

## Gravity- flow network management, the example of Gocho-Zebo (Kindo Didaye)

On the different Watsan projects Inter Aide implements in different areas in Ethiopia, many gravity-flow systems provide water to several communities with the same line. When there are more than 5 water points (or 5 communities supplied), the management of the system becomes more complex and usually requires a specific organisation.

In 2010, in the Woreda of Kindo Didaye, a relatively important network was built with a total of 3 springs capped, 17 water points and more than 8,500 users supplied. A lot of work had to be done, with the communities and the Woreda Water Office, in order to define and organize the network management.



In this document, we present key organisational systems that have been implemented and that contribute to sustain larger water supply systems. Although each system is unique and requires its proper management, which needs to be designed and appropriated by the actors involved, the experience of Gocho Zebo provides interesting elements that can help and inspire other communities.

### Presentation of the network

The following table provides the main elements of the Gocho-Zebo network

<b>Beneficiaries</b>		
Total number of beneficiaries	8 520	
<i>Avg beneficiaries per water point</i>	501	
<b>Water point composition</b>		
Springs capped	3	
Yield (total)	110l/min	
Water points	17	
Cattle troughs	17	
Wash tabs	17	
Reservoirs	13	
Distribution boxes	8	
Total length of the pipe line	30.050m	
<i>Average pipe length to beneficiary</i>	3,5m	
Stream crossings	10	
Number of Kebeles crossed	2	
Site duration (construction time)	273 days	
<b>Construction costs</b>		
	EB	Euros
Material costs	382 105 EB	17 368 €
Pipes	250 939 EB	11 406 €
Wages project technicians	392 531 EB	17 842 €
Community participation	274 185 EB	12 463 €
Transportation	134 460 EB	6 112 €
Administrative costs	142 362 EB	6 471 €
<b>TOTAL</b>	<b>1 576 582 EB</b>	<b>71 663 €</b>
<i>Average cost per beneficiary</i>	185 EB	8,4 €
Percentage of the community participation	17%	

## The key organisational mechanisms

Several decisions have been agreed upon by the main actors, in order to ensure the durability of the network with a convenient management system adapted to the context. The main elements are described below:

### 1. The management structure and official status

The administration of the network is managed by two boards:

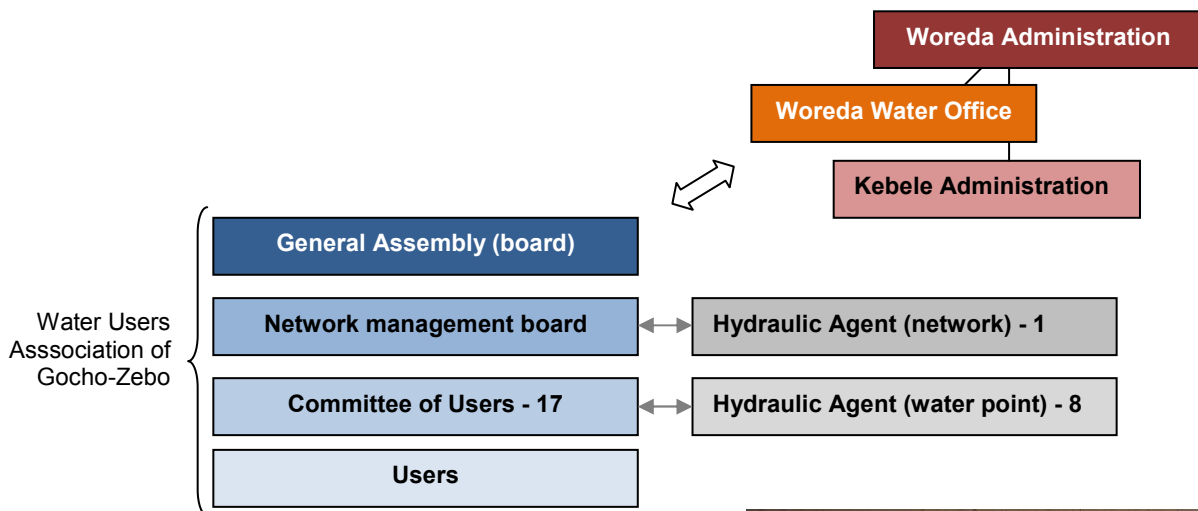
- **The Board of the General Assembly** (3 members: president, vice and secretary). *Its role is to convoke and organise the general assemblies, to decide of “exceptional assemblies”, to validate that the management board operates according to the internal rules and to settle problems beyond the capacity of the management board.*
- **The Management Board** (7 members: president, vice, secretary, treasurer, sore keeper and 2 members). The management board meets every two weeks and is in charge of implementing the network maintenance as described in the internal rules. They coordinate the management activities of the network and employ the services of one hydraulic agent.

Each community supplied by the system is represented at its level by a **Committee of Users**. As a whole, there are 17 Committees of Users. Their role is to manage the water point, to collect the contributions of users at community level (see below) and to participate in the network management.

The General Assembly Board and the management board are directly elected by the users (represented by their committee) during the general assembly, which is composed of 5 members of each users’ committees (85 persons totally).

The network management committee has obtained the legal status of association. Their accounts are audited by the Woreda Administration (Cooperative Office). *A Woreda is an administrative entity corresponding to a district and a Kebele is equivalent to a rural municipality.*

The following chart presents the main actors involved in the management of the network:



### 2. A central office for the board

One of the first actions taken by the network committee was to establish and to find a place to hold their meeting and to store maintenance material. The Kebele of Gocho has provided an office at their disposal. This central office, located in the Kebele administration, plays an important role and officialises the importance of the committee. All water users have contributed to purchase basic furniture’s (benches, tables, shelves, office stationeries), so that the network committee can operate correctly.

Two management board representatives and the hydraulic agent (centre) in front of their office. ←

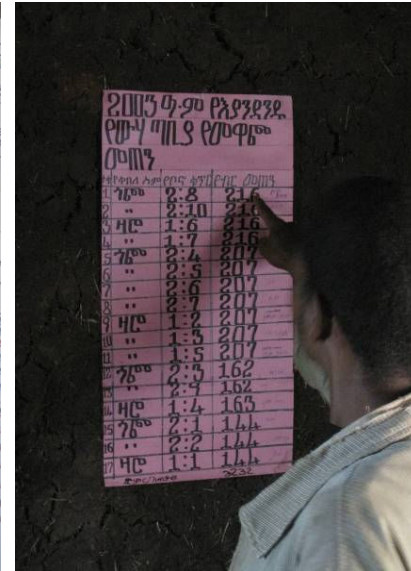


**3. An information clearly defined and displayed**

In the office, three main reports containing key information are displayed:

- The network map, which easily allows to visualise the network and to locate the main elements;
- The network documentation, providing detailed information for each community;
- The yearly fee applied for each community.

The maps of the network	The documentation with the pipe composition per each section line	The tariff decided for each community
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This information is displayed in the office and for an out comer, be it a member of a Committee of Users or a representative of the Local Administration, it is very easy to get a comprehensive understanding of the network and of the contributions for maintenance.

**4. The contribution system: a differentiated fee**

For the system maintenance, two main parts can be distinguished:

- **The “collective” elements**, composed of the spring catchment and the pipeline including the distribution box;
- **The elements that belong to each of the communities**, this is to say the water point (fountain, cattle trough and washing table) and the portion of the line from the water point up to the distribution box (not included). For some communities in the lower lands, it also includes a reservoir. Any breakdown in these elements would not affect the supply of water for the other communities.

**The community part** is directly managed by each community, who sets its own fee based on the complexity of this specific part (mainly the length of the “private” pipeline which can reach up to 3km and the presence or not of a reservoir).

For the **collective part**, four categories of contribution have been determined, based on the distance from the spring. The communities are then categorised according to the length of common pipe separating them from the spring catchment. The network committee can decide to revise this yearly fee, which is clearly displayed in the office of the network committee.

Category	Price	Difference in % as compared to initial tariff
Category 1	144 EB	-
Category 2	162 EB	+12.5%
Category 3	207 EB	+44%
Category 4	216 EB	+50%

### **5. The internal rules and ratification by the local authorities**

All rules that define the management of the network are gathered in one document that signed by all Committees of Users. The document is ratified by the Local Authorities at Kebele and Woreda level. Three offices have countersigned the internal rules: the Water Office, the Administration and the Justice Office. If it gives more legal responsibilities to the network committee, this ratification also provides them more legitimacy. If a problem cannot be solved at their level, the network committee has the ability to raise the problem in front of the local court. The internal rules also include the role and responsibility played by the Water Office and the Kebele Administration. For instance, at least four visits of the Woreda Water Office have to be done in order to assess the status of the system and check the network committee accounts. This validation by the local authorities contributes to ensure the continuity of the responsibilities, as turnover at institutional offices is relatively frequent.

### **6. The hydraulic agent: employment and supervision**

Totally, 8 hydraulic agents have been trained during the construction phase. Most of them only operate at the level of their community. One out of them has been employed by the Network Committee for the monitoring and maintenance of the common elements. Every two weeks, he washes the spring boxes, walks down the full line, opens the distribution boxes and cleans them when necessary. 2 days are needed to go all over the pipeline (one day per section line). In terms of remuneration, the hydraulic agent is employed by the network committee and presently receives 100EB per month. If specific additional operations need to be done, additional payment is based on the labour required. The network committee is still evaluating whether the remuneration is enough or not as compared to the workload; they might decide to increase the monthly remuneration.

During his fortnightly visit, the hydraulic agent has to meet one person of each water committee when visiting the corresponding distribution box. The idea of letting a logbook in the houses close to each water points has been evoked as a way to follow the frequency of the hydraulic agents' visits. He has to report orally about his work to the management board during the regular meetings.

### **7. Access to maintenance tools**

Tool boxes for the maintenance operations have been purchased by the communities (partly subsidised by the project) and are shared between the different communities. It includes basic maintenance tools<sup>1</sup>. The material is kept in the central office and can be borrowed by the Hydraulic Agent or by any users' committees. The material is stored in wood boxes made for this purpose and is handled by a store keeper who is accountable for the tools' management. For the communities, a small fee is required when they borrow the tools, as a revolving fund.



<sup>1</sup> such as pipe wrench, hack saw, glue, mason trowel, sand paper, anti-rust brush, painting brush, iron bar 6mm, shovel, fittings...

**8. The financial management and control mechanisms**

The money collected by the network committee is deposited on a bank account. Recently, Omo Micro inance (IMF) has opened a service at Kebele level which facilitates the saving of the collected fees. For every payment, from a Committee of Users to the Network Committee, an official receipt is given, numbered and stamped by the Woreda Water Office. This official receipt format is used as a control system and checked during audit. Every cash movement is recorded in the bookkeeping.

Each receipt of the pad is numbered and stamped by the Woreda Water Office. One copy is kept by the Network Committee and the other by the Committee of Users



Each cash flow is recorded in a specific double-entry table

In accordance with the internal rules, the network committee presents the accounts at least once a year during the General Assembly.

**Elements to be followed**

Different measures have thus been adopted to ensure a proper functioning of the system. Lessons learned from other experiences, acquired on older similar systems, have shown critical stakes to ensure the sustainability of the system in the longer term. Without being exhaustive, the following part lists important elements that must be taken into account:

**1. The pipeline: the most sensitive part of the system**

Of course, the spring can be considered as the heart of the system but, considering Inter Aide's teams' expertise on spring capping, the risk to have major breakdown in the long term are minimal. The majority of the breakdowns observed on old systems are mainly related to the pipeline. The main risks that can severely affect the system are erosion and landslides.

In order to minimize these risks, trenches have been dug at least 80cm deep. However the risk remains important and increases in the long-run. It is therefore essential to keep a continuous attention on the pipeline and to implement preventive protective measures especially in places prone to land erosion. The network committee has to invest on protective work organisation. *It is important to monitor concrete measures that are taken to address the erosion and landslides risks!*

**2. The need to invest on "preventive" maintenance**

One advantage of gravity flow systems is the very low risk of breakdown during the first years. Except if mistakes were made during the conception of the system, repair is rarely needed during the first 5 to 8 years of the system, even if nothing is done on the preventive side. The disadvantage is that progressively, the management committee may "fall asleep". It is essential that the committee rapidly takes the habit to regularly "invest" in the maintenance of system. Increasing gradually the provisions for maintenance is fundamental, but it is also crucial to use part of this money for preventive maintenances in order to "practice maintenance". Such indication shows that Committees invest in the maintenance of their system and acquire practical skills. Several "preventive maintenance", even if not vital, can be done, such as painting the doors of the catchment and distribution boxes with anti-rust paint, repairing the fences, building some dry walls in the risky places, renewing or adding some tools in the toolbox... *The preventive maintenance and the amount of expenses is another key indicator to follow.*

### **3. The level of fee collection**

In relation with the previous point, the capacity of the network committee to gradually increase its capital is decisive. It will be necessary for the network committee to have benchmarks in order to evaluate whether they are on the good track or if they have to adjust the fees. *This implies to analyse the evolution of the capital compared to a certain reference.* Such analysis could ideally be done with the support of the Woreda Water Office.

### **4. Maintaining the momentum**

At institutional level, there is a potential risk of losing know-how due to frequent turnover without any training transfer. The validation of the internal rules at official level contributes, to some extent, to maintain the continuity of the visits and responses.

Concerning the community representative bodies (network and users' committees) the risk may be the opposite. The stake is more to ensure a certain turnover in order to avoid a concentration of the expertise of network management in the hand of the same leaders. Encouraging a certain renewal of the board members and an involvement of all communities (why not through rotating management system) may be a way to prevent this risk.

*Therefore, monitoring the regularity of the Woreda Water Office "services" and the evolution of the board members deserves special attention.*