Fig. Source excavation is performed along the waterproof layer to a depth of 1.5 - 3 m, as far as the stability of the base permits. On the last 2m of the excavation the integrity of the impermeable clay layer is observed.

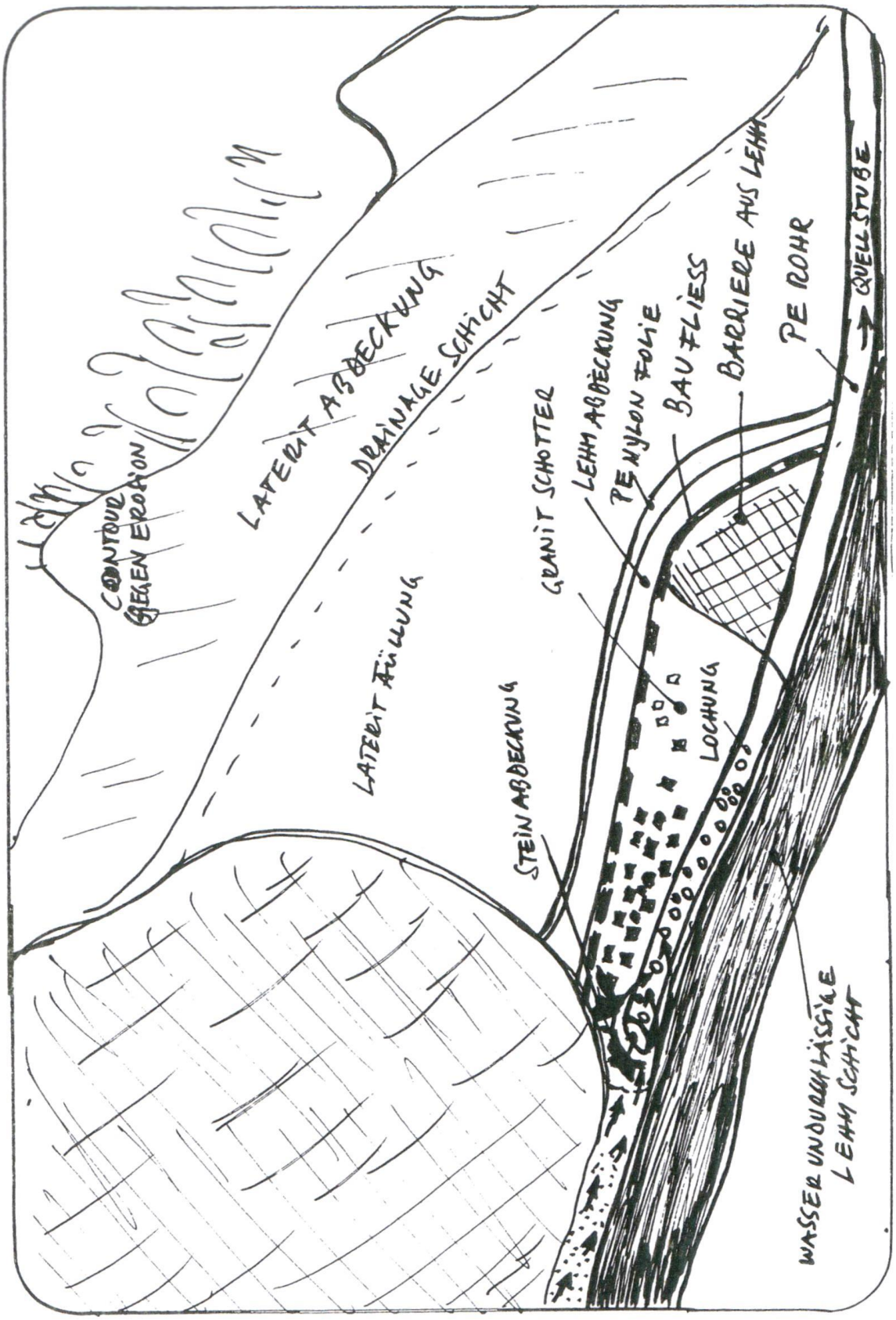
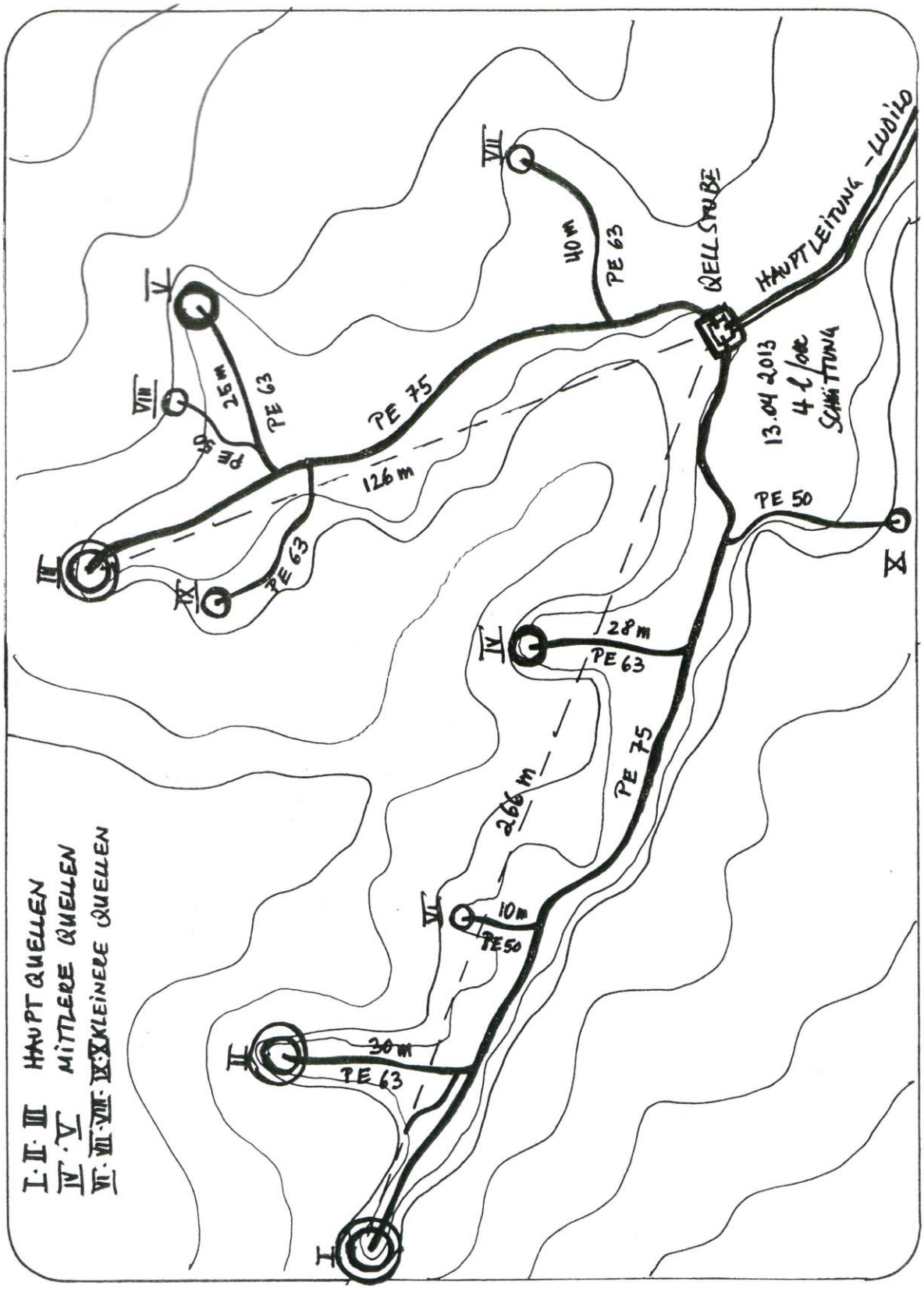


Fig. Illustration of the Source Version

OVERVIEW OF THE CARRIED OUT SOUCE VERSIONS



8. LABOUR MANAGEMENT

Fig. RDO – Committee busy with Coordination and Documnetation of WATA-concerns

The Labour was supported by the Water Committee of the Water Association (WATA) of Mdabulo Ward and was very well organized . Every day there were up to 120 or 150 people in action. The distribution of work was carried out by the so-called "Streets ". These are districts that compose a kind of village district. Every day two of these Streets were assigned to work. The pure working time was set 5 - 6 hours. The paths to the source area are very long. The shortest route from Ludilo includes a minimum of 5 kilometers, the longest route of Ikanga was 19 kilometers. The source area itself is only accessible on foot. The next point reacheable by tractor is 800 meters away from the source area. The work rate of the population includes the following tasks:

- All excavation work
- All pipe installations
- Stone transport, sand transport, gravel production by means of hammer crusher

In addition, all pipes had to be transported over nearly one kilometer. In 19 days, 5,700 hours were done of women, men and young people in the area of the source version. Furthermore, 720 hours of work were used for the excavation and the access road to the main tank.
During those big workloads of the people their commitment was shown very noticeable. It was striking that they see this as their project and perform as such. This can be explained that those responsibles, but also the villagers can experience the feasibility of this project first hand. Promises of the government were formerly very vague, and one could not determine whether this should be carried out by companies or by the village investments.

A special event was at the moment when the source chamber was put into operation and the amount of this clean drinking water could be seen. Those present were deeply impressed.

9. DATA AND CALCULATION

WATER – REQUIREMENTS DETERMINATION IN THE VILLAGES LUDILO, KIDETE, IKANGA, MLEVELA, IBWANZI

Verbrauch Einwohner	25	l/E*d
Verbrauch Schüler	8	l/Sch*d
Einwohnerwachstumsrate Mufindi	1,5	%
Fluktuierendes Wasservolumen	45,8	%
Quellschüttung	2,8	l/s

	Einwohner 2013	Einwohner 2033	Verbrauch m³/d 2013	Verbrauch m³/d 2033	Reservoir m³ 2013	Reservoir m³ 2033	Höhe WSP m	Grundfläche m²	Durchmesser m
Ludilo	2040	2748	51	69	23	31	2	15,7	4,5
Kidete	3000	4041	75	101	34	46	2	23,1	5,4
Ikanga	1565	2108	39	52,69570213	18	24	2	12,1	3,9
Summe	6605	8896	165	222	76	102			
Mlevelwa	981	1321	25	33	11	15			

	m³/d
Quellschüttung	242

Insgesamt werden im Wasserprojekt Mdabulo 1.298 Haushalte und 2 Kindergärten, 5 Volksschulen , 1 Mittelschule 1Berufschulzentrum und eine Krankenstation versorgt.
Aktuelle Quellschüttung gemessen am 13. April 2013: 4 Liter/Sek. =14,4 m³ = 345 m³in 24 Stunden

A total of 1,298 households and 2 kindergartens, 5 primary schools, 1 Secondary School, 1 VTC and 1 Dispensary are supplied from water project Mdabulo.

Current spring discharge measured on 13 April 2013: 4 liters / sec. = 14.4 m³ = 345 m³ in 24 Hours

DATA CONCERNING GRAVITY (WATER GRAVITIONAL FORCE PLANT)

	Difference	Sea Level
Source Chamber	00 m	2.005,5 m
Main Tank Ludilo	- 28,1 m	1.977,3 m
Besides Tank Ludilo	- 45,5 m	1.960,0 m
Tank Kidete	- 48,8 m	1.956,6 m
Tank Ikanga	- 128,5 m	1.876,9 m

10. TIME TABLE

2010-2012	Raising Awareness of water, development of spring capture method
March of 2013	Esthablishing the Water Cooperaitve (WATA – Suborganization of RDO)
March- Mai of 2013	Source Versions completed
Mai- Juni of 2013	Laying of Main Lines and Construction of Main Tank Ludilo
Juli-September of 2013	Water Supply Village Ludilo
Oct. of 2013 – Feb. of 2014	Laying of Main Lines Ludiolo – Kidete, Construction Kidete Tank
July –September of 2014	Water Supply Village Kidete, Laying of Main Lines Ikanga
Oct. of 2014 – Febr. of 2015	Ikanga Reservoir, Wasserversorgung Dorf Ikanga