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DGCS

Office IX Evaluation

ETHIOPIA

WASH in small and medium towns

AID 9428

Water point at Durame town

2016 | Evaluation report

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Acronyms and Abbreviations

AA: Addis Ababa
AFD: *Agence Française de Développement*
AI: Intergouvernemental Agreement
AICS: Italia Agency for Development Cooperation
BI.: Budget item
BAD: African Development Bank
BoQ: Bill of Quantity
CB: Capacity Building
DGCS: Italian General Directorate for International Development Cooperation
DL: Supervision
EvT: Evaluation Team
GDP: Gross Domestic Product
GOE: Government of the Federal Democratic Republic of Ethiopia
GOI: Government of the Italian Republic
GTP: Growth and Transformation Plan
HDI: Human Development Index
IDC: Italian Development Cooperation
IE: Italian Expert
IRR: Instalment Request Report
ITA: Italian Technical Assistance
lcd: litre per capita day (water demand)
MAE: Ministry of Foreign Affairs of the Italian Government
MWE: Ministry of Water and Energy
MoWR: Ministry of Water Resources
MDG: Millennium Development Goal
MoE: Ministry of Education
MoFED: Ministry of Finance and Economic Development
m a.s.l: meter above sea level
O&M: Operation and Maintenance
OP: Operational Plan
OWNP: One Water Sanitation and Hygiene National Program
PASDEP: Plan for Accelerated Sustainable Development to End Poverty
PIC: Person in Charge
PID: Project Implementation Document
PIS: Project Implementation Schedule
PSC: Project Steering Committee
RWB: Regional Water Bureau
SAR: Semi-Annual Report
SNNPR: Southern Nations, Nationalities and Peoples Region
TA: Town Administration
TWU: Town Water Utility
UAP: Universal Access Programme
UTL: Local Technical Bureau IDC in AA (presently changed into AICS Local Bureau-Law 125/2014)
WASH: Water, Sanitation and Hygiene
WB: The World Bank
WIF: WASH Implementation Framework
WRB: Water Resources Bureau
WRDF: Water Resource Development Fund
WS: water supply

EXECUTIVE SUMMARY

1. Introduction

In the context of the *Ethio-Italian Cooperation Framework* 2009-2011, the Italian Government (GoI), through DGCS, and the Ethiopian Government (GoE), through *Ministry of Economy&Finance* (MoFED), agreed on the implementation of a water and sanitation plan to be financed by the GoI, with taxes expenses and land acquisition covered by the GoE.

The Millennium Development Goals (MGDs) compliant plan aimed at easing access to potable water and at providing sanitation services in 5 selected Ethiopian towns. The financing of the initiative was based on an *on-lending agreement* envisaging soft loans from the *Water Resource Development Fund* (WRDF) to be directly transferred to the Town Water Utilities (TWUs), the latter bound to repay the loans through the collection of tariffs, thus creating a virtuous circle due to sustain the WRDF further projects.

On 15/03/2010 the DGCS approved the project "WASH in medium and small towns – AID 9428", with directive resolution n. 31. The Inter-governmental Agreement (IA) was signed in Addis Ababa (AA) on 07/05/2010.

The project, with a GoI grant of € 6.15 million and around € 3.7 million from the Ethiopian side, is divided in two Components, each one containing different Budget Lines (BL). The project implementation was entrusted to the outfits listed in art. 4 of the I.A., the following are the main ones:

- Ministry of Water Resources (MWR)
- Water Resources Development Fund (WRDF), named "*Executive Agency*"
- Regional Water Bureaus (RWB), as *Co-financing Agencies*
- Town Water Utilities (TWUs), the project's final beneficiaries
- Italian Development Cooperation/Local Technical Unit (IDC/UTL).

The project goal, along with the MDGs, is the improvement of the access to safe drinking water and sanitation services in 5 selected Ethiopian towns by means soft loans managed by the Water Resources Development Fund (WRDF) given through an on—lending agreement to the Town Water Utilities (TWUs) that are in charge of the integrated WASH services. The latter are the beneficiaries of the project. The refunding of the loan is expected through the collection of the water tariffs. Such approach has established a rotation fund utilizing by the WRDF for performing further actions in other towns according to the Growth and Transformation Plan (GTP- II 2016-2020). The project has been implemented upon the Italian Law 49/87 (art. 15).

The 5 selected towns, listed here below:

AID 9428: The 5 selected towns		
n.	***Town***	***Region***
1	Huruta	Oromia
2	Durame	S.N.N.P.
3	Limu Gennet	Oromia
4	Ghenda Wua	Amara
5	Shire E.	Tigray

The General Objective of the project, referred to art. 21 of the AI, was set on improving access to safe water and sanitation services for the resident population and at the same time on strengthening the National WASH program and promoting the strategic National plan aiming at easing the access to water and to sanitation services for the population according to the Millennium Development Goal n. 7 target 2 adopted by the *Universal Access Plan* of the Ethiopian Government.

The specific objectives of the project, referred to in art. 2 section 2.2 of the AI, was set on easing access to safe water sources and to sanitation services in 5 towns by: i) increasing the water supply; ii) rehabilitating or enhancing the drinkable water distribution network; iii) bettering the public sanitation infrastructures; iv) improving the planning and O&M management capabilities of the TWUs, and v) the loans management capabilities of the WRDF.

The Target Indicators, referred to PID, were:

1- A minimum of 20 lcd[1] of safe water available within 0.5 km from their home;
2- Time per household dedicated to fetch water is reduced to a maximum of 30 minutes per day;
3- 100% of target population not using unsafe alternative sources of water for drinking;
4- Water related diseases decrease of 50% from baseline by local health facilities;
5- Target towns are open-defecation free, and
6- Share of households' income allocated for water provision is reduced to a maximum of 4%.

The Expected Results, referred to in PID (annexed to A.I.), section 2.3, were:

1- Water supply networks, properly sized to the target populations, functional and sustainable;
2- Public sanitation infrastructures and services upgraded, constructed and management set up;
3- Improved capacity of 5 target Town Water Utilities for planning, management and O&M and of WRDF for loans management and delivery of technical assistance to recipients.

The Indicators of the Results

The project indicators, referred to in PID (annexed to AI), section 2.3, were:

1- 60% of the target population actually consumes a minimum of 15 lcd as the new water scheme starts working;
2- Tariff strategies for sustainability of water schemes are in place and billing systems in use;
3- Unaccounted-for-water less than relevant national targets and international best practices;
4- Interruptions of water supply service is less than relevant national targets and international best practices in the first 3 months of new water schemes working period;
5- 100% of schools and health facilities in selected areas has adequate latrines with hand washing facilities;
6- Communal and institutional sanitation infrastructures are used and are properly managed;
7- Septic tank sludge removal facilities are functional and users pay for the service;
8- Integration of water, sanitation and hygiene planning and monitoring at Town Administration level, and
9- TWUs are able to properly perform the water schemes financial management, provide adequate O&M assistance and repay back the loan.

The implementation process envisaged the following activities:

1. Preparation of the Feasibility Studies and water wells tests by the WRBs;
2. Tender for the selection of consultants put out by the MWE;
3. Preparation of the final designs by the select consultants;
4. Tender for the selection of Works supervisors put out by the WRPF;
5. Tender for the selection of contractors put out by the WRPF;
6. Start date, established by the Supervision/Engineer;
7. Construction works by select contractors;
8. Supply of equipment by the WRPF to the TWUs;
9. Acceptance and Handover certificates of the works and the supplies by the TWUs;
10. Capacity Building and technical assistance to the TWUs and
11. Monitoring and Audit.

Here below the main works and activities at the project sites are listed:

Water Supply sector

1.1 In-take from springs: Huruta;
1.2 Borehole fields: Durame, Limu G.; Shire E., Ghenda W.;
1.3 Pumping Stations and main pipes: Durame, Limu G.; Shire E., Ghenda W.;
1.4 Transmission and delivery pipes: Huruta, Durame, Limu G.; Shire E., Ghenda W.;
1.5 Municipal water tanks: Huruta, Durame, Limu G.; Shire E., Ghenda W.;
1.6 Final consumer water supply networks and public fountains: Huruta, Durame, Limu G.; Shire E., Ghenda W. and
1.7 Means of transport supply (Pick-up + Minibus) supply of any other stuff.

Sanitation sector

1.8 Public latrines: Huruta, Durame, Limu G.; Shire E., Ghenda W. and
1.9 Sludge drying tanks: (Huruta, Durame, Limu G.; Shire E., Ghenda W.);

[1] litre per capita and day

Capacity Building and Technical Assistance

2.1 Capacity Building: management and administration skills and expertise at the TWUs;
2.2 TA and hardware and software "billing" supply;
2.3 Supply of welders for HDPE pipes and chlorination plant;
2.4 Design and works supervision and
2.5 Monitoring and Audit.

The project started on 05/10/2010 with an original duration of 3 years. Some administrative hurdles in the local tendering for the assignment of the engineering contracts and the lengthy custom procedures as well as technical problems during the works and in the dealings with the Work supervision have delayed the completion of the project by over 3 years. Thus its duration has been the double of the planned time. The project has been completed in December 2015 when some procured goods and supplies had not yet been delivered to the TWUs. The final hand-over to the TWUs has shifted to April 2016 as a consequence of some claims by the beneficiaries on the performed works.
The Evaluation of the project was assigned to this firm through a tender and the evaluation contract signed on 24/09/2015.

The Evaluation Report (ER), along the DGCS guidelines, is made of the following sections:

1. Section A: The framework and context;
2. Section B: The Project;
3. Section C: The Evaluation;
4. Section D: The Project analysis;
5. Section E: Lessons learnt and Recommendations.

Section A includes a short presentation of the intervention area and of the Ethiopian socio-economy as well as the national water policies, described and listed along their date a time sequence.
Section B includes the preliminary phases of the project identification, formulation and bilateral contractual agreements; it also presents the framing of the project and the financial resources assigned to each budget lines. It lists the Goals, Indicators and Results. It synthesizes the *procurements* and *tenders* of the project design, supervision, building works, *Capacity Building*, *Audit* and Monitoring with their planned and final budget allocations. It shortly presents the *on-lending agreement* for the grant refunding.
Section C presents the project evaluation, starting with the planned activities and it describes the findings of the field surveys of the project sites and works in the selected towns, the issues at stake in the works construction and management. It presents the interviews of the stakeholders and it analyses the composition and the management system of the TWUs and the increase in the water fees. On the basis of the stakeholders' interviews, it analyses, the percentage of results achievements vs the planned indicators of the objectives and results in each surveyed town.
Section D presents the project analysis along the OECD/DAC criteria: Relevance, Efficiency, Effectiveness, Impact and Sustainability of the project.
Section E presents the lessons learnt validated on the basis of the field visits, meetings and interviews, and lists the recommendations for the implementation of similar WASH projects.

After the *Desk analysis* and the approval of the *Inception Report* by the DGCS, the Evaluation team has undertaken the field mission in Ethiopia between November 28th and December 19th, 2015. The Team met the main players of the project in Addis Ababa and attended the final Workshop on the *Capacity Building* event organized by the UTL. According to the Inception Report, the Evaluation Team visited four selected towns (see the photo documentation in Annex 2): Huruta, Durame, Shire E., Limu G,.
The Team has visited the work sites and interviewed the stakeholders of the project by using the questionnaires included in Annex 3 of the ER. Totally 50 interviews were carried out during the visits.

The Final Evaluation Report presents the reports of the site visits.

The engineering works performed follows a basic scheme, the only main difference being the source of water supply system that in Huruta is from uphill springs while in the other four towns from di aquifer through deep boreholes equipped with submergible pumps.
The performed civil works are listed here below:

- Intake works from springs or boreholes;
- Transmission pipes from the water source to the header tanks, in PVC;
- RCC header tanks;
- Chlorination plants;
- Water distribution networks with HDPE pipes, from the tank to the user connections;
- Break pressure tank;
- Delivery points to the users;
- Public water points (fountains);
- Aqua privy public latrines and showers;
- Sludge drying tank.

In the target towns, excluding Shire, the project envisaged the construction of new buildings for the TWU offices, mechanical workshops, spare part stores and toilets.

Within the project each TWU was supplied with: a pick up Toyota; a motorbike; a set of equipments and tools for hydraulic interventions; HDPE pipes, spare parts and fittings; HDPE pipe welding machine.

The site visits have verified that the proposed works have been completed and that they are running. There are some critical issues not yet solved in the management of these works. For instance the latrines in Huruta and Durame still out of order due to the failed agreement between TWU and the Municipality on their managing.

Still critical is the situation at Shire E. site where the two boreholes, barely equipped, dried up rapidly compromising the addition water supply in a town suffered particularly water shortage, aggravated by a impressive population grown. Despite the expected result n. 5, no sanitation works have been carried out at any schools without fulfilling the Ministry of Education's standards. The latrines have been built in the marketplaces and bus stations, highly appreciated by the population. The sludge collection has been put in place in Shire town only. A confirmation of the shortage of public sanitation services is the observation by the 100% of the interviewed people because the open air defecation is still going on.

About the water tariff, it has to be highlighted that the increase in the water services fees performed by the TWUs in order to refund the loan as per the *on-lending agreement* is excessive for the lower belt of water consumption up to 3 m^3/month per household (fulfilling the water demand of 20 lcd). It has recorded an increase of over 100% of the previous water fee. Such increase challenges the economic capacities of the weaker segments of the population. The highest water services fee increases have been recorded in Huruta (150-206%), followed by Durame (100-47%). Shire is the only town were the water services fee have decreased for the lower consumption belts (from -20 to -25%) while + 125% for the higher ones. Limu water service fees are more affordable, ranging between 83% and 12.5%.

The project analysis was done according to the 5 OECD/DAC criteria (Relevance, Efficiency, Effectiveness, Impact and Sustainability) and is completed with the analysis of its realizations.
The analysis is based on the information retrieved from the project desk analysis, from the site visits and from the interviews carried out during the field mission (questionnaires can be found in Annex 3).

RELEVANCE: the project agrees with the federal water policies, with the economy development lines (GTP) and with the MDGs, particularly with the priorities of the water sector of the PASDEP. It also agrees with the frame work of the *2013-WaSH Implementation Framework* (WIF) in terms of decentralization directly involving the local TWUs under the direction of the WRDF. The objectives, the indicators and the expected results of the project agreed with the targets of the OWNP that aimed at a 98.5% safe running water covering and a 84% for sanitation services. More in detail it must be pointed out that only partially the 6 target indicators have been met.
The 3 expected results have been met although the related to the sanitation structures (Result n. 2) shows some criticalities, particularly in Huruta and Durame towns, where the new latrines are not working yet. More in detail

the meeting of the 9 result indicators, perhaps a little bit of overtly ambitious at their start, have shown some problems described in detail in the ER. The surveyed situation does not diminish the relevance of the project that agrees with the federal targets but shows the difficulties of a transformation process in the water sector to be solved next following the Recommendations listed in the last section of this report too.
What missed in the project formulation and in the project framework are the gender issues, particularly in this WASH interventions which see the women directly involved in the family water supply and management and more sensitive on sanitation facilities in the schools, in the marketplaces and in the working places.
Furthermore the sanitation sector, but in Shire, is a particularly delicate one although changes from the past habits are already visible and looked after by the population. Indicator n. 5 is very critical: its target pointing to a diffusion of the sanitation services in 100% of schools, also in line with the Ministry of Education standards, has been totally forgotten in the designing phase.
The exam of the "Project Implementation Document" (PID), attached to the IA, carried out by the UTL experts in collaboration with the WRDF, shows that a thorough analysis was made in each of its part although it could appear that the expected results have been maybe too ambitious both in reference to the limited budget and the pre-existent situation of the sanitation in rural Ethiopia.
One phase of the *project cycle* to be bettered is that of the designing that, as more in detail discussed in Section E of the Evaluation Report, could envisage a sort of technical and administrative validation of the final/detailed design before the construction tender phase involving the TWUs, as final beneficiaries, and the Client too in order to minimize delays risks in the construction phase.
The final evaluation for the relevance ranks as "fair".

EFFICIENCY: pretty efficient has been the project in the initial phases of formulation and defining the project implementation agreements even because well compliant with the Ethiopian Water Policies. The project was efficient in its aim of carrying out in all of the 5 selected sites the full works realization process, although with the criticalities that have delayed the project. The doubled time duration remains the main issue influencing the efficiency judgment even if this project could be considered as a *pilot WASH project* in the innovative decentralization process involving WRDF and TWUs, both newcomers in the WASH project implementation. As the monitoring Semi Annual Reports (SARs) states, custom procedures and selection of the engineering service providers have delayed the project together with variations/changes of the proposed works due to poor design in the first place, but also to not collaborative or absent works supervision and unsuitable financially weak contractors. According also to the debate of the Workshop presentation held on 05/07/16 at DGCS premises the final evaluation on the efficiency ranks as "sufficient" only.

EFFECTIVENESS: the project was effective and incisive in its effort to follow the addresses of the national policies in the WASH sector, fairly effective (70/100) to achieve the project objectives but insufficient to reach the expected results, with different scores varying from Limu G. with the highest score and Huruta and Durame sharing the lowest ones.
A greater effectiveness should be also looked after in future projects supporting the decentralization process now ongoing in Ethiopia by a more direct involvement of the TWU in the whole project cycle.
With such an aim in mind, a revision of the composition of the Boards of the TWUs would be advisable supporting merging forms among the towns so to strengthen the underlying financial structure itself that would better sustain the upgrade of the service as a whole, technical and administrative management included. A greater participation of the consumers in the boards – presently there are just 2 consumer's representatives in a total of 9 members – should also be encouraged through the institution of free associations of water users as 100% of the interviewed declared. In some TWU boards the presence was noted of too many municipalities' representatives that, on the one hand, ease the decision process but, on the other, can limit the freedom of the outfit itself and its managing orientation.
The effectiveness must also be strengthened by the speeding up and by the homogenization of the Project Cycle due to the works similarity and repetitive as well, allowing a standard approach for the services tender procedures, procurements, technical specifications for works and supplies. The WRDF could be the most suitable technical player to start such *standardization* of the WASH implementation process. All of the donors involved in WASH

projects should join in this task setting up, for instance, a panel of qualified experts with the aim of supporting the WRDP in such process.
In conclusion, the final evaluation for the effectiveness ranks as "Fair/sufficient".

IMPACT: the WASH project has had a positive impact in influencing many aspects of the daily life of the population. Appreciation for the work done was expressed warmly during the field visits and the interviews. On the other hand the ascertained increases of the water tariffs, linked to the TWU financial pledge, seem unaffordable in the small rural towns. The increases for the lowest consumption segment of 3 m^3/month reached the 150% in Huruta, the 100% in Durame and the 83% in Limu – only in Shire a decrease of 20% has been registered. As was also reported in the based on a WB survey - *Guidelines for TWUs Tariff Setting* issued by MoWE in 2013 - tariffs increases, particularly when they reach the 100% or more, are evidently unsustainable, particularly for the poorest group of the population. According to the federal water policies, the minimum consumption level of 3 m^3/month, 20 lcd destined to standard 5 people families, should be assured to each household, regardless of their income. The WB survey capped to 5% of the family income the maximum outlay for the water service provision to be affordable for the consumers.
Another aspect that impacts on the quality of life of the population is the location of the fountains/WPs. Such location should be carefully studied in the design phase – and not during the construction of the works. Barycentric locations at no more than 1-2 km distance (30 minutes walk), preferably located uphill, in order to ease the downward trip with a filled yellow *jerrycan* of 25 litres, should be designed more carefully.
Generally speaking, such *small* works pose no threat to the environment impacts but water losses and waste of fuels should be carefully avoided inserting always float valves at the tank inlets and analysing, at feasibility level, renewable energy sources for the boreholes and micro-hydro at the break pressure tanks. In conclusion, the final evaluation for the impact ranks as "Fair".

SUSTAINABILITY: the project sustainability is based on two main conditions i) the financial and economic sustainability of the project, and ii) the technical sustainability of the design choices.
Financial and economic sustainability: it is based on the possibility of implementing same projects in other towns by the rotating funding fed by the redemption of the soft loan, as per the "on-lending agreement" signed between the TWUs and the WRDF, through the tariffs collection. As already noted, in order to sustain the financial pledge, the tariffs have undergone too high increases, not easily affordable in the rural areas. Furthermore, there still lingers a misunderstanding among the costumers regarding the loan that some of them consider a free grant. The TWUs that bear the redemption pledge should be more involved in the project choices that inevitably fall upon the consumers. In all of the surveyed sites, the difficulty of the TWUs in the loan redemption has surfaced.
The rotating funding based on the on-lending agreement; together with the decentralization policy represent an excellent combination. This approach should be sustained involving much more the TWUs in all the phases of the project cycle.
Technical sustainability: the best choices in the WS network designs are those that place at the top the following issues:

- *The maximization of the works lifespan;*
- *The minimization of the water losses and dispersion especially in case of energy fed systems;*
- *The minimization of O&M costs.*

Wash projects are implemented in different sites and conditions but envisage a similar range of works and interventions. It would then be advisable to work out a Technical Manual containing typology standards for civil works and supplies, provided with check lists orienting the project choices. Such manual would also be helpful in the implementation of the WASH over the whole Ethiopia that is now underway. Some examples were listed in the Evaluation Report.
The sustainability evaluation f ranks as "Fair/Sufficient".

OVERALL EVALUATION: For each selected town the overall evaluation of the OECD/DAC criteria, based on the scores: *Excellent, Very good, Fair, Sufficient, Insufficient and Scarce*, is summarized in the box here below. The average evaluation of the whole project marks between "Fair" and "Sufficient".

Overall evaluation criteria						
Town	***Relevance***	***Efficiency***	***Effectiveness***	***Impact***	***Sustainability***	***TOTAL***
Huruta	Fair	Suff.	Fair	Fair	Fair	**FAIR**
Durame	Fair	Suff.	Insuff.	Suff.	Insuff.	**SUFFIC.**
Shire	Fair	Suff.	Insuff.	Insuff.	Insuff.	**INSUFF.**
Limu G.	Fair	Suff.	Fair	Fair	Fair	**FAIR**
Overall	**FAIR**	**SUFFIC.**	**SUFFIC.**	**FAIR**	**SUFFIC.**	**F/S**

In conclusion, it must be highlighted WASH projects in Ethiopia, by all means, have a big one influencing many aspects of the daily life of the population: healthcare, economy, quality of life etc. Such deep impact emerged during the field visits and the interviews when the importance was perceived by the Team of the presence of just a simple running water tap in a compound that greatly changed the life of the families and particularly of the women that are generally in charge for the collection of water. The warm appreciation of the project efforts by the population has been unanimous and the need for investments on the WASH facilities and services always stressed out during the interviews.

The lessons learned in the course of the present evaluation can be summarized as follows:

1. Decentralization: technical and managerial decentralization works very well in such small, low budget interventions with a strong social impact: it speeds up the project realization and makes aware the final beneficiaries (TWUs) of the responsibilities in the management of the works. The process could strongly benefit from the standardization of the *Project cycle*.
2. Soft loan redemption: the *on lending agreement*, oriented to feed the rotating fund, is a virtuous circle in itself, but it must be more thoroughly studied in reference to the sustainability of the redemption plan and the situation of the community of the consumers. In line with the 2013 federal Guidelines, the redemption plan should envisage modest tariffs increases for the low segment of water consumption (3 m^3/m) and/or adopting discounts for the poorer sectors of the population.
3. TWU organization: the visited TWUs have well impressed but they need to increase their technical expertise and skill. They furthermore are to strengthen their managing independency. The board should include a stronger presence of the civil society and costumers through free Water User Association.
4. Gender issue: The TWU employed women rate shows a pretty good figure ranging between a maximum of 62% in Huruta and a minimum of 16.2% at Durame, with an overall average of 35%, such percentages include the O&M workers that women can't perform easily. Women are very little involved in the Board, where men dominate.
5. Preliminary studies: water demand analysis, demography projections, Feasibility Studies and water tests should be conducted at a higher level than the TWUs (*Regional* or *Zone Water Bureau*) and should be made according to national University or Ministry prepared standards, always fully approved before the project start.
6. Supplies and materials: in the design phase it should always considered that supplies, materials and maintenance services are locally irretrievable and must be therefore ordered from major far away cities.
7. Sanitation: in the sanitation works, some of the latrines are still out of order due to the lack of agreement between TWU and Municipality. The latter should be signed in advance, always before the design phase. Even the location of them must be agreed during the design phase.
8. Toilets and Fountains management: in this service the civil society, women groups particularly, should be directly involved also through a *Performing Chart* of the services, to be prepared.
9. Design: both the design and the works supervision are essential professional services. During the mission, these services showed some technical deficiencies (lacking of minor works drawings and construction details) causing delays. The technical drawings and technical specifications should be improved in quality and definition too.
10. Works supervision: as the TWUs reported, the work supervision has been poor. A daily presence at the work sites should be included in the supervision contracts, engaging junior engineer as resident engineer.

11. Protection facilities of the works: the electro-mechanical equipments (boreholes, pumping station/Booster) and the rising pipes resulted to lack the protection system both against the varied elastic flow (water hammers and depressions) and the lighting shocks.
12. Tank: at the tank inlet, the lack of the float valve to arrest the flow at the full level must be always foreseen in order to reduce water losses and energy dispersions and, consequently, the energy bill for the TWU, and
13. Tariffs: the increases that the *on-lending Agreement* generated result to be too high and unsustainable especially for the low bracket of consumption (up to 3 m^3/month). A basic supply of water should instead be assured to all the population with a threshold increase according to the *Guidelines* 2013.

The recommendations for the forthcoming WASH projects can be summarized as follows:

1. Standardization of the process: taking into account the similarity and the high number of the WASH works to be implemented in the following years in order to meet the OWNP targets, the standardization of the whole process is highly advisable, in all of the project's aspects: engineering services, specifications, procurement, works and supplies. Such standardization would also help the TWUs in taking more technical and administrative confidence in WASH interventions also allowing them to play a more decisional role in the whole *project cycle*.
2. On lending Agreement: the redemption mechanism should envisage more stringent rules in order to assure the on time reimbursement of the instalments. Such redemption, that activates the rotating fund, is a major factor in the project sustainability and the meeting of the federal Water Policy targets.
3. Gender issue: the women participation should be encouraged, in the TWU Boards in particularly.
4. Economic stimulus: with the aim of boosting their professional growth, the TWU key staff should be economically motivated on the basis of a performance based evaluation. In this way the TWU would more effectively respond to the challenges posed by the project cycle and prevent them, once enough trained and skilled, from leaving their places for more lucrative jobs.
5. Designing: resistance and durability of the works and of the supplies are always to be rated in the first place. The choice of the materials for the pipes, for example, should never disregard this principle to be also reported in the design, especially when the project site is far away from major cities where supplies and maintenance services are based. Minor works should also be always included in the final designs.
6. Validation of the design: taking even into consideration the monitoring Semi annual Report remarks, a technical validation of the final designs should be envisaged before launching the tender. A validation mission by a WASH expert, the designer, a *Regional/Zone Water Bureau* and TWU representatives should be organized before the construction tender.
7. Works supervision: backed by the TWUs, the use of plastic pipes, largely utilized in the pressurized pipe networks, needs a careful check of the underground laying (bedding/surround/backfilling) stages to assure cross static stability according to the *Technical Specifications*. During such activity the works supervisors must be therefore present at the work site. Such daily presence, to be included in the contract, could be assured by junior resident engineers.
8. Audit: as seen, it was really too poor and certainly not up to the international standards due also to the too poor outlay earmarked for such activity.
9. Tariffs: in line with the directives of the *on-lending Agreement,* that became necessary in order to meet the financial obligations of the TWUs, the water fee should agree with the federal *Guidelines*[2], assuring the service also to disadvantage consumers using not more than 3 m^3/month (fulfilling a water demand of 20 lcd for the 5 family people), in line with the right to water access of the federal *Water Policy*.
10. Sanitation: in accordance with the standards of the Ministry of Education that takes into account the poor situation of the sanitation services in schools and universities, each one of the future WASH interventions should also envisage the placing of at least one sanitation service in one school site.
11. Tanks: all tanks and break pressure chambers should be provided with float valves to stop the inlet flow once the tank is filled up, avoiding water losses and energy costs.

[2] GoE- Ministry of Water and Energy: *National Guideline for Urban Water Utilities Tariff Setting* – March 2013

12. Protection of the systems: the electro-mechanic equipments (borehole and pumping station/Booster) and main pipes should always be provided with protection systems against the water hammer/depression effects and lighting shocks.
13. Public fountains: their location should be decided together with the municipality before or during the design phase. The water points should be placed within a maximum of 1-2 km radius (30 minutes walk) preferably selecting an uphill location in order to ease the transport downhill of the filled *jerrycan*.
14. Sand filters: the use of such very simple and cheap tools should be encouraged envisaging their sale at a wholesale price and supporting their employment in the intervention's adjoining areas, and
15. IT equipment: hardware and software must be always provided with a UPS (uninterruptible power supply) against electric shock/blackouts and holders/covers protecting from dusts coming from the unpaved road.

THE EVALUATION REPORT

SECTION "A"

OVERVIEW

A.1 – ETHIOPIA: THE CONTEXT

Ethiopia, a landlocked 1,1x10^6 km^2 wide country at the heart of the Horn of Africa, is a federal republic (fig. A.1) composed of nine autonomous regions (Afar, Amhara, Benishangul-Gumuz, Gambella, Harari, Oromia, Somali, *Southern Nations, Nationalities and Peoples* and Tigray) and by two independent metropolitan areas (Addis Ababa and Dire Dawa). The Regions are again divided into Administrative Zone, the latter subdivided into Districts (Woreda).

Fig. A.1: Administrative Regions and Zones of Ethiopia

With a population of around 100 million and a growth rate of 2,6%, Ethiopia is expected to be among the ten most populated countries in the world in 2050. In spite of the rapid development of the last 20 years or so, during which the GDP has soared to over 10% (2003-4 and 2011-12), the country is still among the ten poorest country in the world with a per capita income of 370 USD only.

Such scant result in income terms has not hindered Ethiopia's progress in meeting some of the Millennium goals (MDGs), viz. Goal 07 Environmental sustainability and Goal 10 Safe water access, and in climbing up into the Human Development Index (HDI). However, some sectors of Ethiopia's public services and social life have lagged behind.

Troubled by water scarcity, lack of hydraulic infrastructures, steep population growth and high number of small and secluded settlements, the WASH services are among the losers notwithstanding a comprehensive and ambitious series of interventions among which the 2010-15 *Growth and Transformation Plan* (GTP) stands out, that envisaged the supply of safe drinking water to 98% of the population, the provision of basic sanitation facilities for all and of improved sanitation facilities for 84% of the Ethiopians. The GTP also benefited from two further plans, designed by the Ethiopian Ministries in order to speed it up: the *Memorandum of Understanding* (MOU)

bound to develop the national plan "*One Water Sanitation and Hygiene* (WaSH) *National Program* (OWNP)" (Nov. 2012); and the *WaSH Implementation Framework* (WIF) (March 2013).

The OWNP, that actually represented the implementation tool of the GTP with the aim to rapidly improve the life conditions of the population (Water Supply & Sanitation first and foremost) in rural and urban areas, was financed by the GoE and supported by some International outfits, among them: the *Development Association/Department for International Development* (IDA/DFID), *African Development Bank* (AfDB), USAID, SWASSA (*Suitable Water and Sanitation in Africa*), Unicef, UE and National Cooperation Agencies through bilateral and multilateral channels. Among the latter ones, was the Italian Development Cooperation (IDC) that financed the now under scrutiny AID 9428 project.

The OWNP operated inside an articulated context composed of a series of in WASH involved outfits. At the top come the four ministries: i) *Education*, ii) *Finance and Economic Development*, iii) *Health*, and iv) *Water, Irrigation and Energy*. The to IV linked Water Regional Bureaus comes next. In 2004 (*Proclamation* n. 78/2004) the decentralization policy, still in progress, made the water competences to be passed on to the Zones, the Woreda and the Municipalities, represented by the respective Town Water Utility (TWU), in accordance with the WIF that locally reorganized the responsibility chain. Such TWUs, although poorly funded, played a key role locally. In 2002, the *Water Resources Development Fund* (WRDF) was established under the umbrella of the *Ministry of Water, Irrigation and Energy* (MoWIE). This semi-autonomous body represented a very effective tool to promote the WASH sector development and to speed up the technical and burocratic procedures of the projects, directly linking the financing outfits and the stakeholders, represented by the TWUs.

In 2013, the *One Water Sanitation and Hygiene National Program* (OWNP), made the WRDF's competences to grow to cover not only the rural areas but the urban ones as well. The WRDF directly manages the WASH funds coming from National and International institutions and directly signs agreements with the final stakeholders (TWUs, Villages or Municipalities) for the projects implementation. By collecting water fees, the TWUs can meet the financial obligations of the soft loan reimbursements based on an *on-lending agreement* generally signed between the WRDF and the TWUs themselves, feeding in such way a sort of rotation fund for further projects, directly managed by the WRDP.

Such articulated institutional net testify to the efforts concentrated on the still under way WASH development to which the already completed project AID 9428 can provide solutions for the eventual critical steps and remedial interventions in the future projects. Particularly, its analysis can be helpful in the implementation of the additional IDC, French Cooperation and BEI funded project, started in 2015, with € 80 m budget.

A.2 – THE WATER POLICIES IN ETHIOPIA

- 1999 - *Water Resource Management Policy* (WRMP). Programmatic framework envisaging the strengthening of the National effort geared towards an efficient, fair and optimal resource utilization triggering a sustainable socio-economic development (see also NWSS here below);
- 2001 *National Water Sector Strategy* (NWSS). The WRMP's implementation tool, divided into four sectors: water resources, hydroelectric development, aqueducts and sanitation, irrigation. It provides the guidance lines on life standard and social welfare upgrade, both in urban and rural areas, together with the implementation road map.

- 2001, *Water Sector Development Programme* (WSDP 2002-2016). A more detailed road map, involving both National and International partners, for the achievement of the NWSS targets also complying with its leading principles. In 2006-07, in order to speed up the set in 2006 Plan for Accelerated Sustainable Development to End Poverty (PASDEP, see below), WSDP was updated and the WS service coverage was increased to 84,5 from 76%.
- 2005 *Universal Access Program* (UAP 2005-2012). The water and sanitation MDGs compliant programming paper (access to drinkable water for 98% of the world population and sanitation for 100%), that ambitiously set the completion date three years earlier, in 2012 instead of 2015.
- 2006 *Plan for Accelerated and Sustained Development to End Poverty* (PASDEP 2006-2010). MoFED 5-year plan was an attempt to speed up the socio-economic development of Ethiopia, UAP included, by infrastructures boosting interventions. This ambitious plan suffered from all kind of hindrances and from the funding shortages caused by the 2008 financial crisis.
- 2008 *Ethio-Italian Cooperation Framework* 2009-2011. Bilateral agreement containing the IDC priorities in Ethiopia and their funding. Project Aid 9428 was included in this frame.
- *Growth and Transformation Plan* (GTP) 2010-2015. Based on UAP, this further multisector plan envisaged a new development boost. In the WASH sector targets were set on safe access to water for 100% of the urban population and for 98% of the rural one by 2015. Although such targets have not been met, thanks to the plan safe water is now accessible to 76,7% of the population (84,55 in urban areas and 75,5% in rural ones).
- 2013: "*One Water Sanitation and Hygiene* (WaSH) *National Program* (OWNP)". Again a based on UAP plan signed 13/09/2013 by the four ministries involved in the development policies. It envisaged the widening and strengthening of the WS networks, the provision of hydro-hygienic services to the population together with the fosterage of personal care, this latter a MDGs and GTP compliant target. In the WASH sector targets were yet again set on access to drinkable water for 98,5% of the population and sanitation for 84% of the population by 2015.
- 2013: *WaSH Implementation Framework* (WIF). Signed in 2013, it is an inter-ministerial agreement geared towards the meeting of the *Universal Access Plan II* targets and the realization of the *One WaSH National Program*. Centred on water supply and sanitation both in urban and rural areas, WIF also structured the governing bodies from the federal to the Woredas level based on a shared and decentralized approach. At the top come four outfits: Wash Steering Committee, Technical Team, Program management Unit and Coordination Office. Then there is the Zonal WaSH Management Team that works in between the top level and the Woreda level with its Woreda WASH Teams.
- 2013: GoE-Ministry of Water and Energy: *National Guideline for Urban Water Utilities Tariff Setting,* Deals with water tariffs on the basis of managing and maintenance costs.
- 2016: *Growth and Transformation Plan* (GTP- II 2016-2020). This under way plan represents the development of the previous GTP-I, concluded in 2015. WASH strategies and targets are dealt with in Chapter III, Sect. 3.1.4 "Economic Infrastructure Sector", par. e) "*Potable Water Supply, Sanitations & Irrigation*". The coverage percentages remain unchanged but their achievement is postponed to 2020.

SECTION "B"

THE PROJECT AID 9428

WASH IN MEDIUM AND SMALL TOWNS

B.1 - OVERVIEW

In the context of the *Ethio-Italian Cooperation Framework* 2009-2011, the Italian Government (GoI), through DGCS, and the Ethiopian Government (GoE), through MoFED, agreed on the implementation of a water and sanitation plan to be financed by the GoI, with taxes expenses and land acquisition covered by the GoE.

The MDGs compliant plan aimed at easing access to potable water and at providing sanitation services in 5 select Ethiopian towns. The financing of the initiative was based on an *on-lending agreement* envisaging soft loans from the *Water Resource Development Fund* (WRDF) to be directly transferred to the Town Water Utilities (TWUs), these latter bound to repay the loans through the collection of tariffs, thus creating a virtuous circle due to sustain the WRDF further projects.

15/03/2010 the DGCS approved the funding of € 6.15 million with directive resolution n. 31.

After the signing of the inter-governmental agreement (IA) in Addis Ababa (AA) 07/05/2010, the project started 05/10/2010.

B. 2 – THE PROJECT FORMULATION AND THE FUNDING PROPOSAL

The UTL and the WRFD prepared the Project Funding Proposal based on the National WASH Program embracing suggestions from the Ethiopian Ministry of Water Resources and based on the project formulation mission carried out 1/06 to 11/07 2009.

The project was set up as part of a wider water and environmental hygiene development program also sustained by the World Bank, the European Union, the European Investment Bank, the Arab Bank, the African Development Bank (BAD), USAID and others.

As already said, the Aid 9428 aimed at easing access to potable water and at providing sanitation services in 5 towns. The upgrade of the TWUs' managing capacities both from a technical and an economic point of view was also part of the project.

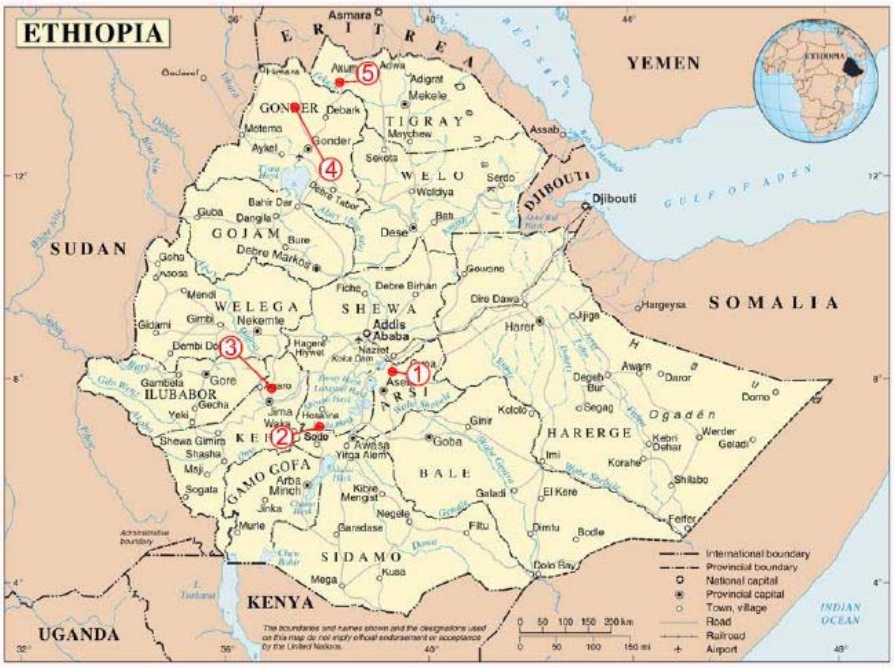
The 5 towns, selected together with the Regional Water Bureau, were:

Chart B.1: AID 9428 -the selected towns

n.	Towns in the Proposal	Towns after OP 1	Regions
1	Huruta	Huruta	Oromia
2	Durame	Durame	Sud
3	Limu Gennet	Limu Gennet	Oromia
4	Bati	**Ghenda Wua**	Amara
5	Humera	**Shire E.**	Tigray

As Chart B.1 shows, two of the five initially chosen towns, n. 4 and n. 5 (red) were substituted when the Operation Plan of the project (OP n. 1) was presented.

Fig. B.1 shows the geographical position of the five towns in Oromia (2 towns), Amara, SNNP and Tigray.



1: Huruta; 2: Durame; 3: Limu Gennet; 4: Ghenda W.; 5: Shire E.

Fig. B.1: The five small towns involved in Aid 9428

B.3 – THE INTERGOVERNMENTAL AGREEMENT

The 17-articles IA between GoI and GoE was signed 7th July 2010 in Addis Ababa. The project duration was to be 36 months with a completion deadline set on 5/10/2013.

Euro 6.15 million were pledged for the project by the Italian Ministry and 3,707 by the Ethiopian institution , as in chart B2 (by art. 3).

Chart B.2: AID 9428 – Funding pledges by art. 3 of IA			
Contribution	**Component**	**Amount (€)**	**Item**
GoI	A	5,500,000	WASH works
GoI	B	650,000	Experts fund & local expenses - overhead
GoE	-	3,707,000	VAT & local taxes

The project implementation was entrusted to the outfits listed in art. 4, the following are the main ones:

- **Ministry of Water Resources – (MWR)**, entrusted with supervision of all of the project activities.
- **Water Resources Development Fund (WRDF),** named "*Executive Agency*", it was the "*Person in Charge*" (PIC) of the project;
- **Regional Water Bureaus (RWB),** as *Co-financing Agencies*;
- **Town Administrations – (TA)**, entrusted with the local supervision.
- **Town Water Utilities (TWUs),** the project's final beneficiaries;
- **Italian Development Cooperation/Local Technical Unit (IDC/UTL/AICS).**

The project monitoring by the WRDF and the IDC envisaged half-yearly reports to be issued (according to art. 7). The funding instalments were paid after the submission and auditing of the financing report, called "*Instalment Request Report*" (IRR), provided with the *Operational Plan* (OP), proving that 70% of the previous instalment had been already pledged and at least 20% already spent.

B.4 – THE PROJECT COMPONENTS AND THE BUDGET LINES

The project was divided into two components on their turn divided into budget lines (BIs):

Component A: endowed with € 5,500,000 - by way of credit or gift - divided into three BIs, earmarked for works and supplies, *Capacity Building* and technical assistance (Chart B.2);

Component B: endowed with € 650,000 – by way of a free grant – divided into two BIs, earmarked for: i) Experts fund e ii) Local expenses – overheads managed by the local AICS.

B.4.1 – Component "A"

Component A was divided into 3 Budget Lines (BLs): the first two, in the form of credit, destined to the realization of the infrastructural works, water supply facilities (BL 1) and sanitation (BL 2), the third one, by way of gift, to the capacity building and the technical assistance activities, including the costs of design, works supervision and audit.

Chart B.3: Component A and Budget Lines (BLs)

Comp. A	Item	Type of funding	1st instal. (€)	2nd instal. (€)	3rd instal. (€)	Total (€)	%
B.L. 1	Water Work	Loan	1,748,000	1,253,000	874,000	3,875,000	70,6
B.L. 2	Sanitation	Loan	-	325,000	487,000	812,000	14,7
B.L. 3	C.B. & T.A.	Grant	406,000	203,000	203,000	812,000	14,7
	Total		**2,154,000**	**1,781,000**	**1,565,000**	**5,500,000**	**100**

BLs 1 and 2 envisaged the realization of the infrastructural works, aqueducts and sanitation that were visited by the Team during the evaluation mission in Ethiopia and described here below in Section C, particularly:

Main works realized in the *Water Supply* sector:

1.10 In-take from springs: Huruta;
1.11 Borehole fields: Durame, Limu G.; Shire E., Ghenda W.;
1.12 Pumping Stations and mian pipes: Durame, Limu G.; Shire E., Ghenda W.;
1.13 Transmission and delivery pipes: Huruta, Durame, Limu G.; Shire E., Ghenda W.;
1.14 Municipal water tanks: Huruta, Durame, Limu G.; Shire E., Ghenda W.;
1.15 Final consumer water supply networks and public fountains: Huruta, Durame, Limu G.; Shire E., Ghenda W.;
1.16 Means of transport supply (Pick-up + Minibus) supply of any other stuff.

Main works realized in the *Sanitation* sector:

1.17 Public latrines: Huruta, Durame, Limu G.; Shire E., Ghenda W.;
1.18 Sludge drying tanks: (Huruta, Durame, Limu G.; Shire E., Ghenda W.);

BL 3 - Capacity Building (CB) and Technical Assistance (T.A.):

2.6 Capacity Building: management and administration skills and expertise at the TWUs;
2.7 TA and hardware and software "billing" supply;
2.8 Supply of welders for HDPE pipes and chlorination plant;
2.9 Design and works supervision;
2.10 Audit.

For the final balance of the three budget lines see below Chart B.4 (amounts according to SAR n. 8). BLs 1-2 also encompass € 128,570,44 (ETB 3,108,036.10) paid for the purchase of the 5 pick-ups, for the TWUs and for the WRDF's minibus.

Chart B.4: Final balance of Component A (€)		
B.L.1-2	***Works***	€ 5,908,432,00
	Sub. Tot. 1-2	**€ 5,908,432,00**
B.L. 3	***C.B & A.T.***	
3.1	Capacity Building (CB).	€ 129,832,65
3.2	Billing	€ 18,711,97
3.3	Welders HDPE	€ 38,366,55
3.4	T.A. for Design and W.Superv.	€ 469,117,71
3.5	Audit	€ 3,107,49
	Sub. Tot. 3	**€ 659,136,37**
	TOTAL	**€ 6,567,568,37**

B.4.2 – Component "B"

Component B was divided into two BLs, both directly managed by the UTL (presently changed into AICS Local Bureau, as per Law 125/2014) in Addis Ababa. The first one was earmarked for the experts (BL1) to be locally dispatched and the second one was earmarked for the local expenses, particularly the purchase of a car, out-of-pocket expenses and wages of the Ethiopian staff.

Budget Line B.1: Expert fund

Chart B.5: Component B: Budget Line 1- Expert fund					
Component B	**Fund**	**1° Instal. (€)**	**2° Instal. (€)**	**3° Instal. (€)**	**Total (€)**
BL.1: *Italian Experts*	Grant	176,000	168,000	168,000	512,000

The Italian expert missions are listed in Chart B.6.

Chart B.6: Component B- B.L.1: Missions of the Italian Experts			
n.	**Dates**	**Expert**	**Role**
1	July – Aug. 2010	G. Cancelliere	T.A. at WRPF
2	Aug. - Dec. 2010	R. Save	Eng. Project coordinator
3	Jan. – Feb. 2011	G. Cancelliere	T.A. at WRPF
4	May 2011	F. Archi	Support to T.A.
5	May – July 2011	R. Save	Coordinator
6	20/11/2012	E. Ambrogi	T.A. at WRPF
7	10/08-05/12/2012	M. Paba	Program Coordinator
8	2-16/12/2012	E. Ambrogi	T.A. at WRPF
9	01/02-30/05/2013	M. Paba	Program Coordinator
10	08/09-19/12/2014 09/02-05/06/-10/08-04/12/2015 06/02-02/06/2016	T. Tamanini	Program Coordinator
11	From 06/04/2010	Taye Yadeta	Consultant
12	21/12/2015	S. Cardascia	Program Coordinator Assistant

Budget Line B.2: Local expenses fund

The free grant, directly managed by the UTL/AICS in A.A., for the local expenses of € 138,500, was divided into three instalments one for each of the three-year project.

Chart B.7: Component B – Budget Line 2 – Local expenses fund					
BL 2	**WRDF**	**1° instal. (€)**	**2° instal.(€)**	**3° instal.(€)**	**Total (€)**
BL2: Local expenses fund	Grant	75,670	31,170	31,170	138,500
Addition fund -2013	Grant	-	-	-	55,000

Such grant covered the equipment costs, the wages of the Ethiopian staff, the purchase of a 4x4 car and all petty out-of-pocket expenses.

B.5 – OBJECTIVES, INDICATORS AND EXPECTED RESULTS

General Objective

The general target of the project, referred to in art. 2.1 of the AI, was to set on improving access to clean water and sanitation services for the resident population and at the same time on strengthening the National WASH program and promoting the strategic National plan aiming at easing the access to water and to sanitation services for the population according to the Millennium Development Goal n. 7 target 2 adopted by the "Universal Access Plan" of the Ethiopian Government.

Specific Objectives

The specific objectives of the project, referred to in art. 2 section 2.2 of the AI, was set on easing access to safe water sources and to sanitation services in 5 towns by: i) increasing the water supply; ii) rehabilitating or enhancing the drinkable water distribution network; iii) bettering the public sanitation infrastructures; iv) improving the planning and O&M management capabilities of the TWUs, and v) the loans management capabilities of the WRDF.

Targets indicators

The target indicators, referred to PID (annexed to A.I.), section 2.3, were:

1- *A minimum of 20 lcd of safe water available within 0.5 Km from their home to the target population (about 270.000 people in 5 towns);*
2- *Time per household dedicated to fetch water is reduced to a maximum of 30 minutes per day;*
3- *100% of target population not using unsafe alternative sources of water for drinking;*
4- *Water related diseases decrease of 50% from baseline by local health facilities;*
5- *Target towns are open-defecation free, and*
6- *Share of households' income allocated for water provision is reduced to a maximum of 4%.*

Expected results

The expected results, referred to in PID (annexed to A.I.), section 2.3, were:

1- *Water supply networks, properly sized to the target populations, functional and sustainable in the 5 select towns;*
2- *Public sanitation infrastructures and services upgraded, constructed and management set up in the 5 select towns, and*
3- *Improved capacity of 5 target Town Water Utilities for planning, management and O&M and of WRDF for loans management and delivery of technical assistance to recipients.*

Indicators of the results

The project indicators, referred to in PID (annexed to AI), section 2.3, were:

1- *60% of the target population actually consumes a minimum of 15 l/p/d as the new water scheme starts working;*
2- *Tariff strategies for sustainability of water schemes are in place and billing systems in use;*
3- *Unaccounted-for-water less than relevant national targets and international best practices;*

4- *Interruptions of water supply service is less than relevant national targets and international best practices in the first 3 months of new water schemes working period;*
5- *100% of schools and health facilities in selected areas has adequate latrines with hand washing facilities;*
6- *Communal and institutional sanitation infrastructures are used and are properly managed;*
7- *Septic tank sludge removal facilities are functional and users pay for the service;*
8- *Integration of water, sanitation and hygiene planning and monitoring at Town Administration level, and*
9- *TWUs are able to properly perform the water schemes financial management, provide adequate O&M assistance and repay back the loan.*

B. 6 – CONTRACTS, ACTIVITIES AND FINAL BALANCES

The project started on 05/10/2010, when the first instalment of Component A was transferred to the MoFED euro-denominated bank account. According to the I.A., art. 17.1, of the, the project was due to be completed after 36 months, to wit 05/10/2013.
The deadline date was twice deferred:

- The first time extension from 05/10/2013 to 05/04/2015, 16 months more;
- The second time extension from 05/04/2015 to 05/12/2015, 8 months more.

The project was completed in 60 months: it took 66% more time than the initial scheduling. The causes for the delay, together with those mentioned in the SARs, are also to be found in the implementation of the RWBs preparatory activities, such as the finalization of the Feasibility studies, the water tests (flow reasts) at the sites' borehole fields, the selection of the Ethiopian professionals for the designs (8 months to complete). The Ethiopian professionals' Final designs, to be used for the tenders of the works, run up further delay.
Also the due to last 12 months construction phase implied delays: Durame needed 4 months more to complete and Genda W. 15.
Custom and tax-exemption issues, related to the TWUs' supply, and some of the technical assistance activities weighted on the project as well.

B.6.1 Allocated funds transfers

According to A.I. the related to Component A funds were to be annually transferred by the DGCS, through Artigiancassa, a bank, to the MoFED, in three instalments, one for each of the three-year project, after the submission of the IRR. Such instalments were regularly transferred to the euro-denominated account of the *Bank Of Ethiopia*, n. 016010141600:

Chart B.8: Component A - funds transfers (euro)

	Item		**1st year**	**2nd year**	**3rd year**	**TOTAL**
C.A BL1-2	*WASH*	*Loan*	1,748,000	1,578,000	1,361,500	4,687,500
C.A BL 3	C.B.&AT	*Grant*	406,000	203,500	203,500	812,500
	TOTAL		**2,154,000**	**1,781,500**	**1,565,000**	**5,500,000**
Paid	***Date***		***01/11/10***	***17/09/2012***	***n.r.***	

The payments by the MoFED to WRDF are listed below, where also the official change of the Bank of Italy is reported when the payments were made.

Chart B.9: Component A :Trasfers from MoFED to WRDF			
Date	Transferred amount (€)	Cross rate	ETB
13/04/2011	24,106.52	24,3931	588,032.75
28/10/2011	74,726.29	24,3648	1,820,691.11
02/08/2012	1,619,784.72	22,0061	35,645,144.53
04/03/2013	2,037,524.68	23,8476	48,590,073.56
22/04/2013	128,570.44	24,2	3,111,404.65
25/08/2014	1,610,552.00	26,2101	42,212,728.98
21/10/2014	4,734.70	25,5707	121,069.59
TOTAL:	**€ 5,499,999.35**		**ETB 132,089,145.17**

B.6.2 Implementation process and project steps

Here below the implementation process is described of the two components that envisaged according to the implementation order:

1. *Preparation of the Feasibility Studies and water wells tests by the WRBs;*
2. *Tender for the selection of consultants put out by the MWE;*
3. *Preparation of the final designs by the select consultants;*
4. *Tender for the selection of Works supervisors put out by the WRPF;*
5. *Tender for the selection of contractors put out by the WRPF;*
6. *Start date, established by the Supervision/Engineer;*
7. *Construction works by select contractors;*
8. *Supply of equipment by the WRPF to the TWUs;*
9. *Acceptance and Handover certificates of the works and the supplies by the TWUs;*
10. *Capacity Building and technical assistance to the TWUs and*
11. *Monitoring and Audit*

6.2.1 The designing: consultant selection and contracts

The tenders for the assignment of the final designs services were put out by MWE according to the WB's tender procedures (*Procurement of Consultant guidelines*), referred to in art. 9 of AI.

Section 9.3 of AI, in fact, envisaged such tendering activities to be carried out not at a central/federal level but at a TWSs level, albeit with the support of the WRPF in order to meet the International procurement standards, also an expected result of the project (see section B.1.4 above in this paper). The *Project Implementation Schedule* (PIS) assigned a total of 4 months for such activities to be completed, but instead it took 8 months (22% of the scheduled duration) from the start of the selection procedure (EoI) in October 2010 to the signing of the contracts with the consultants in June 2011.

Chart B.10: Selection of the consultants		
Expression of Interest	Oct. – Nov. 2010	1 month
Selection of *consultants*	Nov. 10 – Feb 2011	3 months
Tender Procedures	Mar. - Apr. 2011	1 month
Negotiation and contract	Apr. – June 2011	3 months
Designs submission	Nov. 2011	5 months
TOTAL	**Oct. 2010 – June 2011**	**13 months**

Chart B.11 below lists the select designers, the contractual emolument for each one of them, and the percentage of the design services involved. All contracts were signed June to July 2011 and the projects submitted in the first

semester of 2012. The final balance for this activity was € 78,207.31, accounting for the 1,49% of the total figure earmarked for the works.

Chart B.11: Contracts for the engineering designing						
n.	**Town**	**Consultant**	**Design (ETB)**	**Design (€)**	**Proposed Works**	**% D/W**
1	Durame	JV Zenas - Yerer	393.569,57	€ 16,031.35	€ 1.057.178,49	1,52
2	Huruta	DH Consult	278.600,00	€ 11,348,20	€ 761.414,91	1,49
3	Limu G.	DH Consult	312.450,00	€ 12.727,09	€ 781.328,38	1,63
4	Ghenda W.	MS Consultancy	388.882,50	€ 15.840,43	€ 594.521,60	2,66
5	Shire E.	MS Consultancy	546.487,50	€ 22.260,18	€ 1.594.521,60	1,40
		TOTAL		**€ 78,207.31**	**€ 5.259.279,12**	**1,49**

1€ =ETB 24,55 in June 2011 (for design contracts); 22,27 June 2012 (for the works)

When the designs costs and those of the works are compared, it appears that the percentage for the services is fairly beyond the International standards, but in the case of Limu G. the Italian tariffs applied in this kind of works and amounts are about the 2,3%. Taking into account the projects' shortcomings, also lamented by the WRDF, a revision of the bid procedures could be put in envisaging flat rebates, for example excluding excessive reductions, and more stringent contract clauses also binding the designer to take out insurances to protect themselves in case of designs' shortcomings, mistakes etc.

6.2.2 The work supervision: Engineer selection and contracts

The works supervision services were entrusted March to June 2012. The works supervision contracts underwent prorogations during the works construction and consequent cost increases, as in Chart B.12, up to a total of ETB 2,2 m (ab. € 100,000), 30% more than the original budget, that were drawn from the *Capacity Building &* A.T. fund (BL n. 3). The increase percentages were comprised between the highest value of the 50% in Limu G. and the lowest of 0% in Shire.

Chart B.12: Work Supervision contracts (VAT net)						
n.	***Town***	***Supervision***	***Contract (ETB)***	***Final balance (ETB)***	***Final bal.*** (€)	**%**
1	Durame	Tropics Eng..	1,893,550,00	2,412,158,30	108,314,25	27,4
2	Huruta	Zenas Eng.	911,405,00	1,241,723,90	55,757,70	36,3
3	Limu Gennet	DH Consult	1,951,400,00	2,927,400,00	131,450,38	50,0
4	Ghenda Whua	MS Consultancy	1,230,900,00	1,586,985,14	71,261,12	28,9
5	Shire E.	Zenas Eng.	1,187,400,00	1,187,400,00	53,318,37	0
		TOTAL	**7,174,655,00**	**9,355,667,34**	**420,101,81**	***30,4***

1€ =ETB 22,27 – June 2012

6.2.3 The work construction: contractor selection, contracts and final balances

According to the IA, the TWUs were to be put in charge for the tenders by the WRDF. But for the Durame TWU, in fact, the remaining four TWUs, due to the too complicated tendering procedures for the local unskilled staff to be delved with, delegated the activity to the respective RWBs.

The tendering procedures for the four contracts were carried out in 2012 and the contracts signed July 2012 to January 2013 as in Chart B.13.

The works at the five sites started July 2012 (Shire) to January 2013 (Genda W.) and were completed December 2013 to March 2014.

According to SAR n. 8, the final balance of the works registers a total costs increase of ETB 27,986,943 (€ 1,139,533), that is 23,90% more than the original final designs, without taking into consideration the discounts that were in any case absorbed during the execution of the works themselves.

Chart B.13: Construction contract agreements (VAT net) - 1€ =ETB 24,56 – dec. 2014

Town	Contractor	Contract	Amount of the contract (ETB)	Final balance (ETB) (*)	Final balance (€)	Costs increase %
Huruta	United Const.	25/07/12	18,103,693	18,223,361	**741,993,53**	**0,66**
Limu G.	AKA Constr.	26/07/12	17,400,183	22,078,773	**898,972,84**	26,89
Durame	GTB eng.	5/11/12	23,543,365	29,512,673	**1,201,656,07**	25,35
Shire E.	JV RayCon-Tsmex	12/07/12	35,509,996	40,606,926	**1,653,376,47**	14,35
Ghenda W.	Abebe Negash	17/03/13	23,713,892	33,328,695	**1,357,031,56**	40,55
		TOTAL	**117,124,146**	**145,111,089**	**5,853,030,46**	**23,90**

(*) source: SAR 8

The desk analysis of the Final Report of the works supervision revealed the presence of some discrepancies between the final balance's amounts and the SAL 8, that should be thoroughly examined in the final accounting. The increase of over 20% was authorized by the DGCS. as per IA section 9.2.2.

According to the SARs, the causes for such increases, from the maximum of Genda W (40,55%) to the minimum of Huruta (0,66), are to be above all found in imprecise designs and in a not enough careful works supervision at the building sites. The contractors, for their part, lamented delays in the payments of the work instalments, due to the slowness of the bureaucratic procedures of approval and discrepancies of the quantities and supplies stated in the designs and sometimes bad weather conditions.

In Chart B.14, below, the increases for works and works supervision are registered.

Chart B.14: Comparison between Supervision (WS) and Construction (W) costs (VAT net)

n.	*Town*	*WS-contract (ETB)*	*Works (ETB)*	WS/W %	*WS-Final balance (ETB)*	W-Final balance *(ETB)*	WS/W %
1	Huruta	911,405	16,956,710	5,37	1,241,723	19,584,022	6,3
2	Limugennet	1,951,400	17,400,183	11,21	2,927,400	22,078,773	9,9
3	Durame	1,893,550	23,543,365	8,04	2,412,158	29,512,673	8,2
4	Shire E.	1,187,400	35,509,996	3,34	1,187,400	40,606,926	2,9
5	Ghenda W.	1,230,900	23,713,892	5,19	1,586,985	33,328,695	4,8
	TOTAL	**7,174,655**	**117,124,146**	**6,13**	**9,355,667**	**145,111,089**	**6,45**

6.2.4 Monitoring and Audit

According to IA section 7, the project monitoring by the WRDF envisaged a six-month report (SAR) drawn by the PiC that was to be submitted to the Steering Committee. During the project-time 05/10/2010-05/12/2015) 8 SARs were issued as in Chart B.15-16. Such monitoring, except only for the missing of a couple of deadlines, was carefully carried out, although it progressively loosed clearness and effectiveness. The SARs 7 and 8, reporting the final balances of costs and expenses, are still missing.

Among the causes of the delays the SARs list:

- Studies and projects *poor* quality, lacking some lines as well; scarce adherence of the projects to the real conditions of the works sites that resulted in delays in the carrying out of the necessaries changes done by the supervisors;

- Insufficient financial capacity of some contractors in order to make for the payments timing. This resulted in delays in the execution of the works;
- Unwillingness of some Works supervisors to timely cope with variations or additional works needed during the works execution also due to poor designs. Furthermore insufficient carefulness in providing attention to costs and innovative solutions in case of technical problems at the building sites.

Chart B.15-16	SAR	Due	Done	Submission
Year 2011- se	1 SAR	Nov.10-Apr.11	Nov. 10-July11	22/07/2011
	2 SAR	May11-Nov.11	July11-Dec.12	20/02/2012
Year 2012	3 SAR	Dec.11-May12	Jan.12-June12	20/08/2012
	4 SAR	June12-Dec.12	Sept.12-Jan.13	23/05/2013
Year 2013	- SAR	Jan. 13-June13	Missing	----
	5 SAR	July13-Dec.13	Sept.13-Feb.14	20/05/2014
Year 2014	6 SAR	Jan.14-June14	Mar.14-Aug.-14	missing
	- SAR	July 14-Dec.14	Missing	----
Year 2015	7 SAR	Jan. 15-June15	Sept.14-Feb.15	missing
	8 SAR	July 15-Dec.15		

According to IA section 8, the A*udit* should have checked the IRR and, once it had been approved, let the transfers of the instalments be made by the Italian partner. Such checking service was granted to the ASC *Audit Service Corporation* and to the HST *Chartered certified Accountants and Authorized Auditors*, through a tendering put out by the General Auditing Office of the Government. The budget for the service was € 910.64 for the project and € 2,196.85 for the works that the Author deems too poor taking into consideration the Audit high standard.

6.2.5 The Capacity Building

The Capacity Building part of the project was granted to JV-Eyob Defere *Management Consultant* and to HYWAS *Engineering Consultant* with funding from Component A – BL n. 3. It envisaged, on the one hand, a series of preliminary surveys and analysis of the existing WASH related capacity of the 5 TWUs and, on the other hand, the planning of the training activities, training on the job included, to be put in place in order to plug any technical and management capacity gaps and to guarantee the effective running of the upgraded WASH services delivery to the population.

The theoretical and practical courses were destined not only to the TWUs but to managers and technicians of the municipalities and of the Local Outfits as well. Two phases courses were held in the 5 project-towns, as follows:

CAPACITY BUILDING SESSIONS		
1° Session	**Oct.-Nov. 2014**	**Nov.-Dec. 2014**
TWU	Huruta, Durame, Limu G.	Shire E., Genda W.
2° Session	**Dec. 14 – Jan. 15**	**Mar. 15**
TWU	Huruta, Durame, Limu G.	Shire E., Genda W.

The subject matters of the courses *on-the-job/on site training* included:

- Orientation of the boards towards an entrepreneurial approach;
- Management of the services' infrastructures;
- Technical management of the town's WS networks;
- O&M of networks and pipes;

- O&M of electromechanical equipments;
- Accountancy and billing;
- Planning and balance of the water services management;
- Operational plan and tariffs;
- Chart of the service and,
- Collection, filing and database management.

For the training JV employed 8 teachers: 6 senior and 2 junior. The attendants were 350, of which 108 from the TWUs and 30 from the Boards. The women were about 30%. The suggestions-rich final report *Consultancy services for utility Capacity Building for five-towns* was issued in 2015.

In a final workshop held 1-2 December 2015 in AA, in which the Authors were present, the training activities performed were presented together with their results and the recommendations for the implementation of further projects.

The spokesman, a consultant, showed how the decentralization process was being hampered by the TWUs' technical and managerial insufficient skill and expertise - a problem that is still unsolved. He stressed that further training means, such as handbooks, web, more in depth courses, should be put in place, together with constant monitoring in order to strengthen the capacity building process of the TWUs and that the TRWUs staff should be granted performance-based bonuses. He suggested to set up a web site with information regarding the access to the rotating fund and an online database. Also the adoption of insurances for the professional activities performed by third parties was recommended by the spokesman.

6.2.6 "*On Lending Agreement*"

The On Lending Agreements between the TWUs and the WRDF were all signed 24/08/2011. The loan conditions were as follows:

- *Loan: € 937,500,00;*
- *Grace period: Exemption time: 3 years;*
- *Redemption time: 20 years by two annual instalments 1st July and 1st Jan.);*
- *Fixed interest rate: 3%;*
- *Starting date: from the date of the first credit transfer to the TWUs;*

And the main commitments of the TWUs:

- *Adjust tariffs to the financial obligations undertaken;*
- *Contribute to the undertaking for a mere 2%;*
- *Assume the all additional costs for the realization of the project (art. V, sect. J).*

About this latter commitment it could be pointed out that the TWSs were not to be considered fully responsible because the engineering consultancies (Designing and Supervision) were not contracted by them, but by WRDF and/or WRBs.

The rotation mechanism, applied for financing the works and supplies, appears to be an effective one. It seems to lack, however, at least one important detail: the capping of the water tariffs to be imposed on the consumers on a social/economic basis to be affordable for the rural people. The Right to Water, stated by the Federal Constitution, on which the 2013 *National Guideline for Urban Water Utilities Tariff Setting* acts and the Water policies

are based, that could envisage a threshold up to a monthly consumption of 3 m^3, inside the average 20 l/per capita day for an Ethiopian family of 5 people, should have been taken sure enough into consideration.

The *agreement*, as can be also retrieved from the Audit, came into force during the first semester of 2012 when the first instalments were transferred from the WRDF to the TWUs, although in the Audit the precise dates of such transfers are not registered. The TWUs should therefore had started the redemption of the loans by July 2015. They did not. And they still (28/04/16) have not. According to the WRDF the redemptions were to be started from the next deadline of 1st July 2016. The *On-lending agreement* envisages no sanctions whatsoever for delays or lack of payments altogether on the part of the TWUs.

SECTION "C"

THE EVALUATION

C.1 – THE EVALUATION ACTIVITIES - OVERVIEW

The contract for the evaluation envisaged:

1. Desk analysis;
2. Inception Report;
3. Field visits in Ethiopia;
4. Data analysis;
5. Evaluation report;
6. Presentation of the outcomes of the evaluation to the DGCS and in AA at a *Workshop*.

C.1.1 The desk analysis

The desk analysis, carried out in Rome October-November 2015, envisaged the collection, filing and study of the paperwork provided by the DGCS and the UTC. During this activity, the Evaluator met with the UTC Expert at the DGCS, who at that time was also the UTC director (Dr. F. Melloni), and with the managers of the Department IX (Architect M. Morana).

C.1.2 The Inception Report

After the desk analysis, the Inception Report (IR) was drawn together with the planning of the meetings, the field visits and the interviews.

In the preparation phase of the participative surveys, the team experts worked out the evaluation matrix, formulated the questions related to the evaluation on the basis of the Term of Reference of the task and integrated the logic framework indicators. The IR also contained the activities timetable to which the evaluators were to stick and the program of the field visits in 4 sites, over the 5 covered by the project, one for each region: Huruta (Oromia); Durame (SNNPR), Shire E. (Tigray) and Ghenda W. (Amara). Clan clashes along the Gondar to Ghenda W. route made it impossible to reach Ghenda W., that was therefore substituted with Limu Ghennet (Oromia).

C.1.3 The mission in Ethiopia

17/11/2015 the evaluation team leader sent an e-mail to the UTL/AICS and the IX Department announcing the mission start also containing the schedule of the foreseen field visits. The mission in Ethiopia took place 28 Nov. to 19 Dec. 2015. Annex 1 contains the list of the meetings, journeys and field visits to the 4 towns.

The mission began with the briefing at the AICS local office in A.A. (that currently is an outfit of the Italian Agency for Development Cooperation (AICS – established in 2015), where the team met with the coordination team for the water sector (Civ. Eng. T. Tamanini and Dr S. Cardascia) and the *Regional consultant* (Civ. Eng. Taye Yadeta). During the meeting the available paperwork collected, particularly the execution designs, the missing SARs, the *on-lending agreements* regarding the redemption of the loans, the Audit Reports, the handover certificates of the works done by the Works Supervisors, etc.

During the first two days of December, the Evaluation Team (EvT) attended the End of project and results evaluation workshop organized by the UTL/AICS at the Capitol Hotel in AA (fig. C1) where they met with the

WRDF managers (dr W. Wake and Civ. Eng. Solomon) and the directors and technicians of the 5 TWUs also confirming to them the plan of the imminent field visits.

Fig. C.1: The Workshop in Addis Ababa

The Evaluation Team had also the opportunity to gather information from the Ethiopian Ministries involved in the water sector and from some International Organizations carrying out WASH projects. At the end of the workshop dr G. Letizia announced the set up of a new French Cooperation and BEI WASH project with a € 80 m budget.

In the following days the EvT began their field visits (see Fig. C.2) envisaging surveys at the project sites and interviews both to public/private institutions/entities (hospitals, schools, universities, clinic etc.) - first type - and to some of the households benefiting from the project by connections to the WS networks - second type.

Fig. C.2: ETHIOPIA WASH MISSION CALENDAR

n. day	Calendar	Place	Subject
1	29 **Nov**. Sun 2015	ROMA-ADDIS	Meeting with the local expert
2	30 Mon.	ADDIS ABABA	UTL - Briefing with WASH team
3	01 **Dec**.Tue	ADDIS ABABA	CB-WORKSHOP
4	02 Wed	ADDIS ABABA	CB-WORKSHOP
5	03 Thu	AA- HURUTA	Travel by car and site visit
6	04 Fri	HURUTA	Site visits and interviews
7	05 Sat	HURUTA	Site visits and interviews
8	06 Sun	HURURA-DURAME	Huruta - Durame: travel by car
9	07 Mon.	DURAME	Site visits and interviews
10	08 Tue	DURAME	Site visits and interviews
11	09 Wed	DURAME-ADDIS	Interview and travel
12	10 Thu	ADDIS-SHIRE	Travel by car and site visit
13	11 Fri	SHIRE E.	Site visits and interviews
14	12 Sat	SHIRE-ADDIS	Interviews and travel by plane
15	13 Sun	ADD-LIMU G.	Addis-Gimma - Limu G.: travel by plane
16	14 Mon.	LIMU G.	Site visits and Interviews
17	15 Tue	LIMU G.	Site visits and Interviews
18	16 Wed	LIMU G.	Site visits and Interviews
19	17 Thu	LIMU-ADDIS	Limu - Gimma - Addis: travel by car
20	18 Fri	ADDIS	ADDIS Debriefings
21	19 Sat	Return flight	Addis - Rome: Return flight

C.1.4 The data analysis

N. 50 interviews were carried out, 15 of the first type and 35 of the second one. The people interviewed answered to a series of questions contained in forms (see Annex 3). Photographs taken during the interviews and the field visits can be found in Annexes 2.

In chapter C2 *Field visits and interviews*, a report about each of the visited sites can be found containing the activities carried out there, the terrestrial coordinates of the works and the places where the interviews took place.

Once collected and processed, data were organized into charts taking also into consideration Targets, Indicators and Expected results. The preliminary conclusions were set into a Power point, used also in the workshops (par. C.1.6).

C.1.5 The preparation of the Evaluation report

The complying with the DGCS guidelines Evaluation report was started at the expert's comeback to Italy. In the report the locally retrieved information were matched with the information drawn from the paperwork. The preliminary Evaluation Report, that was submitted to the IX DGCS's Department (May 2016), was prepared February to April 2016. Its fine print was completed July 2016 after the Workshop, of which in the following section.

The quantitative analysis and the comparison with the project indicators and the expected results, allowed evaluating the project on the basis of the 5 OECD/DAC criteria: 1. Relevancy, 2. Efficacy, 3. Efficiency, 4. Impact and 5. Sustainability.

The Evaluation report was finally translated into English in order to make it accessible to a wider audience, the Ethiopian partners in the first place, also through its publication on the MAECI website.

C.1.6. The Workshops

The preliminary Evaluation Report was presented, as per contract, in a workshop at the IX Department of the DGCS 05/07/2016. After the reception of the comments and feed backs, the final Evaluation Report was prepared that, in its English version, was presented in specific workshops. A power point presentation of the Final Evaluation Report was held at the Italian Embassy premises on 21 February 2017.

C.2 FIELD VISITS AND INTERVIEWS IN THE PROJECT TOWNS

During the mission in Ethiopia, 4 of the total 5 sites of the project were visited, according to the Inception Report (par. C.1.2), approved by the DGCS – IX Evaluation Office.

At the beginning, the plan had been to visit one town for each of the four regions: Amara, Oromia, SSNN, Tigray. During the mission, safety issues in the Gondar zone, forced the Evaluation Team to switch the Genda Wua visit in Amara with that in Limu Gennet in Oromia. The final schedule of the mission in Ethiopia can be found in Annex 1. In the following paragraphs the outcomes are reported of the field visits and of the interviews in the four towns: Huruta, Durame, Shire and Limu Gennet.

During the field visits, specific surveys were carried out at the building sites registering their terrestrial coordinates and realizing technical analysis in order to evaluate the functioning and the state of the art of the structures, also pointing out possible shortcomings and malfunctioning.

A series of interviews were carried out as well both to the WS network newly connected consumers and to the public institutions involved in the project and to shops and business owners. The translated into Amaric standard forms used for the consumers interviews contained 71 questions grouped together according to the various subject matters: livelihood and life; relations with the TWU; changes brought by the project in the water and sanitation services provision; hygiene and health care conditions. Slightly different questions, although similar to the consumer's interviews in their organization, were addressed to the public institutions (schools, hospitals) and the businesses (hotels, bars, etc.). In total, 50 interviews were realized, involving: 35 new private consumers, 4 hospitals and clinics, 5 schools and universities, 3 public institutions, 3 businesses, as shown in Chart C.3. The forms used are in Annex n. 3.

Chart C.3: NUMBER AND TYPE OF INTERVIEW						
Town	**Private Consumers**	**Hosp/Clin.**	**Sch/Univ.**	**Inst.**	**Busin.**	**Tot.**
Huruta	7	1	1	1	1	**11**
Durame	10	2	2	1	1	**16**
Shire E.	8	-	-	-	1	**9**
Limu G.	10	1	2	1	-	**14**
Tot.	**35**	**4**	**5**	**3**	**3**	**50**

C. 2.1 Huruta town: site visits and interviews

Fig n. C.1.1: Huruta town: view from the spring site (Northward view).

2.1.1 Overview

Huruta (terrestrial coordinates N 08°08'50,3"; E 039°21'05,3"), in Oromia Region, Arsi Zone, is located 165 km Southeast from Addis Ababa. At an elevation of 2,050 m.asl, the town can only be reached by a 15 km long dirt road, indirectly connected, through an eastward junction, to the National Road to Asella, this latter connected to the newly built Adana Highway.

The hilly land is mainly planted with grain. Rain fed agriculture is the main activity of the population. As per the 2013 census, the rural population, including that of the villages scattered around the town, amounts to 56,376 people, while the urban one is 31,031.

Detached, single storied homesteads, provided with small annexed compounds, are the typical building of the area. In the compounds a pit latrine is generally located. The town did not have neither sewerage nor drainage systems. Before the project implementation, public sanitation facilities were totally absent in the town not to say in the rural area. Thanks to the project a public latrine was built at the market place and close to the bus station (photo n. 32, 33, 34 e 35).

The project also brought to 3,256 water connections. Multiplying such 3,256 water connections by the Ethiopian family average composition of 4,8 people, the population supplied directly with running water connection from the pipe network within their homesteads, is to be estimated in 15,629 people or 50,36% of the urban population. The remaining 50% uses the 12 already in place public water points (fountains) to be increased with 5 more within the project - but not 6 as per in the contract design. On average, each 4 taps fountain serves around 183 families that is 42 ones each tap.

The located in the town centre TWU is responsible for the water supply and sanitation services.

The Evaluation team, composed by A. de Vito and his assistant E. Simba, carried out the site visits and the interviews to the stakeholders December 3rd to Dec. 5th 2015.

2.1.2 The management of the WASH systems

The TWU of Huruta, established in 2004 as per Proclamation n. 78/2004, manages the water supply system, the water points, the sanitation facilities and the sludge removal and treatment from both public and private septic tanks.

According to the proclamation, the number and composition of the Huruta TWU board is composed by 9 members, with a staff of 26 employees (10 men and 16 women): n. 1 manager, n. 9 administrative staff, n. 3 meter checking officers and n. 8 O&M workers.

The Board staff was recently changed. Decided by the Regional/Zone Water Board and based on an annual performance evaluations, such changes are frequent causing managing problems and, above all, loss of acquired both technical and management capacities as was pointed out in the Addis Ababa Workshop. More care in managing such staff turnover should be taken in order to assure a more efficient running of the service.

The 2014-2015 balance sheet registered a revenue from the water consumption of 2,5 m, 1,6 m of which earmarked for the credit redemption, based on the signed by the TWU *on-lending agreement* with the WRDF of ab. 1 m. Both the managers and the consumers, which were already connected to the existing WS network, lamented the burdensomeness of the redemption that caused the tariffs to soar from August 2015 on.

Chart C.1.1 bears the comparison between before and after tariffs that shows dramatic increases of more than the 100% (up to 200% in some cases!), the ceiling that the WB had altogether fixed establishing a social tariff.

A 150% increase particularly affects the less affluent consumers.

Chart C.1.1 - HURUTA WATER TARIFF

	Before prj		After prj –Householder			After prj - Commercial.	
	m³/month	**ETB**	**m³**	**ETB**	**%**	**m³**	**ETB**
1	0 – 3	2	0 - 3	5	**150**	1 – 5	6,5
2	4 – 6	2,35	4 - 6	7	**198**	6 - 10	7,25
3	7 – 8	3,25	7 - 10	7,8	**140**	11 - 30	7,6
4	9 – 11	3,75	11 - 15	9,75	**160**	> 30	8,25
5	> 11	3,85	> 15	11,77	**206**		

The increases are actually very high also taking into consideration that the Huruta's water scheme is the only one, of the project's 5, to be totally gravitational, that means that it is not burdened with those energy costs to which booster structures are subjected.

The meters are monthly read and until now there have been neither delays in payments nor defaults.

The fountains are managed by a local 5 people committee, chosen by the community that also selects a collection officer. The collection officer pays a fixed rate of ETB 600/month to the TWU, the remaining sum is managed by the committee themselves that also pays the collection officer's wage.

Such is the tariff enforced after the project:

- 20 litres: ETB 0,1
- 1 m³: ETB 4

Before the project, the 20 litres tariff was 0.75 cents. The increase of the 33% was easily accepted.

Within the project the TWU was supplied with:

- a *pick up* Toyota (Photo n. 14);

- a motorbike (Photo n. 13);
- a set of equipments and tools for hydraulic interventions (Photo n. 13);
- HDPE pipes, spare parts and fittings;
- HDPE pipe welding machine (to be delivered next).

2.1.3 The project infrastructural interventions

The water supply system (WSS) that was in place before the project implementation was realized in the 80s with the support of the Swedish International Development Agency. Such WSS, still operational, was fed by two springs (14,5 l/s): Fursa 1 and Fursa 2, that by way of a transmission pipe feeds a 100 m³ tank, located in the centre of the town (N 08°08'45,4"; E 039°20'59,93" – 2046 asl) from which the water distribution network starts made of zinc coated steel pipes. Crossing the town, the pipe feeds the fountains of the rural villages. The WS network feeds 2,612 households, 6 tanks and 12 public fountains located both in the town and in its neighbourhood.

The two phase's enhancement project is based on a feasibility study carried out in 2008 by the *Oromia Water, Mineral and Energy Bureau*. The study was an ambitious one that calculated that by adding a flow of a total 15 l/s the villages of Guchi, Adele, Badosa, Kekersa, Anko, Lode, Gerda Busa, North from Huruta, could be fed by 2023 (see chart C.1.2).

The present first phase project was designed by DH Consult in A.A., after the signing of the contract with the WRDF on 15/06/2011. The base cost of the works of the I phase was 15,415,191 ETB, plus the 10% for contingencies and the 15% VAT, reaching a overall cost of 19,500,217 ETB.

Chart C.1.2 : POPULATION AND WATER DEMAND PROJECTIONS FOR DESIGN HORIZONS

	Unit	2013	2018	2023	2028	2033
Population	n.	56,376	63,175	77,086	86,689	98,876
Average Day Water Demand	m3/d	1,394,6	1,725,2	2,126,9	3,170,3	4,104.5
Water flow	l/s	16,1	20,0	24,6	36,7	47.5
Demand (lcd)	lcd.	24,7	27,3	27,6	36,5	41,5
Max Day Demand	m3/d	1,673	2,070	2,552	3,487	4,515,0
DesignFlow	l/s	19,4	24,0	29,5	40,4	**52,3**

The works construction tender was awarded to the United Construction plc building contractor that 25/07/2012 signed the contract agreement with the Oromia Water Regional Bureau envisaging a works value of ETB 18,103,693 with completion date 25/08/2013. The construction activities, started 08/08/2012, were completed 28/02/2014, with 7 months delay. The provisional work hand-over, due to TWU's claims, was expected to be signed in April 2016. The Work Supervision was carried out by Zenas *Engineering* firm, as per contract signed 29/05/2012.

The Completion report was submitted by the Consultant June 2014, certifying the total amount of ETB. 18,223,361 with a very small increase of 0.6% over the contract. During the works, a contract amendment was signed.

The final design of the 1st phase of the project envisaged the following main works:

- TWU Office building with toilettes;
- n. 3 intake works at the spring sites of Hamado, Fincha 1 & 2;
- Steel DN 150 transmission pipe, 5,686 m long, from the springs to the town tank;
- 500 m³ water tank with chlorination, guard house and store;

- HDPE De 150-40 mm pressurized network for a total length of 19 km;
- N. 6 Water Points (or Public Fountains);
- N. 1 *Aqua-privy* public latrine at the bus station site.

On the visit date, the contract works were completed and the water supply network on duty.
The field visit at the work sites showed:

TWU's Office: the new building is located along the central main road, crossing the urban area, on the right side, entering the town (Terrestrial coordinates N 08°08'50,3"; E 039°21'05,3"). The one storied building was built according to the design lay-out. The toilettes, separated on a gender basis, weren't connected to the WS's network and out of order (Photo 8-15). The quality of the building materials and of the supplies seemed not so impressive. HW billing equipment, to be provided by the project, still missing. The TWU manager pointed out that February 2014 some concrete cracks on the floor and along the walls appeared.

Springs and intake works: accompanied by the TWU technician, a visit to the spring area was carried out. The springs are located along a steep ravine (Photo n. 16), that can only be reached by a one hour walk, after an initial car trip. From the hydraulic left side of the steep ravine's rocky slope, various perennial springs gush out, that are drained by a d/s brook.
The 3 main springs are indicated in the above mentioned feasibility study:

1. Hamada: N 08°06'04,4"; E 039°22'14,9" alt. 2,290 m.asl – Q= 5 l/s; Photo n. 19 ;
2. Fincha 1: N 08°06'06,9"; E 039°22'13,1" alt. 2,282 m.asl – Q= 7,5 l/s; Photo n. 17;
3. Fincha 2: Covered by plants – survey unfeasible – Q= 2 l/s; Photo n. 18.

The 3 springs, with an overall flow of 15 l/s, are collected by way of reinforced concrete intake manholes.
During the close examination of the catchment area, it emerged that a great part of the collected water did not reach the outlet but was lost through the overflow device (Photo n. 20), due to the sediment obstruction of the pipe at the bottom of the manhole (photo n. 17 and 19). It is such position to be sure, at the bottom of the manhole, which eases the sediments inflow threatening the obstruction of the pipe itself. The difference in height between the outlet pipe and the overflow pipe is also too poor making it easier for the water to overflow instead of flowing inside the transmission pipe inlet, partially obstructed by the sand and gravel sediment.
The lack of any detailed designs of such intake works among the project drawings let one think that they were directly executed by the contractor, with little control by the supervision. Alas, the imperfect realization of this important (but minor) works may damage and drastically reduce the whole water town feeding. Some prompt advises were given by the Evaluation Team to the TWU in order to rectify the situation as is shown in Fig. C.1.2.a), where a possible corrective option is also shown (Fig. C.1.2.b). The TWU was advised to promptly clean up the catchment pits - an operation that was to be repeated on a regular basis - in order to prevent the transmission pipe obstruction and to open periodically the wash out valve to evacuate sediments already deposited for sure inside the pipe that, by accumulating, could have partially obstructed the pipe, facilitating the overflow losses.

Transmission pipe: from the springs intakes at 2,290 m.asl, the DN 150 5,687 m long steel transmission pipe, reaches the town's water tank at an elevation of 2,078 m.asl. Along the SE-NW pipe n. 8 wash-out and n. 7 air valve manholes are located as well as n. 2 pressure break tanks. River Vadecha (N 08°07'56,4"; E 039°20'34,1" –

alt. 1,995 m.asl), is where the pipe reaches its lowest level, before it climbs up the hill's slope, by a 210 m ductile steel pipe, finally reaching the tank. The 210 m long pipe reach, crossing the Vadecha river, was realized in cast iron.

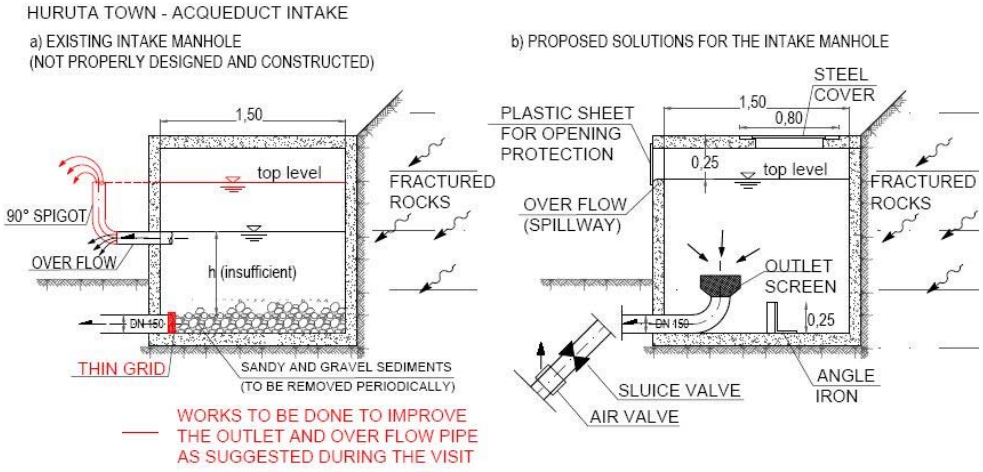


Fig. C.1.2: intake chamber: dysfunctions

Along the pipe course the following observations were made.

At chainage (Ch.) 2,600 at 2,153 m.asl, a pressure break tank is located that disconnects the pipe into two reaches. From a hydraulic examination of the design profile (11 tables) it appears that the two reaches bear a different flow capacity: the first reach up to the break tank (chainage. 2,600 m; 2,153 m.als) bears a capacity of 45 l/s, while the second one of 28.25 l/s. In any case they both are oversized for the nominal flow of 15 l/s.

From the pipe construction point of view, it appears that in some parts the pipe was not laid down at the depth indicated in the designs as for example in the case of the last reach between the ch. 4+975 and 5+275 (at the pipe resurfacing from the Vadecha river), where the pipe emerges from the rocky land (cast iron reach - photo 21). A thick layer of stones should be put in place here in order to protect it. At Ch. 4+875, the pipe crosses the dry bed of the Vadeche river, where, in October 2014, a flood washed away the supporting piles of the overhead pipe of the river crossing. The structure having collapsed, it was substituted by an underground crossing (photo. n. 22) utilizing part of the Capacity Building budget item. The photo shows that the piles were simply placed directly over the river bed rocks with no founding work whatsoever thus allowing to be easily destroyed by the first seasonal flood. The present crossing also lacks detailed technical drawings: its construction was ipso facto decided by the Contractor and only by him – as at the springs.

500 m³ water tank: the municipal circular RCC 3 n above ground located tank (N 08°08'18,6"; E 039°20'22,5" – alt. 2,075 m.asl - photo n. 23), dominates the lower WS network. Inside the fenced area, as per design drawings, a small guard building, a store and the chlorination plant on the tank top are located. The DN 300 UTL/AICSet pipe that originates from the tank is controlled by a sluice gate and a flow meter device (photo n. 24). At D/S the gate, an air valve is missing and should therefore be inserted.

Water distribution network: starting from the tank UTL/AICSet, the HDPE De 250 mm 610 m long pipe, reaches the node J-4 (N 08°08'35,4"; E 039°20'43,1" - alt. 2,024 m.asl - Photo n. 25) at the town's entrance. Here the pipe branches into two reaches that continue in a N-Eastern direction along the two main roads, feeding the

distribution close grids serving the householders' connections. The De 200 to 50 mm HDPE distribution pipes, reach the eastern limit of the town close to the Stadium area. The as built WS lay out is in drawing HUR-002- (called *Master-topo)*. The 644 new connections are composed by a ball valve, with annexed flow meter, located inside the private house compounds as shown in photo n. 39. 16,180 m of new pipes were laid with the project.

Town water points: the new WS network feeds n. 5 water points or fountains (WPs) provided with 4 water taps each. N. 6 was their original number according to the contract design. The location of each WP was not indicated in the design layout, but it was decided on the ground during the construction phase.
The 5 WPs, visited during the site visit, are listed here below:

- WP n. 1: N 08°09'05,8"; E 039°20'51,7" – alt. 2,024 m.asl – Photo n. 27 – closed .
- WP n. 2: 08°08'53,52"N; E 039°21'24,10"E – alt. 2,023 m.asl – Photo n. 28 – on duty.
- WP n. 3: N 08°09'10.7"; E 039°21'46,2" – alt. 1,998 m.asl – Photo n. 29 – closed.
- WP n. 4: N 08°08'52,25"; E 039°21'35,6" - alt. 2,003 m.asl – Photo n. 31 – on duty.
- WP n. 5: N 08°09'12,52"; E 039°21'12,5" - alt. 1990 m.asl – Photo n. 30 – closed.

The location of the WPs was not a happy one. Three of them were out of order (1, 3, 5), surely enough located in empty areas, destined probably to future urban developments. Furthermore, the WPs, besides being fairly far away, were located ab. 50 m lower than the inhabited areas thus compelling the water collecting people, generally women, to walk their way up carrying a 25 kg load on their backs.

Hygiene and sanitation interventions: the project envisaged the realization of just one public toilet, provided with showers, to be located near the market and the bus station. The pit latrine of the *Aqua privy* type, provided with annexed septic tank (Photo n. 32-36), was realized according to the design's drawings and located in the market area close to the bus station (N 08°09'12,1"; E 039°21'35,3"; 2012 mm). When the Author was visiting the site, the service was not running and in a state of neglect apparently due to its not being connected to the WS network. Further explication revealed that an agreement on the management of the service was not reached between the Huruta Municipality and the TWU. Precisely, the Municipality was ready to manage the service but only on condition of paying to the TWU just for the water used and not more, as the TWU asked on the basis of the loan redemption of the on-lending agreement. According to the TWU the contrast was now close to be finalized.

Sludge drying beds: n. 3 of them (Photo n. 37) are located in the NW corner of the town close to the football court (N 08°09'16,87"; E 039°21'53,26"). They are currently unutilized both because the public toilet is still out of order and because householders do not agree to pay for the collection service but to dig a new latrine in their compound when filled up. Maybe one should simply acknowledge such practice and postpone its eradication to the moment when the houses will be provided with toilets inside the buildings.

2.1.4 The evaluation interviews

N. 11 interviews were carried out: 4 with institutions and 7 with new private consumers (Chart C.1.3.). The questionnaires of the interviews can be found in Annex n. 3.

Chart C.1.3: Huruta interviews: TWU - Clinic- School – Commercial – Householders –

Sh.n.	Name	Sex	Position	Place/address	Coordinates /Alt. m.asl	Photo
	M Jemal	M	Manager	TWU	N 08°08'50,3"; E 039°21'05,3"/2056	48
1	Alemayehu	M	Owner	Private clinic	-	
2	Bahilu Tasa	M	Director	Prim. School	N 08°09'26,2"; E 039°21'39,0"/2056	45

3	A. Awas	M	Owner	Wine Hotel	-	47
1	Kifle Getaneh	M	Householder	01 Kebele	N 08°08'37,5"; E 039°20'43,2"/2056	41
2	A. Mengesha	M	Householder	01 Kebele	-	42
3	A. Ayalew	M	Householder	01 Kebele	-	-
4	B. Mengesha	F	Householder	02 Kebele	N 08°09'27,7"; E 039°21'29,0"/2029	43
5	Hailu Aseffa	M	Householder	02 Kebele	N 08°09'32,7"; E 039°21'30,8"/2028	44
6	F. Tesfaye	F	Householder	02 Kebele	-	46
7	Alemayehu	M	Householder	03 Kebele	-	-

2.1.5 Project effectiveness assessment

In charts C.1.4 and 5 the answers are gathered on the basis of the indicators of the targets/objectives, and the expected results (paragraph B.5).

A. Target indicators

With a score of 8,6/10, the project was much appreciated by the local population, particularly by the private newly connected consumers. Although neither before nor after the project, the risks of unsafe water consumption has been perceived and water filter devices have been practically unknown, the intervention greatly benefited the population representing an outright upgrade of the pre-existing condition. With the water issue solved or partially so, the main problem that now bothers the town population is the recurrent electric black outs.

In reference to the indicators, the interviews testified to:

1. The high level of appreciation of the intervention by the population (8,6/10);
2. The absence or rarity of gut related illnesses due to consumption of spring water by the population;
3. The trust of the private consumers (100%) that said they rated safe the water supplied by the aqueduct;
4. The too high tariff paid by the 90% of the consumers that said they suffered an increase up to 150%. While 85% said they were paying less;
5. The efficacy of the intervention: 100% said they did not suffer from water supply shortages or interruptions; 90% that they did not suffer from interruptions. 40% owned private water reservoirs;
6. The need of public latrines: 60% lamented their lack, particularly at the market (60%) and in schools (30%). 100% of the population complained about outdoor defecation.

To sum up, of the six indicators of the project 5 were reached and one was not (see chart C.1.4.).

Chart C.1.4: PROJECT INDICATORS	YES	NO	Notes
1. Water demand di 20 lcd. day	X		
2. Collection time at the WPs < 30"	X		3 WPs misplaced
3. Safe water for 100% of the popul.	X		
4. 50% reduction of unsafe water induced illnesses	X		Not a great concern
5. Eradication of outdoor defecation in the urban area		**X**	Public latrines insufficient and out of order
6. 4% costs reduction of the water supply to the population	**X**		Too high tariffs especially for the poorest bracket of the popul.
Total	**5**	**1**	

B. Expected results

Result 1: *Sizing, functionality and sustainability of the WSS suitable to the population served*

The distribution network was correctly sized envisaging water distribution over a medium-long period of time. The project was accurately prepared, with proper surveys, and its implementation in two phases correctly scheduled.

However, some works were not designed in detail: the intake manholes at the spring need a prompt maintenance intervention in order to prevent the obstruction of pipes; the river crossing, lacking a foundation whatsoever, was washed away by a flood. The building materials employed, pipes, joints and special HDPE made parts, are quality materials bought not far from AA. It though appears that their maintenance is presently unassured due to the lack of skills and expertise of the maintenance staff.

Result 2: *Enhancement of public hygiene and sanitary infrastructures, management included*;

The one and only latrine was properly built. At the time of the field visit it was out of order, albeit the need was felt by 60% of the population of latrines, particularly near the market and even more so in the schools and above all the primary ones. 90% of the households use dry latrines, located in house annexed compounds, that are each time interred and dug. Outdoor defecation is yet very popular. No sludge collection system is envisaged. The TWU services are still out of order and unconnected.

Result 3: *Upgrade of the management skills of the TWU in the planning, technical assistance, and maintenance of the system and in the financial credits management.*

The managers and staff are quite up to the task. The TWU staff is efficient and highly motivated. A keen interest was perceived by the Author in bettering the service also adopting IT, although the premises are unsuitable for the hosting of HWs (dust, electric power changes, black outs, viruses etc.). Technically, in case the IT is adopted, the HWs should be protected by a UPS to make for the power changes. Such upgrade could envisage staff reductions.

According to the 9 result indicators (Par. B.5), the situation is not very comfortable with only 4 positive indicators - and 5 negative.

Chart C.1.5: RESULT INDICATORS	**YES**	**NO**	**Note**
1. 60% of the population provided with 15 lcd	**X**		
2. *Billing* in place and running		**X**	Traditional billing -No upgrade (*)
3. Not paying consumers < National average	**X**		No delay in payments by the consumers
4. Service interruptions < National average	**X**		Gravity system with no risk of black outs induced interruptions
5. 100% schools provided with toilette etc.		**X**	No intervention in schools and institutions
6. Public latrines running		**X**	Latrines underprovided and out of order
7. Collection of sludges running		**X**	Lack of a vacuum truck, not even a private one
8. Municipal monitoring of the service	**X**		
9. TWU staff adequately trained and credit redemption		**X**	Too high tariffs. The first instalment not paid.
Total	**4**	**5**	**44% of result**

(*) The IT *Billing*, as confirmed by the local AICS was recently supplied but still not functioning.

Fig. C.1.3: TWU billing reader at Huruta town

C.2.2 Durame town: field visits and interviews

Fig. C.2.1: Durame town: view from the main western street

2.2.1 Overview

Durame (coordinates: N 08°08'50,3"; E 039°21'05,3"), in the SNNPR region, is the capital town of the Kembeta-Tembaru district. It is linked to AA both by the Alemgene – Butajira – Hossaina – Durame, 320 km long road and the Mojo – Shashamene – Durame, 350 km long road. Durame is located at the foot of Mount Ambaricho (3000 m asl) on the NW, at an altitude of 2,050 m asl.

The land is verdant and hosts a thriving farm and cattle-breeding based economy. The resident population is 44,000 people (2013 census), expected to reach 48,064 by 2023. In Durame there are three administrative zones: Kesha, Zeraro and Lalo.

Notwithstanding such fair hydrologic and morphologic conditions, the water service is very poor in the area. Only two springs are used for the water supply to the population that generally use 180-220 m deep wells instead. The TWU managed water service does not cover the population's needs and it is also unprepared to delve with the too high presence of iron in the aquifer, which also caused one well to be closed of the four built within the project. The water service is provided by turns to the various zones of the town. Frequent black outs affect the water supply. In Durame there are nine schools.

The houses in Durame are generally small one storied rock or mixed materials one-family buildings to which small plots are adjoined where a wet latrine usually stands. In Durame there are no sewerage and drainage systems; before the project, the public sanitation services were very poor if not totally absent.

The project envisaged the construction of three public latrines. Only two of them, close to the two markets, were realized, while the third one was not because of NIMBY (not in my back yard) issues.

These were the select catchment sources to be utilized for the water supply system envisaged by the project:

- Ambaricho spring;
- n. 6 wells of which 4 new ones.

Of the two already existent wells, the one located in Gocho, to the south of Durame, with an estimated flow of 2,6 l/s, is the oldest, having been dug about 20 years ago; the other one with a potentiality of 7 l/s, dug out in 2010 by World Vision, provides just 2,77 l/s, according to the TWU.

The total of the water connections, served both by the old and the new WS networks, now is 2,662, of which 1,500 were the new connections provided by the project (56,3%).

Multiplying the 2,662 water connections by the Ethiopian family average composition of 4,8 people, the population supplied directly with water from the piped network within their homesteads, is to be estimated in 12,780 people or ab 30% of the total urban population. The remaining 70% are to use the 31 water points (fountains) of which: 16 are running no more, 13 were built from scratch within the project and 2 were already in place, for a total of 15 fountains. Collected information showed that each fountain was used by ab. 60 families that is (15x60) 900 families for a total of (900x4,8) 4,320 people. When to this latter figure of 4,320 people served by WPs the 12,780 people directly connected to the network are added, a total of 17,100 people are reached or 40% of the population. It means that 60% of the population doesn't make use of controlled water supply sources, among which is the Gocho spring that can be used for free.

The town water supply network mainly draws from wells (fig. C.2.2). The water attainment from the wells and its distribution are powered by electricity. Due to the frequent black outs the service is provided only by turns according to the TWU's open for consultation from the consumers schedule. Before the project, the town zones had a water service 2 days a week. After the project, with no black out in place, the town zones could be served up to 4 times a week for about 6-8 hours continually. The pumps purchased through the project have a load limit of ab. 7 l/s at their best. They are however working alternatively in order to allow both the heat reduction of the engines and the refill of the well. Assuming therefore that, working alternatively, each one of the 5 wells supply 7 l/s during the 24 hours, the overall average supply would be 20 l/s that is about 39 l each person much above the 20 l/s per person of the target (water dispersion are also taken into account). Nonetheless there appears to be a couple of problems: firstly August 2015 one of the 4 new wells was closed due to the high level of iron; and secondly the water supply of the pre-existent sources is far from the nominal flows indicated in the project (source: design, TWU). Last but not least, the water demand is ever more growing due to the booming new water consuming commercial activities.

The final project also revealed some flaws in the building designs, particularly:

- The PVC-U pipes are not strong enough to support the frequent electricity induced water hammers. It would have been much better to use welded steel pipes that are more resistant;
- The field wells part of the project, in the second step of the intervention, should also envisage a reserve well (2+1) in order to allow a working rotation;
- The wells and boosters seem to lack a protection system against the atmospheric discharges (Faraday cage and ground dispersion electrode);
- The underground boosters are already showing infiltrations on their walls. Furthermore they are not provided with the necessary air vessels in order to protect the pipes against the water hammer, due to the frequent electric black-outs;

- The tanks and the break pressure tanks lack the provided with floating structure valves that allow the shutter to close once they are full. Due to such situation, pumped water dispersions are inevitable causing energy costs to soar for the TWU and water supply inefficiencies;
- The Capacity building appears not to have met the targets. The recent staff turnover itself did not help. The TWU manager and the hotel manager both said that there are no plumbers in town, making it impossible to repair even the hotel rooms' bathrooms that still lack running water.

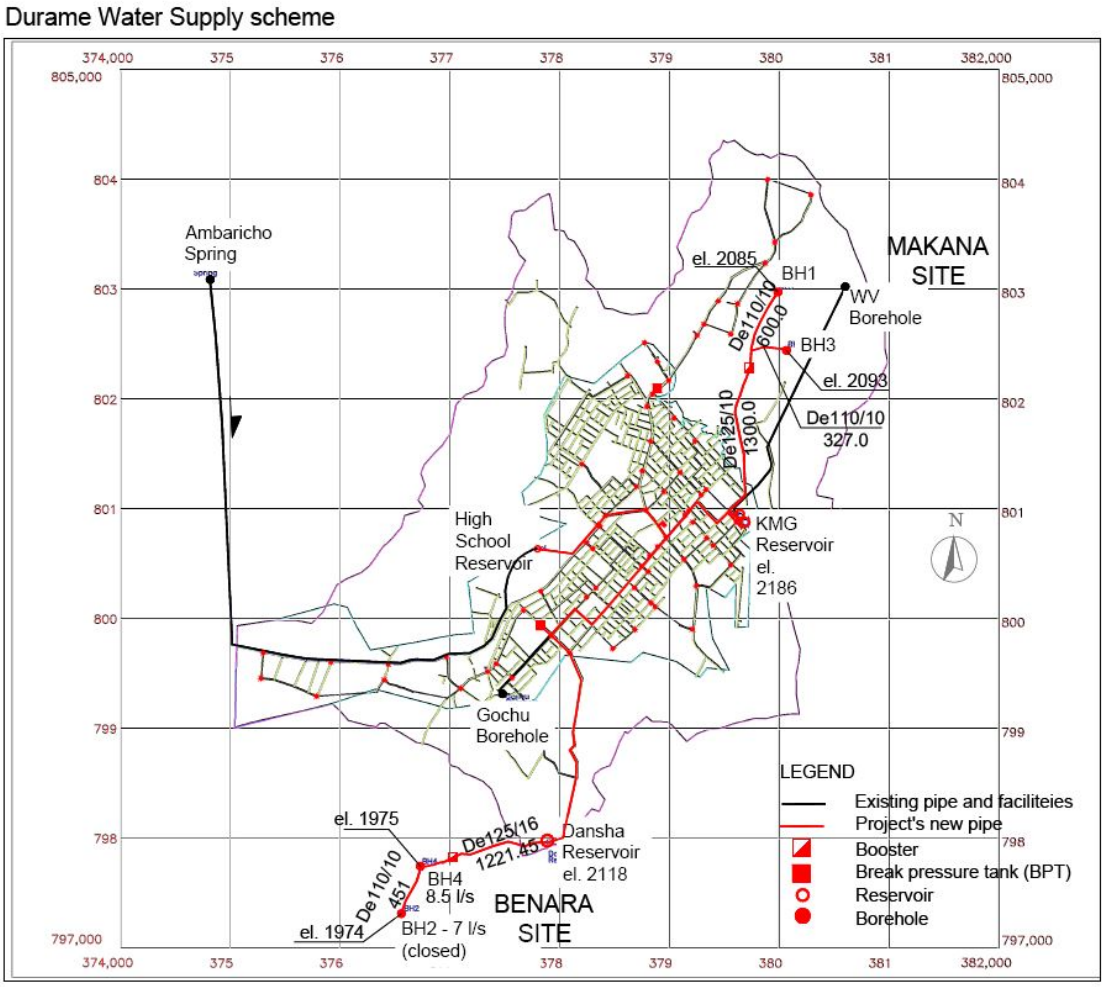


Fig. C.2.2: Water supply layout of Durame town

The deep aquifer water has too much iron in it so that the TWU was forced to shut down one of the two boreholes of the project. The water check is carried out monthly by the Healthcare ministry staff.

The evaluation team, formed by civ. eng. A. de Vito and Assistant Mr. E. Simba, carried out the field visits and the interviews on 7, 8 and 9 December 2015.

2.2.1 The water supply service management

The Durame TWU manages the WS network, fountains included. It should also take care of the public latrines by periodically collecting the sludge from them and from the private latrines as well. The close to be signed agreement with the Municipality envisages the management of the latrine to be handed over to the Municipality itself.

The TWU staff is composed by n. 33 persons: 6 women and 27 men:

- 1 manager;
- 1 engineer;
- 1 secretary;
- 3 finance and cash officers;
- 2 billing officers;
- 22 O&M staff.

Meters are monthly checked by 10 technicians in a 5 days' work.

Presided by the mayor of Durame, the board, that meets once a month is composed by 9 members: 1 representative of the local water and energy outfit, 1 manager, the municipality manager, a regional representative of the Healthcare ministry, 2 spokespersons of the local community, 1 spokesperson of the women and children association and a TWU manager.

The Zone Administration decides on the board composition on a performance based annual evaluation. The *Board* is a political structure whose members are frequently changed often causing the dispersion of technical capacities. As was pointed out in the workshop in AA, it is advisable to keep the technical capacities.

The balance sheet 2014-2015 registers that the income from the water consumption amounts to ETB 3,22 m, of which ab. ETB 1 m was the cost for electricity, from which the wells are powered, and ab. ETB 1 m was earmarked for the credit redemption. Although the *on lending agreement* came into force in 2012, the TWU has not reimbursed any instalment as yet also lamenting that such reimbursement would reduce its capacity of working on the new connections to the water net and limit the maintenance service. There is great concern about such reimbursement both on the part of the manager and of the already connected consumers that are also burdened with the new tariffs introduced in February 2015. In Chart C.2.1, the comparison is made between the before Feb 2015 tariffs and those after, which shows that the lower segment of the population was particularly penalized with increases that reached the 100%. The meters are monthly read and consumers pay regularly their bills.

Chart C.2.1 - DURAME WATER TARIFF

	Before prj		After prj: household			Commercial	
	m³	ETB	m³	ETB	%	m³	ETB
1	0 - 5	4	0 - 5	8	100	0-30	10,3
2	6 - 10	5	4 - 6	9	80	-	-
3	11 - 30	6	11 - 30	9,5	58,3	-	-
4	>30	7	>30	10,3	47,1	-	-

The project should have ensured an adequate water service also in the long run. The 4 new wells by their underground pumps should have well enough provided 5,8 (BH1) + 7,5 (BH3) + 8,5 (BH2) + 7,0 BH4) l/s = 28,8 l/s, or, on a 12 hours basis, 1.244.160 l/d, that is enough to provide the domestic demand of 20 lcd to 62,208 people. But things went differently. According to the TWU manager of the 4 new boreholes, the two in Mekane are currently utilized not more than 8 hours a day, while of the two in Benara, one was closed due to too high level of iron (BH4) and the second one is used only for 2 hours a day due to the hydro-geological conditions. It is also to be said that the pumps, at least according to the information contained on their plates, are inadequate for the water flow they funnel, as was also confirmed by the TWU. Assumed that the current average flow was 6,5 l/s, the three new wells would supply 421,000 l on a 18 hours per day basis that is they would

provide water for 21,000 people – with the target domestic demand of 20 lcd. There are though other water sources to be taken into consideration. The Ambaricho spring supplies 1,6 l/s round the clock that is 138,420 l/d; the Gocho wells supplies about 2,6 l/s for 17 hours a day amounting to 159,000 l/d the same as the World Vision well. The total supply would then be $877x10^3$ l/d corrected to $600x10^3$ l/d due to 30% of water dispersions, that is 30,700 people, about 30% less than the target. In such situation, the TWU's decision to provide water by rotation is perfectly understandable.

The management of the fountains (WP): the management of each group of three WPs was assigned to 5 members of the community that also chose a book-keeper. The income is so divided: 60% for the TWU and 40% for the management committee.

The tariffs are:

- 25 litres: ETB 0,3;
- 20 litres: ETB 0,25.

The TWU was provided with (or delivery underway):

- one *pick up* Toyota;
- one motorcycle;
- a set of equipment and tools for hydraulic interventions;
- pipes and spare parts (delivery underway);
- HDPE pipe welder (delivery underway).

The TWU complains about the delays in the delivery of the welder and of the spare parts for the pipes and the special parts as well that hampers the maintenance and repairing activities. The field visit confirmed the validity of the TWU's complaints.

2.2.3 The infrastructural interventions

According to the project scheme in fig. C.2.3, the WS pressurized network envisaged the realization of two sub-systems each one of them independently supplied by n. 2 boreholes at each well field in Makana and Benara. The schemes, pretty similar, are formed by:

- n. 2 boreholes equipped with submergible pumps;
- U-PVC De 110 mm distribution pipes from the wells to the iron stepped spillway to reduce the high iron content;
- 5x4x5 m^3 wet tank feeding the adjoining booster;
- n. 2 horizontal sharp pump set in the booster station;
- main/rising pipe U-PVC De 125 mm to the municipality's 300 m^3 tank;
- Municipality's 300 m^3 header tank, provided with chlorination plant and guard house in KMB and Kalehwot sites;
- De 150 mm transmission pipe from the tank to the break pressure tank;
- n. 2 pressurized distribution HDPE networks supplied directly by the transmission pipe for each of the following areas: Lalo Kabalo and Katama, for Makane sub-system, and Investment area and Haroge Village for the Benara sub-system.
- n. 13 fountains;

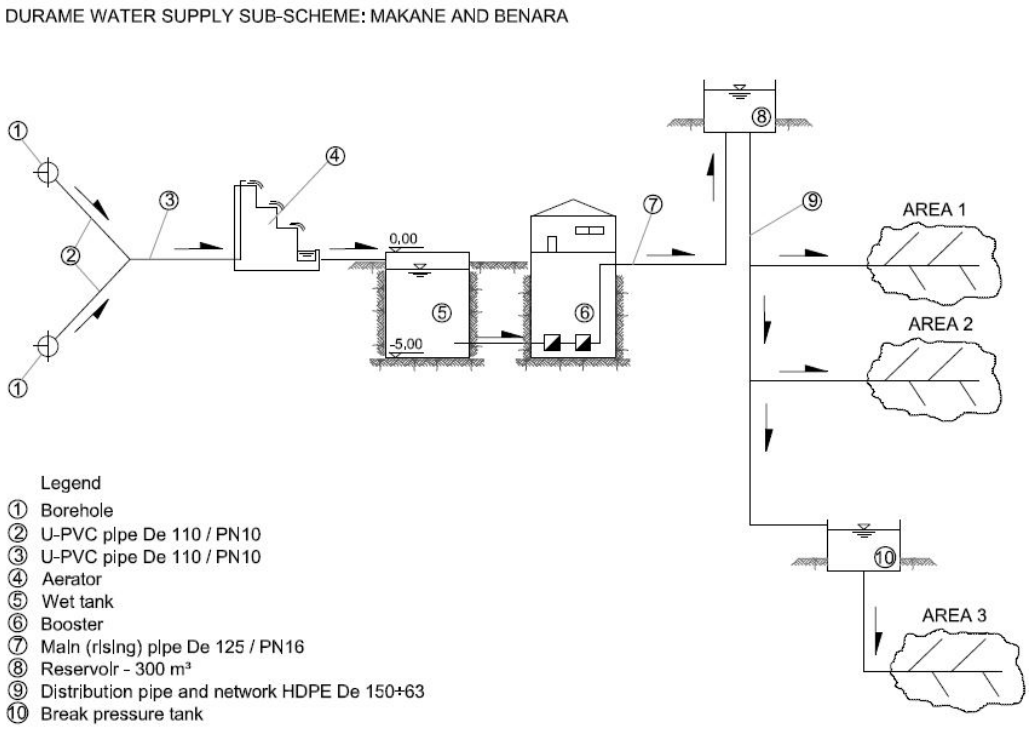


Fig. 2.3: Standard water supply layout for Makane and Benara schemes

The sanitation works of the project envisaged the following buildings:

- n. 3 public *Aqua-privy* latrines;
- N. 1 sludge drying bed;
- TWU premises provided with toilets.

Started 22/11/2012, the works were completed 29/03/2014, with 4 months delay and 23.35% of extra budget.
When the field visit took place, the system was working.
This was the schedule of the field visit:

Office of the TWU: located along the Makana road that originates from the main town crossing road (N 07°15'05,7"; E 037°54'16,7" - 2020 m.asl – Photo nn. 2, 3, 4). The new building was constructed according to the design. When the field visit took place, the toilets inside the building, of a median standard and divided by gender, were not connected to the WS network yet and were therefore out of order (photo n. 5). There is another issue that compromises the functioning of the toilets: the lack of a sludge collection tank which the TWU say had not been envisaged in the design drawings. Briefly the staff still uses the rundown outdoor dry latrine at the back of the building.

Water supply system: with reference to fig. C.2.3, the WS network realized within the project is composed by two similar independent sub-schemes located along the NE-SW directives at the far end of the town: the first one, Makana, in the NE, and the second one, Benara, in the SW. Both of them are fed by two deep boreholes each that, by way of a booster, supply the municipality header tank from where the distribution network starts. The water supply network envisages two pressure belts, disconnected by a break pressure tank. Particularly:
Makana Sub-system: with the Manager and a TWU technician the Mekana well field was visited. The realization of the two boreholes was ascertained: BH1 – Makana: at coordinates N 07°15'37,7"; E 037°54'57,5" – alt. 2,093 m.asl – 210 m deep-, provided with a 22 kW that is Q= 5,9 l/s submergible pump (Photo n. 7, 8, 9) and BH3

Weta Village, at coordinates N 07°15'37,7"; E 037°54'57,5"- alt. 2,085 m.asl – 180 m deep, provided with a 22 kW that is Q= 7,3 l/s submergible pump (Photo n. 10,11). Furthermore the presence was ascertained of two De 110 mm /PN 10 PVC-U pipes, 327,2 m and 577,8 m long respectively, connected to the aerator stepped spillway for the suppression of the iron oxide of which the aquifer is rich. (Photo n. 12). From the aerator spillway, the flow is stored in a rectangular shaped (5x4 m^2) wet tank (5 m deep), from which the pumps of the adjoining booster draw (coordinates N 07°15'32,2"; E 037°54'47,0" – alt. 2,110 m.asl - Photo 13).

The booster, through a De 125 mm/PN 16, 1,666.8 m long U-PVC rising pipe feeds the municipal header reservoir, called KMG tank, a 300 m^3 circular shaped RCC tank (terrestrial coordinates N 07°14'47,0"; E 037°54'41,9" – alt. 2,186 m.asl -Photo 14). From such tank the distribution network originates that feeds, along its course, the Lalo Kabale and Katama off-takes, before ending in the N 07°15'41,8"; E 037°54'32,1" – alt. 2,140 m.asl break pressure tank (Photo n. 15), serving the Weta Village lower network draws by a 430 m long De 100-38 PN10 HPDE pipe.

Benara sub-system: it is similar to the previous sub-system (fig. C.2.3). In Benara two boreholes were dug: BH4 (terrestrial coordinates N 07°13'05,5"; E 037°53'09,3" – alt. 1,974 m.als -Photo 16, 17), that was closed June 2015 due to the iron concentration that was above the drinkability limits (Photo 20- the iron in the aerator is brown); and BH2 (terrestrial coordinates N 07°12'51,7"; E 037°53'03,8" – alt. 1,975 m.asl - Photo 18), that, when visiting, was out of order since a couple of days due to the depletion of the oil of the electricity adaptor's cooling system and did not present any drinkability issue. The two wells are both connected to the De 110/PN10 ab. 460 m long PVC –U rising pipe that feeds the aerator stepped spillway for the suppression of the iron oxide of which the aquifer is rich (photo 19). The flow then is stored in a wet tank from which the two booster pump sets draw (terrestrial coordinates N 07°13'01,6"; E 037°53'16,2" – alt. 1,980 m.asl - Photo 19, 21).

A De 125 mm/PN 16 U-PVC rising pipe, then, feeds the municipal 300 m^3 circular shaped tank, named Dansha Reservoir, close to the Kalehwot Church, that could not be visited due to a landslide road interruption. From the Dansha R. the De 150 mm PVC-U network starts that feeds the off-takes of Investment Area and Baroche Village, finally ending in the break pressure tank (terrestrial coordinates N 07°14'04,3"; E 037°53'28,3" – alt. 2,052 m.asl - Photo 21), from which the low De 80-40 mm HDPE distribution network starts to Dilalo Village.

Town fountains: the network feeds n. 13 new *water points* (bono, in Amharic), each with 4 to 6 taps. Of such WPs 4 were surveyed during the field visit:

- Water Point n. 1: Lalo Kabalè N 07° 15' 03,0"; E 037° 54' 42,5"- alt. 2,124 m.asl – Photo n. 28.
- Water Point n. 2: Ambo N 07° 14' 06,9"; E 037° 54' 37,9" – alt. 2,150 m.asl – Photo n. 29.
- Water Point n. 3: Weta village N 07° 15' 51,6"; E 037° 54' 39,9" – alt. 2,098 m.asl – Photo n. 30.
- Water Point n. 4: Zato village N 07° 14' 11,3"; E 037° 52' 50,0" – alt. 2,015 m.asl – Photo n. 31.

Each water point serves about 65-100 families. The service is provided by turns only of 2/3 days per week, each time for 10 hours continuously. From the flash interviews made with the people using the WPs, it emerged that the greatest part of them lived not farther than 30 minutes walk from the WPs. For the interviews conducted at WP n. 2 (photo 31) see chart C.2.2.

Chart. C.2.2: MINUTE WALK NEEDED TO REACH WP n. 2													
Consumer	1	2	3	4	5	6	7	8	9	10	11	12	13
T min	15”	30”	5’	5’	3’	10’	2’	3’	4’	6’	15’	20’	>30’

Closer residents may need to fetch water from the WPs up to 2-3 times a day.

During the visits, it emerged that one pipe of the Mekana distribution system (N 07°16’ 0,3”; E 037° 54’ 48,3” – alt. 2,088 m.asl –Photo n. 28) had broken causing a decrease of pressure in the whole higher system that prevented the water from reaching the WPs where people were cueing. The TWU technicians could not mend the pipe because they did not have the HDPE welder set.

Sanitation works: the project envisaged the construction of three public latrines provided with showers and septic tanks. Only two were built while the third one was not built because its location was too close to the residential area.

The two latrines were visited:

- Latrine n. 1 in the market area of Addis Katama - N 07°14’ 31,1”; E 037° 54’ 04,0” – alt. 2,121 m.asl – Photo n. 22, 23, 24.
- Latrine n. 2 in the market area of Allo Aroche - N 07°14’ 10,1”; E 037° 53’ 30,8” – alt. 2,064 m.asl – Photo n. 25, 26.

Provided with septic tanks, the two latrines (Photo n. 24, 26) sit in the crowded market areas of Addis Katama (Fri-Sat-Sun-Mon) and Allo Aroche (Tue-Wed-Thu). Both of them were out of order, actually they were outright not connected to the water supply network and evidently in a state of neglect and abandon. Outdoor defecation was therefore a serious issue also felt by the population as the interviews showed when the stakeholder surveys took place.

The TWU Manager said though that the *Agreement* was close to be met with the municipality for the latrine management and that the TWU would have taken care of the WS network connections with their own financial resources. He also said that the municipality would pay only for the water consumed and that the latrine management would be granted to an association of citizens that had been set up already.

2.2.4 The evaluation interviews

In Durame n. 17 interviews were made: n. 6 with public institutions, n. 1 with a factory manager and n. 10 with new householders. Chart C.2.3 bears the list of the interviewed people with their role, sex, and possibly the location and the photo (the Ethiopian expert not always had the tools).

Chart C.2.3: Durame interviews: TWU - Clinic- School – Commercial – Householders						
Sh. N.	***Name***	***Sex***	***Position***	***Place/adress***	***Coordinates /El. asl***	***Photo Ann. 3***
1	A. Mekebo	M	Manager	TWU	N 07°15’05,7”; E 037°54’16,7”	31
2	D. Ashebo	M	Manager	General Hospital	N 07°15’28,1”; E 037°54’21,6”	33
3	M. Titos	M	Director	Health Center	N 07°14’52,52”; E 037°54’17,9”	-
4	A.Wotiro	M	Owner	Masala Hotel	N 07°14’46,1”; E 037°54’06,2”	-
5	B. Gatizo	M	Director	Primary sch.	-	-
6	A.Erdeno	M	Coordinator	Univ. Campus	-	-
7	T. Wanore	M	Manager	Coffee factory	N 07°14’09,6”; E 037°52’21,8”	39
1	T.Bezu	F	Householder	Lalo Kebele	-	-
2	T. Yohannis	M	Householder	Lalo kebele	-	-
3	A. Anewa	F	Householder	06 kebele	-	-
4	A. Tembiso	M	Householder	Lalo Kebele	-	-
5	A G/Mariam	M	Householder	Zararo Kebele	N 07°14’22,4”; E 037°54’08,0”	35
6	Y. Tessema	F	Householder	Zararo Kebele	-	36

7	T. Tadele/7	F	Householder	Zararo Kebele	N 07°14'24,2"; E 037°54'09,8"	37
8	A. Hakimo/8	F	Householder	Zararo Kebele	N 07°14'24,6"; E 037°54'07,9"	38
9	D. Jawo	M	Householder	Zararo Kebele	N 07°14'48,4"; E 037°54'03,7"	-
10	T. Shirango	F	Householder	Zararo Kebele	N 07°14'47,1"; E 037°54'03,2"	-

2.2.5 Project effectiveness assessment

See the forms and the interview sheets in Annex. n. 3. Here below are registered the answers to indicators and expected results of the project (section. B.5).

PROJECT INDICATORS

The population benefited from the intervention and a remarkable bettering was noted from the pre-existent situation. Much, though, is still to be done both from the quantity and quality of the water supply point of view. The service is yet to be improved: water supply turns are too scant and black outs too frequent.

In reference to the indicators, the interviews showed:

1. The project was averagely rated 6,5/10;
2. The Hospital staff said that intestinal diseases, usually caused by unsafe water drinking, had decreased;
3. 100% of the householders interviewed declared that the water supplied within the project was much safer and that the frequency of water caused intestinal diseases had diminished. Previously it was just the 70% that rated the water supply safe;
4. 100% of the householders do not use filters anymore, although previously only 30% used filters despite 40% of them complained about water diseases;
5. 90% declared that they were paying less for the water supply while 70% lamented tariff increases after the project;
6. 60% still complained about the water supply quantity, although 90% had their own collection tanks;
7. 80% complain about the lack of public latrines and about outdoor defecation.

Briefly, of the six indicators of the project, four were met, 2 were not, as in chart C.2.4.

CHART C.2.4: PROJECT INDICATORS	YES	NO	Remarks
1. Water supply 20 l p/d		X	Not running wells and frequent black outs
2. Minute walk to the WPs < 30"	X		An unmeasured percentage draw water from free sources
3. Safe water for 100% of the population	X		With risks due to discharge and low pressure
4. 50% decrease of gut water induced diseases	X		Too much iron in the aquifer
5. Outdoor defecation defeated		X	Out of order latrines
6. Decrease of the supply costs by 4%	X		Although water tariffs have doubled
Total	**4**	**2**	**66% of result**

EXPECTED RESULTS

Result 1: *Right dimensioned, correctly functioning and sustainable WS networks:*

In reference to the pipe nets the networks have been rightly dimensioned, assuring a water distribution in the long time. According to the TWU and to the field visits, less effective was the design and the dimensioning of the supply system (flow tests and iron concentration analysis). Notwithstanding the reported deficiencies, the network was running. The use of more resistant steel pipe should always be preferable for the rising pipes.

Result 2: *Strengthening of the public sanitation infrastructures built and managed*:

Two of the foreseen three public latrines provided with showers have been built but they are not yet connected to the WS network and are not running. Although an agreement between the TWU and the municipality seemed close, the population still complained about the want of an efficient sanitation service covering. Furthermore, interventions, above all inside the schools, have not been planned. The sludge collection is also lacking. Outdoor defecation is inevitably still very popular and also the use of dry latrines in the compounds that are refilled once they are full.

Result 3: *Bettering of the management capacity of the TWU in reference to planning, management, maintenance, technical assistence and financial expertise:*

The staff's skills and expertise in the maintenance of the water network is low. The TWU staff is young and motivated but not adequately prepared. There are no professional plumbers capable of mending the private systems. Furthermore, the welder were not delivered yet for the polyethylene pipes at the time of the field visits. The setting up of IT processing must follow a previous activity of staff training and of creating a safer environment: dustless and with a continuous electricity supply. Much more needed is the upgrade of the TWU staff that, once trained, should also be paid more.

In detail, regarding the 9 indicators (Parg. B.5), the situation appears more delicate with just 3 positive indicators and 6 negative:

Chart C.2.5: RESULTS INDICATORS	**YES**	**NO**	**Remarks**
1. 60% of the population provided with 15 l/per person per day	**X**		
2. Billing		**X**	No upgrade
3. Not paying consumers < National average	**X**		
4. Service interruptions < National average		**X**	Service provided just by turns; frequent black-outs
5. 100% of schools with toilets and other services		**X**	Schools altogether cut out from the intervention
6. Working public latrines		**X**	Out of order- Agreement with the municipality
7. Sludge collection service		**X**	No running service
8. Municipal monitoring of the service	**X**		
9. TWU up to the task and redemption		**X**	Lack of tariffs regulation and no redemption
TOTAL	**4**	**5**	**44% of result**

C.2.3 Shire Eudaselassie town: site visits and interviews

Fig. C.3.1: Shire from Endasilassie Hill

2.3.1 Overview

Shire (terrestrial coordinates N 14°06'15.9"; E 038°17'26.0"), capital town of the Woreda of Tahitay Qoraro, is located in the North of Ethiopia, in the Tigray region. Composed of 5 *kebele* (neighbourhoods), it sits ab 1,000 km from AA, at 1,900 m.asl. The town is quite an important one: it has its own airport (IATA code: SHC), with many daily flights from and to AA, an hospital, 2 public health centres, 6 private clinics, 14 schools, a branch of the Axum University and an industrial area where 9 firms are based of which 2 metalworking firms, 3 flour mills, 1 for minerals working firms ecc.

Shire, designated by the WRB of Tigray, substituted Bati (OP1), the town that had been originally chosen for the current project and that was cancelled when it was inserted in a WB WASH project. The WRB of Tigray's choice of Shire was based on the dramatic situation in which was the local water service due to the demographic soar that occurred from 2007 and on, when the population grew from 47,284 to 67,138 people (2013 Census). In chart C.2.1 the projection is reported of the Shire's population growth. It appears that such growth is now diminishing although at a very slowly pace given the fact that the population is still growing more than the 3.5% annually.

Chart C.3.1: SHIRE, PROJECTED POPULATION						
Year	2011	2014	2020	2024	2030	2034
population	56,327	66,898	82,119	99,800	120,082	143,047

The TWU managed water service is still very deficient due to a scant water supply in the first place. Such supply was limited to 8 deep wells (one of which dried up) that provided 14 l/s flow ranging from 1.200 and 926 m^3/d, although the progressive increase of the drawing up of water has reduced such flow to 650 m^3/d with an average flow of 7.5 l/s. Dispersions and seepages not considered, such flow could provide just half of the daily need of 20 lcd a very low figure compared to the 40 lcd that would be required in case of towns as big as Shire.

In order to take care of such dramatic situation, from May 2015 – also to make for the lack of the contribution – the town was connected to the 5.88 m^3 Maidimu dam, built for agricultural purpose at a distance of 12 km from

Shire, that was to provide 47 l/s but that, due to persistent droughts and consequent conflict in the water use, provided just 25 l/s and not continuously too. Consequently, the water service is provided just by turns to each *kebele*.

In Shire there is no sewage system and toilets were close to inexistent.

The drinkable WS network now (after the project) serves 9,763 households of which 1,005 realized through the project for about 46,000 peoples (each family is composed of ab. 4,8 peoples) that is the 68% of the population. There are now also 19 water points, of which just 12 working that should supply water to the remaining part of the population, 32% or 20,000 people, that is ab. 350 families each WP, a figure too high anyway. That is why many families and businesses have their own private wells. The design of the project was a little bit of careless in its technical choices:

- Lack of a suitable hydro-geological surveys and lack of water tests at the two sites of the new wells that eventually resulted to be unusable. The last activity was carried out by the WRB of Mekelle;
- Lack of protection of the Booster-rising pipe (*water-hammer air vessel*) against the water hammer;
- Lack of a ground dispersion electrode system and of a protection system of the wells and the boosters against the electricity atmospheric shock (lightings);
- Not shareable choice of PVC-U for the very long rising pipe over the more resistant steel or cast iron;
- Limited number of air valves (3) and wash-outs (2) along the 16 km long main pipe;
- Lack of a float valve at the tank inlets that hydraulically prevents overflow losses once the tank is filled up. The water losses determining both energy cost increases for the TWU and service malfunctions.

2.3.2 The water supply and sanitation service management

The Shire TWU manages the WS network while the sanitation is managed by the municipality.

The TWU has 66 staff, 20 women and 46 men, of which 13 just on a fixed-term contract.

In the *Board* there are 9 people that meet once a month. Presided over by the major, the board is also composed of the TWU manager, the town manager, the municipality finance office manager, the municipality technical manager, a spokesperson of the *Woman Affairs Bureau* again pertaining to the municipality, and two representatives of the local community.

The board, essentially a political body, is periodically renewed by the Zone Administration on a performance based monitoring carried out annually. When the field visit took place, it had been recently renewed, as usual on a political basis disregardful of the technical skills acquired by the staff that had been outright fired causing the water service itself malfunctioning. It is advisable to take care of the efficacy issue when intervening on the board composition.

The *on-lending agreement* with its redemption clauses was signed August 2011. Up to now no redemption has been paid by the TWU due to the wells malfunctioning that is causing many troubles to the population. The Board had anyway registered in the balance sheet and scheduled the first payment of ETB 1 m.

The 2014-2015 balance, without any increase of the tariffs, was closed with revenues of ETB 8,3 m, 6 m destined to ordinary expenses, 1 m to the redemption and 1,3 to new investments and maintenance, this last considered a very poor figure compared with the real needs. The tariffs increase subject was many time broached in the meetings with the *Regional Water Bureau*, to no avail.

In chart C.3.2, the comparison is shown between the current tariffs and the tariffs that are to be enforced in a short time where the greatest increase is reserved for those consumers that use more than 20 m^3/m, or 133 lcd for a 5 peoples family, so allowing a decrease of 20% for the consumers that use up to 5 m^3/month, or 33 lcd. Flow meters are monthly read by 7 officers working for 20 days. There are reported to be no delays in the payments for the water service.

Chart C.3.2 - SHIRE WATER TARIFF

	Before prj		After prj		
	m^3	**ETB**	**m^3**	**ETB**	**%**
1	0-10	3.5	0- 5	3	-20
2	11-20	4.1	6-10	5	26
3	21-30	5	11 - 30	10	122
4	> 30	8.7	31-50	15	126
5	-	-	>50	20	

According to the project, the 2 new boreholes would have assured a flow increase of 14 l/s also in the medium run. With such increase, the water supply for the population would have reached the overall flow of 28 l/s along the 14/24 hours of the running of the service, without the contribution of the dam, so assuring a 20 lcd supply for 70,000 people. Alas, the two new boreholes provide not more than 2-3 l/s at their best, causing the covering of the service to plummet to 60% of the population. Furthermore, it must be said that Shire needs much more water than originally envisaged due to the rapid and steady development of businesses, services and industrial activities.

With such scant water supply the TWU provides water only by rotation to the population on a schedule prepared together with the municipality.

Water point management (12), it is carried out by a TWU officer. 5 m^3 cost ETB 5 and 20 l ETB 0,15 ETB. The revenue is shared between the officer and the TWU, 50% each.

Public toilets management, as already said, it is carried out by the Municipality on the basis of an agreement with the TWU. The presence of the major in the TWU board eased the agreement. The public toilet management is actually carried out by a citizens association (Hadinnet Association) of 12 persons (6 women and 6 men). The Municipality pays the TWU the water it draws and the revenue from the service is divided 50/50 between the Hadinnet association and the Municipality. The cost for the toilet service is ETB 1 and for the shower ETB 5. The septic tanks are privately managed by a rent from the Municipality of Axum vacuum truck costing ETB 400 each time.

Project supplies: the TWU was provided with (some supplies were still to be delivered at the date of the visit):

- pick up Toyota (photo 5);
- 1 motorcycle;
- Maintenance hydraulic equipment and supply;
- Pipes and special spare parts (delivery is under way);
- HDPE pipes welder HDPE (delivery is under way).

The TWU complained about the delay of the delivery of the HDPE pipes welder and of the spare parts (special spare parts, fittings)

2.3.3 The project infrastructural interventions

The project was prepared by MS *consulting engineers* and envisaged a final balance of 35,834,608.92 ETB without increases in comparison with the contract. The Works supervision was carried out by Zenas engineering plc and the works were awarded to Raycon Construction and Machinery Rental firm, on behalf of the Tigray Water Regional Bureau. The works were completed 23/04/2014 when a provisional hand over certificate was signed by the TWU. The final certificate should have been signed in 2015 but the TWU has delayed the signing due to the problems that emerged regarding the not working wells.

Such were the project works and supplies:

- n. 2 boreholes equipped with submergible pumps (BHA e BHB);
- 100 KVA power-generator in the BHA store building;
- n. 1 booster station, Store building and guard house at the well field site;
- De 150 mm 16,7 km long U-PVC rising pipe from the booster to the municipal tank;
- n. 1 1.000 m^3 RCC municipal tank provided with chlorination plant;
- De 400-40 mm 19,5 Km long PVC-U and PEAD distribution network, with n. 1,005 new householders' connections and
- n. 3 aqua-pit latrines provided with showers and septic tanks.

Alas, both the project designs and the as-built designs are of poor quality.

The evaluation team, civ. eng. A. de Vito and assistant dr. E. Simba, carried out the field visits and the interviews 10, 11, 12 December 2015.

Schedule of the field visits of the works:

WS network system: it is composed by a well field located in Aditai, 18 Km east from Shire, on the Axun road. In this site, at the foot of a small green valley (photo n. 6), two boreholes were dug reaching the basalt bedrock, equipped with submergible pump sets that feed the booster station. The latter, through a 16 km long rising pipe, feeds the municipal tank from which the town distribution network originates. With the TWU technician mr K. Kebedom, the well field was visited particularly the two wells: BHA, terrestrial coordinates N 14°05'47.7"; E 038°22'10.1" – alt. 1,992 m.asl - 72 m deep, equipped with a s11 kW - Q= 10 l/s submergible pump (Photo n. 7) and BHB, close to the former, 88 m deep, equipped with a 5 kW - Q= 4 l/s submergible pump. The fed by an MT electric line wells' electricity system was out of order due to the fall of some of the support posts and of the burnt out transformer (Photo n. 11).

Both the wells are out of order since August 2015 because of the drying up of the modest aquifer that should have fed them. The BHA pump is also burnt due to having been used when dry. From the provisional certificate, it appears that well water tests were not carried out before the construction.

From each of the two boreholes, two short steel pipes depart that meet the adjoining booster station (N 14°05'48.0"; E 038°22'13.3" – alt. 1,987 m.asl) composed by two Siemens vertical sharp pumps (45 m^3/h/12,5 l/s; H=169 m; 30 kW - Photo 8-9), provided with a 135 kW power-generator diesel Perkins (Photo n. 10).

The booster feeds a rising pipe, PVC-U De 150 mm/PN 16, according to the final design 16 km long, 2 km of it realized with cast iron pipes due to the difficulty to bury it into the superficial basalt platform. Along the pipe route, n. 3 air-valves and n. 2 wash-out manholes are located, that are perhaps too few considering the length of

the pipe. The rising pipe reaches the municipal 1,000 m³ RCC tank located on top of Eudasilassie hill (terrestrial coordinates N 14°06'37.0"; E 038°16'48.7" – alt. 2,001 m.asl -Photo 12) that dominates the city. Close to the tank a guard-house stand. The chlorination plant is located on top of this latter building (Photo n. 13), that has never been used. From it the water distribution network starts, envisaging a main 360 m long De 400 mm PVC-U pipe that feeds into the distribution network that reaches the householders by a PVC-U pipe ranging from 350 to 40 mm, 19,5 km long.

Sanitation interventions: The project envisaged the realization and the activation of three public latrines provided with septic tanks and shower.

The 3 latrines were visited:

- Latrine n. 1 at the Bus Station - N 14°05'52.3"; E 038°16'51.2" – alt. 1,906 m.asl;– Photo n. 14-18.
- Latrine n. 2 at Kebele market 4 - N 14°05'43.1"; E 038°16'44.2" – alt. 1,899 m.asl – Photo n. 19.
- Latrine n. 3 at Kebele market 2 - N 14°06'20.5"; E 038°17'05.4" – alt. 1,918 m.asl – Photo n. 20.

The latrines, divided by gender (W/M) and by service (toilet, shower), are provided with sludge collecting septic tanks. They were in good maintenance conditions and all the three were running being managed by a civic association on behalf of the municipality thanks to an agreement with the TWU. The sludge collection is directly paid by the association that periodically rents a vacuum track from Aksum to move the sludge to the septic tank.

2.3.4 The evaluation interviews

During the Author's stay in Shire 8 interviews were carried out in 4 different Kebele: 7 with newly connected consumers besides the hotel manager. It must be added that, due to some critical issues in the networks, there were an uncounted number of people that chose to dig private wells in their compounds. Among the 7 interviewed people, 3 said they had their own wells before the intervention.

Chart C.3.3: Shire E. interviews: TWU - Commercial & Householders

Sh. n.	*Name*	*Sex*	*Position*	*Place/kebele*	*Coordinates /El. m.asl*	*Ph. Ann. 2*
1	A. Demeke	F	Householder	02 kebele	N 14°06'26.8"; E 038°17'32.8"	n. 22
2	K. Nigussie	F	Householder	02 kebele	N 14°06'26.8"; E 038°17'31.7"	n. 23
3	M. Birhane	M	Householder	01 kebele	N 14°06'20.8"; E 038°16'38.1"	n. 24
4	S. Gebre	F	Householder	01 kebele	N 14°06'23.1'; E 038°16'37.5"	n. 25
5	H. G/silassie	F	Householder	05 kebele	N 14°06'08.7"; E 038°16'43.6"	n. 26
6	A. Adem	F	Householder	05 kebele	Unrecorded	n. -
7	W. Belay	F	Householder	04 kebele	Unrecorded	n. 27
8	F. Lake	M	Africa Hotel	03 Kebele	N 14°06'26.8"; E 038°17'32.8"	n. 28

2.3.5 Project effectiveness assessment

See Annex 3 and Par. B.5.

POJECT INDICATORS:

On the whole the population benefited from the intervention and a certain level of improvement was achieved, compared with the pre-existent very poor situation. The service though must still to be improved being the turns too short – sometimes twice a week only – when not compromised by frequent blackouts.

The interviews showed that:

1. The population's vote on the project was very low due to the fact that just few knew about the project and that the consumers did not perceive the changes in the quantity of water provision. The hotel manager, the only person in town that could directly suffer from the water shortages, gave a 5 vote;
2. 100% of the interviewed people believed the water to be safe and did not suffer from gut diseases;
3. 100% was not using home filters and still are not;
4. 100% said they were paying less or as much as before the project for the water supply. That means that tariffs increases had not been introduced after the project;
5. 100% said that the main issues in town are the water shortages and the black outs;
6. 90% complained about outdoor defecation and lack of public latrines, especially in schools.

To sum all up, of the six indicators four were met while two were not.

Chart C.3.4: TARGET INDICATORS	**Y**	**NO**	**Remarks**
1. Water supply 20 lcd (*)	**X**		Supplied by a reservoir new transmission pipe
2. Minute walk to the WPs < 30"	**X**		The project did not envisage new WPs
3. Safe water for 100% of the population	**X**		No one lamented gut disorders
4. 50% decrease of gut water induced diseases	**X**		
5. Outdoor defecation defecate		**X**	Not enough latrines
6. Decrease of the supply costs by 4%	**-**	**-**	New tariffs not yet adopted
TOTAL	**4**	**2**	**66% of result**

(*) Very insufficient domestic demand for a town as big as Shire.

EXPECTED RESULTS:

Result 1: *Sizing, functionality and sustainability of the WSS suitable to the population served*

In reference to the pipes, the water plant was suitably sized in order to assure the water distribution also in the long run. The program, of which this project was a part, was subdivided into two steps, one centred on the short run and the second on the long one, the former regarding the implementation of the present project. The water supply system, as noted during the visits, was less accurately designed with the consequence that the two wells were totally dried up nullifying in one shot 50% of the present intervention. The water distribution network, with the already pointed out limitations, is working anyway thanks to the project tank that is fed, since 2015, by the adjoining dam. HDPE (polyethylene) was rightly chosen for the distribution pipes less effective was the choice of PVC-U over stronger materials for the very long rising pipe.

Result 2: *Strengthening of the public sanitation infrastructures built and managed*:

The three latrines and showers, rightly connected to the WS network, were working and correctly managed. These were realized in three busy strategic places such as the markets and the bus station. Outdoor defecation was still very popular with the population that complained about the lack of public latrines.

Result 3: *Bettering of the management capacity of the TWU in reference to planning, management, maintenance, technical assistance and financial expertise*

The technical skills of the TWU staff are of a good level. The partly computerized administration is no doubt capable of improvement. The IT supply were still under way. The lack of involvement of the TWU in the project writing phase, may have prevented the TWU from signing the final handover certificate. The TWU had also problems in the redemption of the debt and in increasing the water tariffs.

More in detail, in reference to the 9 results indicators (Par. B.5), the situation seems to be critical with just 5 positive indicators and 3 negative, while about the last one, 9th - although the TWU showed to be up to their role - no evaluation could be done due to the lack both of the debt redemption and of the tariffs increase.

Chart C.3.5: RESULTS INDICATORS	YES	NO	Remarks
1. 60% of the population provided with 15 lcd	**X**		Unsuitable domestic demand target (min. 40 l/s)
2. Billing		**X**	Paper billing. The staff is looking forward to getting the IT supply
3. Not paying consumers < National average	**X**		Tariffs not yet updated
4. Service interruptions < National average		**X**	Rotations and elect. black-outs
5. 100% of schools with toilets and other services		**X**	No intervention in the schools
6. Working public latrines	**X**		Agreement with the Municipality
7. Sludge collection service	**X**		Private service from Axum
8. Municipal monitoring of the service	**X**		
9. TWU up to the task and redemption	**-**	**-**	Tariffs not updated and 1st instalment not paid
TOTAL	**5**	**4**	**55% of result**

B.2. 4 – Limu Gennet town: site visits and interviews

Fig. C.4.1: Limu Gennet centre

2.4.1 Overview

Limu Geneet town (terrestrial coordinates N 08°04'34.0"; E 036°57'25.0"), in Oromia, Jimma and Limu Kossa Woreda zone, sits North from Jimma along the NW reach of the n. 5 road, precisely where, after 12 km, a crossroad stands from where the N dirt road to Limu G. departs. Such dirt road runs for about 65 km, crossing an hilly verdant area, that slightly before LG passes through the regional Kebenna forest protected area where the Kebenna wild coffee grows under the Abyssinian acacia tree.

The town is at an altitude of 1,765 m.asl. The favourable climate conditions make agricolture the most profitable activity in the zone while in Limu trade is very popular among the 22,650 population (2014).

The first WS network was realized in 1978 and many time upgraded until 2002. Such water plant was fed by a built in 1973 well in Kebire, at LG's SW corner, by the Shibiru spring, with a supply of 3-5 l/s, enough to ensure the water supply to not more than 5,000 peoples, through a 7 km long galvanized iron (GS) pipe distribution, servicing ab. 729 consumers (16%): 624 private consumers, 64 commercial outfits, 33 public institutions, 8 institutions and 16 WPs, 2 of which closed. Part of the population drew water from a close by river, the Degge Deggee River. The river's water though were drunk without being boiled or filtered causing people to suffer from gut and parasitic diseases, the third most common cause for hospital admission. In LG the sewerage system is very poor.

Both the sources being in poor conditions, in 2006-2008 n. 2 wells were built that did not increase the water supply due both to the too high iron concentration and to geo-hydraulic issues.

After the project the water supply has improved for the population. Thanks to the increase of the water supply provided by the two new wells, 769 new consumers connected to the WS network making it possible to reach a total of 1,498 families or 7,500 people (1,498 x 4.8 the average composition of each family) that is the 33% of the resident population. Within the project also 11 WPs have been realized.

Alas, in LG electricity blackouts during up to 3-5 hours a day are frequent jeopardizing the wells' functioning and consequently the water supply. The TWU therefore purchased two engine-generators for the two wells. The two pumps work alternatively for 7-8 hours a day in order both to allow the engines to refrigerate and to recharge

(source: TWU). The project has assured a supply of ab. 12.3 l/s, less than the 13.7 l/s originally envisaged, that, during the working hours, funnels up to 300 m^3 into the header tank. Such further supply assured 20 l/people d to about 15,000 peoples, or the 66.25% of the resident population, that must walk as far as the WPs.

Houses generally are small one storied concrete or other materials buildings used by single families together with their adjoining small plots. The water reaches the homesteads through a single meter and gate valve provided connection point. Frequently house tanks are present to be used in case of water shortages. Homesteads are provided with pit latrines. Outdoor defecation was very popular with the population.

Thanks to the project two public toilets provided with showers were built, one close to the market area (photo n. 13-15) and the other to the bus station (photo n.17). The survey carried out during the project showed that 36% of the houses had sewerage connected latrines while 60% used pit latrines without septic tanks that were simply moved elsewhere once filled up.

2.4.2 The management of water supply and sanitation service

The TWU in Limu Gennet manages the drinkable WS network, WPs and public toilets included.

The TWU has n. 27 staff:

- 1 manager;
- 1 secretary;
- 3 finance and cash officers;
- 3 plumbers;
- 3 billing officers;
- 16 O&M officers and support staff.

There are 7 members in the Board that meet once every 3 months. It is chaired by the *Zonal Water Bureau* engineer that is also member of the regional outfit. Then there are: a manager (employee); a spokesman of the *Education Bureau* of the Woreda; a spokesman of the *Financial Bureau* of the Woreda; a spokesman of the *Health bureau* of the Woreda; a spokesman of the administration of the Woreda and n. 2 spokespersons of the community.

The board is periodically renewed by the Zonal Administration on a performance based evaluation carried out annually. The TWU manager of LG is the only long standing manager that we met during the field visits, which eased the implementation of the project. Even in LG the board is a politically dominated outfit although it is here more strongly rooted in the territory.

The manager looked forward to the introduction of IT in order to reduce time and costs.

Flow meters are monthly recorded by 4 women, in a 7 day work.

The balance 2014-2015 registers a revenue from water tariff of ab. ETB 1 m of which ab. 150,000 ETB were disbursed for the energy powering the water systems (electricity and fuel for the electric generators, the cost of fuel was bigger than that of electricity due to blackouts). No redemption from the TWU was made. The tariff increase still waits to be approved by the board that is to meet in January 2016 (chart C.4.1). Chart C.4.1 shows an increase especially in the lower segment of the population that anyway is less pronounced than those occurred in other project sites. Payments by consumers are regular.

The WPs and the sanitation services are managed by the TWU. Each employee checks two WPs, just in the morning (it appears there is no need for more time). 20-25 litres cost 0.3 ETB.

The public latrines are managed by the TWU staff. At the market latrine, a shower costs 3 ETB and toilets are free. At the bus station the latrines, now out of order, are externally managed and rented for 150 ETB.

Chart C.4.1 – LIMU GENNET WATER TARIFF					
	Before prj		After prj		
	m³	ETB	m³	ETB	%
1	0 - 3	3	0 - 5	5.5	83-42
2	4 - 7	6	6 - 10	6.75	12.5
3	8 - 10	6.5	11 - 30	8.10	32
4	11 - 13	6.75	>30	9.4	39
5	>14	7			

Supplies for the TWU (delivery partly underway):

- 1 pickup Toyota (photo 21);
- One motorcycle;
- A set of tools for hydraulic interventions;
- Pipes and special spare parts (to be delivered);
- HDPE pipes welder (to be delivered).

On the maintenance side, the adoption of HDPE does not represent a problem because there are shops in Jimma where spare parts, pipes, joints, special parts can be bought. Bigger supply can be dispatched from AA. The TWU manager was very satisfied with the performance of HDPE. Since 2014, when the network started working, there have been no damages to the pipes. The Water Zone can provide a well maintenance service

2.4.3 The project infrastructural interventions

The project was prepared by DH Consult; the contract with the WRDF was signed 31/05/2011. The project was subdivided into two 20 years long stages the last one reaching 2033: the first step that should end 2023, and the second one to 2033 that envisages the construction of a new well, a new 300 m³ tank and the completion of the distribution network.

The budget for the first step was 22,771,677.26 ETB. The works were granted to the AKA *Construction* plc, that awarded the tender bidding with a 13% discount, or 19,801,458.49 ETB. The contract with the Oromia *Water Regional Bureau* was signed 27/07/2012. The works direction was carried out by the designer himself. Works were completed 28/02/2014, with a delay of 7 months. When the completion was reached a provisional handover certificate was issued by the TWU that filed some claims about the works and obtained some additional works to be done not later than April 2016, when the final works handover should have occurred.

The project envisaged the following works and supplies:

- TWU office building, mechanical workshop and store;
- n. 2 wells equipped with submergible pumps (BH1 and BH2);
- Guard-house and engine-generator in building BH2;
- 988 m long DN 100 steel pipes and 2,752 m long De 150 HDPE rising pipe connected to the tank;
- n. 1 municipal 300 m³ RCC tank provided with chlorination plant;
- 1,893 m long HDPE De 200 transmission pipe linking the old and the new tank;
- 17,300 m long HDPE De 160-50 distribution network;
- N. 11 WPs;
- n. 2 latrines *Aqua privy* provided with running water, showers and septic tanks;
- sludge drying bed.

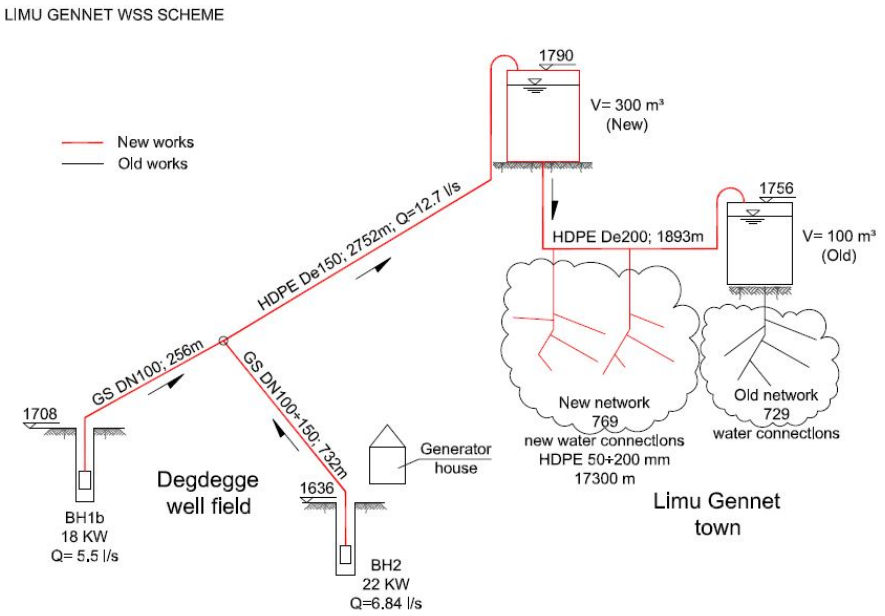


Fig. 4.2: Water supply scheme in Limu Gennet town

The final design was accurate and the hydraulic sizing of the WS network was suitable. Similarly, also the sizing and the technical choices (the choice of HDPE pipes was a good one considering that they can be purchased in Jimma, just 70 km from LG).

In order to improve the durability it is advisable to:

- Include air vessels on the rising pipe and in the pumping station, in order to protect the pipes from water hammer overpressures caused by the frequent black outs;
- Provide the inlet pipe tank with a float valve due to arrest the flow once the tank is filled up;
- Provide a Faraday cage and ground dispersion electrode in order to protect the electro-mechanical equipments (pumps, engine-generator, and transformers etc.) against the atmospheric shocks (lightings).

The evaluation team, civ. eng. A. de Vito and his assistant Mr. E. Simba carried out field visits and interviews 14, 15, 16 December 2015. The field visits were thus scheduled.

TWU office: (N 08°04'34,1"; E 036°57'25.1" – 1,765 m.asl – Photo n. 2) it is located along the central access road on the right at the beginning of the built-up area. The Office is composed by three building blocks: i) offices and services ab 175 m² of covered spaces; ii) a 68 m² workshop and iii) a big 160 m² store room. Realized according to the design, they all are in good conditions with particularly good finishing touches. The toilets, inside the offices, divided by gender are connected to the WS network and to the sewerage system and are running (photo 3-4).

WS network system: It envisaged two deep boreholes in Degdegge site that directly feed the header tank from where the distribution networks originates that comprises two pressure belts , disconnected from the 100 m³ break pressure tank serving the lower part of the town.

With the TWU Manager, a survey was carried out at the well field, where two boreholes were dug:

- BH1b (terrestrial coordinates N 08°05'09.3"; E 036°58'31.1" – 1,708 m.asl) equipped with a 18 kW - Q= 6.7 l/s submergible pump (Photo n. 5). This well was realized by the OWRB, and substitutes a previously dug well BH1 that went burst in 2014 due to a lighting shock (Photo n. 6). The well was running providing 5.5 l/s, less than the design flow.

- BH2 (terrestrial coordinates N 08°05'29.3"; E 036°58'29.4" – 1,636 m.asl) equipped with a submergible 22 kW - Q= 7 l/s pump (Photo n. 7). The well was running and providing 6.84 l/s (photo 8).

In the store building an power generator was warehoused (Photo 9). From the two wells two DN 100 galvanized steel pipes, respectively 256 m and 732 m long, originate that further on join together and continue in one single conduit reaching the final municipal 300 m^3 circular tank, located 4 m above ground (coord. N 08°04'12.9"; E 036°57'26.5" – alt. 1,636 m.asl - Photo 10). From the tank the distribution network starts, consisting of a De 200 mm HDPE 2,752 m long pipe that, along its route, feeds the off-takes of the higher pressure belt, before ending into the old 100 m^3 tank, part of the pre-existent WS network (coord. N 08°05'02.52"; E 036°57'20.21" – alt. 1,756 m.asl) that disconnects the lower network..

The town's WPs: the network feeds n. 11 new WPs (water points, *bono* in amaric) each of them carrying n. 5 taps. According to the project, they were to supply 800 people (averagely 160 families each).
3 of the WPs were surveyed during the field visit as a sample:

- WP n. 1: (terrestrial coordinates N 08°04'21.7"; E 036°57'22.3" – alt. 1,767 m.asl – Photo n. 18;
- WP n. 2: (terrestrial coordinates N 08°04'49.9"; E 036°57'16.3" – alt. 1,752 m.asl – Photo n. 19;
- WP n. 3: (terrestrial coordinates N 08°04'53.7"; E 036°57'20.6" – alt. 1,765 m.asl – Photo n. 20.

According to the TWU, water from the WPs is not much on demand by the population that is why the WPs do not work continuously.

Health care and sanitation works: the project envisaged the realization of 2 running water public toilets provided with sludge collection septic tanks and drying beds, one of which also provided with shower.
The 3 latrines visited were:

- Latrine n. 1, at the market place: provided with showers (terrestrial coordinates N 08°05'20.8"; E 036°57'23.8" – alt. 1,693 m.asl – Photo n. 13-15.
- Latrine n. 2, at the bus station (terrestrial coordinates N 08°05'17.8"; E 036°57'00.2" – alt. 1,693 m.asl – Photo n. 16-17.

Latrine n. 1 (Photo n. 13-15), provided with many washstands, was connected to the sewerage system and was running. It was clean and in a in a good state. Showers were located inside and adjoining building.
Latrine n. 2 was out of order due to unknown reasons. The municipality did not issue the permit for its location in the bus station's place. Consequently the latrine was built in an out of hand and not easily reachable place.
No intervention was envisaged in the first place in the schools/other public institutions.
The sanitation issue has been therefore only partially solved: outdoor defecation still remains highly popular, as the interviews confirmed.
Sludge drying tanks: they are located at the furthest northern end of the town in an open field far from the built-up area (terrestrial coordinates N 08°05'44.5"; E 036°55'53.6" – alt. 1,628 m.asl – Photo n. 11). The beds were not being used because of the lack of a sludge collection service.

2.4.4 The evaluation interviews

In Limu Gennet 13 interviews were carried out: n. 3 with public institutions and n. 10 with private newly connected consumers. In annex 2 photos can be found and in annex 3 the forms and results of the inteviews.

Chart C.4.2: Limu Gennet interviews: TWU - Clinic- School – Commercial – Householders						
Sh. N.	Name	W/M	Role	Place/address	Coordinates /Alt. m.asl	Phot.
1	M. Dessalesn	M	Director	Elementary sch.	N 08°06'00.3"; E 036°57'04.9"	26
2	L. Dusasse	M	Director	High school	N 08°05'50.2"; E 036°57'01.7"	29
3	A. Adawa	M	CEO	Hospital	N 08°05'44.7"; E 036°56'55.4"	24
1	N. Mohammed	W	Householder	Kebele 02	N 08°04'29.2"; E 036°57'22.6"	30
2	R. Dawud	M	Householder	Kebele 02	N 08°04'30.0"; E 036°57'23.1"	31
3	B.Tarresse	W	Householder	Kebele 02	N 08°04'51.6"; E 036°57'20.6"	32
4	H. Shitarze	W	Householder	Kebele 02	N 08°04'55.2"; E 036°57'20.1"	33
5	T. Ahmed	W	Householder	Kebele 02	N 08°04'57.8"; E 036°57'19.9"	34
6	M. Teman	W	Householder	Kebele 01	N 08°05'52.5"; E 036°57'07.0"	35
7	K. Mohammeh	W	Householder	Kebele 01	N 08°05'54.3"; E 036°57'08.0"	36
8	H. Hassen	W	Householder	Kebele 01	N 08°05'54.6"; E 036°57'08.3"	37
9	K. Idosse	M	Householder	Kebele 01	N 08°06'08.9"; E 036°57'21.9"	38
10	N. K. Abasaw	M	Householder	Kebele 01	N 08°06'10.2"; E 036°57'23.7"	39

These were the answers in relation to the targets and the expected results (par. B.5).

TARGET INDICATORS

On the whole the population benefited from the intervention that greatly improved the water supply and sanitation services. The hospital administration confirmed that patients suffering from gut diseases have diminished. Still, the electricity black outs cause frequent interruptions of the service.

In reference to the indicators, the interviews revealed that:

1. The average vote for the project was very high 9,3/10;
2. Gut diseases, also caused by parasites, were at the third place among the causes for hospitalization. After the project gut diseases plummeted to after the 10th place;
3. 100% of the interviewed consumers, that before the project lamented monthly gut disorder, rated safe the newly supplied water. Before the project it was the 30% only;
4. 90% of the interviewed consumers do not use water filters. Before the project water filters were used only by 20% of the population;
5. The water tariffs have decreased for 70% of the consumers and have increased just for 20%. It must be remembered though that up to the time of the field visits there had been no intervention on the water tariffs;
6. 100% of the interviewed consumers (i.c.) do not lament insufficient water supply; 90% do not complain about the frequent black outs; just one consumer still made use of his own tank;
7. 60% of the i.c. complain about the lack of public latrines particularly (80%) at the bus station. 100% complain about outdoor defecation.

To sum up, 5 of the project indicators were met while 1 was not.

Chart 4.3: TARGETS INDICATORS	YES	NO	Remarks
1.Water domand: 20 l p/d	**X**		Electricity black outs
2.Minute walk to the WPs < 30"	**X**		The WS network services most of the population
3.Safe water for 100% of the population	**X**		
4.50% decrease of gut water induced diseases	**X**		Remarkable gut diseases decrease
5.Outdoor defecation		**X**	Not enough latrines
6.Decrease of the supply costs by 4%	**X**		Tariffs not updated
TOTAL	**5**	**1**	**84% of result**

EXPECTED RESULTS

Result 1: *Sizing, functionality and sustainability of the WSS suitable for the serviced population*

In reference to the pipe networks the plant was correctly dimensioned also for a medium-long run. The project was well prepared and the two stages correctly scheduled. The sustainability of the plant takes advantage from the fact that the HDPE special parts and joints can be found in the close to GL town of Jimma where also the electro-mechanic equipment maintenance service is based (ZWB). In order to prevent damages to the wells/tank system, ground dispersion electrode should be put in place shielding it from the atmospheric shocks together with air vessels against the water hammer due to the frequent black outs.

Result 2: *Strengthening of the public sanitation infrastructures built and managed*:

The two latrines have been realized and are running. The 60% of the interviewed peoples however complain about the lack of more latrines, especially in the schools. The sludge collection service was not envisaged in the first place. In the homesteads there are dry pit latrines that, when filled up, are moved elsewhere in the compounds. Outdoor defecation is still very popular. It would have been better to build less WPs and more latrines first of all in schools.

Risultato 3: *Bettering of the management capacity of the TWU in reference to planning, management, maintenance, technical assistance and financial expertise.*

The skills and expertise of the management staff and of the technical staff are quality staffs. The TWU is efficient and very motivated in their effort of bettering the service. There is much interest in the adoption of the IT system. The closeness of Jimma is a plus.

In reference to the 9 result indicators (Par. B.5), there are 6 positive and 2 negative ones. About the 9th result nothing can be said because tariffs were not upgraded and the 1st instalment of the on-lending agreement had not been paid but the manager has confirmed both are expected to be done within the first months of 2016, upon the handover of the contract works and supplies.

Chart C.4.4: RESULT INDICATORS	**YES**	**NO**	**Remarks**
1. 60% of the population provided with 15 lcd	**X**		
2. Billing working		**X**	The staff is still waiting for the IT system.
3. Not paying consumers	**X**		
4. Service interruptions	**X**		Frequent electricity blackouts
5. 100% of schools with toilets		**X**	No interventions in schools
6. 6. Working public latrines	**X**		Managed by the TWU
7. Sludge collection service	**X**		Not working
8. Municipal monitoring of the service	**X**		
9. TWU up to the task and redemption	**-**	**-**	Tariffs not updated-1st instalment not paid
Tot.	**6**	**2**	**66% of result**

SECTION "D"

PROJECT ANALYSIS

The evaluation of the project was done according to the 5 OECD/DAC criteria (relevancy, efficiency, efficacy, impact and sustainability) and is completed with the analysis of its realization.
The analysis is based on the information retrieved from the project desk analysis, from the site visits and from the interviews (questionnaires can be found in Annex 3).

D.1 RELEVANCE

The project agrees with the federal water policies, with the economy development lines and with the MDGs, particularly with the priorities of the water sector of the PASDEP established by the MoFED. It also agrees with the frame work of the WIF in terms of decentralization directly involving the local TWUs under the direction of the WRDF. The involvement of the TWUs actually was a plus of the project although some functions were carried out by the Regional Bureaus due to the technical and administrative difficulties of the TWUs themselves that need to be upgraded and strengthened, particularly their technical staff. The objectives, the indicators and the expected results of the project (par. B.5) agreed with the targets of the OWNP that aimed at a 98.5% fresh running water covering and a 84% sanitation covering. More in detail it must be pointed out that just 5 of the 6 target indicators have been met (1, 2, 3, 4, 6), some of them poorly, while n. 5 was not met in any of the visited towns, as shown in Chart D.1.

Chart. D.1: INDICATORS OF THE OBJECTIVES	Hu	Du	Sh	Li
1. 20 lcd water demand	YES	NO	YES	YES
2. Fetching water time < 30"	YES	YES	YES	YES
3. 100% supplied with safe fresh water	YES	YES	YES	YES
4. 50%Water diseases reduction	YES	YES	YES	YES
5. Open defecation free in the town	NO	NO	NO	NO
6. Water costs 4%.	NO	YES	NO	YES
Tot. (Positive/YES)	**4**	**4**	**4**	**5**

The 3 expected results (see B.5) have been met although the related to the sanitation structures n. 2, shows some criticalities particularly in Huruta and Durame where the new latrines are not working yet. More in detail the meeting of the 9 result indicators, perhaps a little bit of overtly ambitious at their start, show some problems as shown in Chart D.2.

Chart D.2: INDICATORS OF THE EXPECTED RESULTS	Hu	Du	Sh	Li
1. 60% of population supplied with 15 lcd	YES	YES	YES	YES
2. *Billing* on service	NO	NO	NO	NO
3. Unaccounted users < nat. average	YES	YES	YES	YES
4. Water service interruption < nat. average	YES	NO	NO	YES
5. 100% of schools with improved latrines	NO	NO	NO	NO
6. Public latrines on service	NO	YES	YES	YES
7. Sludge removal on service	NO	NO	YES	YES
8. Service Monitoring	YES	YES	YES	YES
9. TWU well organized and credit reimbursement	NO	NO	NO	-
Tot. Positive/YES	**4**	**4**	**5**	**6**

Only 3 of them, n. 1 (minimum water demand), n. 3 (unaccounted users) and n. 8 (service monitoring) can be deemed fully met; n. 2 (billing), 4 (black outs and rotation), 6 (working sanitation structures) have been just partly met while there is scarce evidence of n. 5 (schools sanitation) and n. 7 (sludge removal). Finally it is perhaps too early to evaluate the situation of n. 9 (TWU capacity and debit redemption) because the redemption by the TWUs has not started yet although some of them, Shire and Limu particularly, would be already up to this obligation.

The present situation does not diminish the relevance of the project that agrees with the federal targets but shows the difficulties of a transformation process in the water sector that needs to be speeded up anyway due to the time delays of the project implementation. Needless to remember the project duration doubled in comparison to the 3 years scheduled duration and several time extensions were approved. It should be noticed that the complex process of the project cycle has suffered a start when the "engine" wasn't properly ready under both technical and administrative aspects (lacking the finalization of the preliminary activities: Feasibility studies and Water Tests; as well as Client pinpointing, tender procedures and supplies custom formalities to be defined, etc.).

In spite of everything, the project, fully completed, could be considered as a *pilot* project in the on-going decentralization process. Due to this, the project has the merit to highlight all the necessary improvements for the WASH project cycle implementation in order to speed-up the timing achieving the goals of the GTP 2015-20, even considering the Recommendations of the present Report (Section E).

What's missing in the project formulation and in the project framework is the gender issue, particularly in this kind of interventions which see the women closely involved in the family water supply and management and very sensitive on improving sanitation facilities in the schools, markets and working places as well.

Indeed, despite the Ethiopian Federation has modern laws and proclamations in this field, establishing the minimum age of 18 for wedding, the equal parental duties and the inheritance sharing between the sons; the 2013 *Social Institutions & Gender index* of the OECD *Development Centre*, shows a 67 percentage of married women at 18'teen with 44% of them below this age (2011) [3]. These percentages mirror a *traditional* matriarchal society but with the women involved in minor roles inside the family when important decisions should be taken. This situation is more marked in the rural areas and in the southern and central region of Ethiopia. The International Community is acting to give more space to the women and for their employments. A recent Report of the ONU General Secretary (03/06/2016) states the way is still long to achieve the MDG n. 5 "Achieve gender equality and empower all women and girls" [4]. That's why more attention on the gender issues must be kept in consideration in the future WASH projects.

Furthermore the sanitation sector, but in Shire, is a particularly delicate one although changes from the past habits are already visible and looked after by the population. Indicator n. 5 is very critical: its target pointing to a diffusion of the sanitation and health care related services in 100% of schools, also in line with the Ministry of Education standards, has been totally missed.

The exam of the *Project implementation document* (PID), worked out by the UTL experts in collaboration with the WRDF, shows that a thorough analysis was made in each of its part although it could appear that the expected results have been maybe too ambitious both in reference to the budget and the pre-existent situation of the sanitation in rural Ethiopia.

[3] http://www.genderindex.org/sites/default/files/datasheets/ET.pdf
[4] http://www.un.org/ga/search/view_doc.asp?symbol=E/2016/75&Lang=E

One phase to be bettered of the *project cycle* is that of the designing that, as more in detail discussed in Section "E", could envisage a sort of technical and administrative validation of the final/detailed design before the construction tender phase involving the TWUs, as final beneficiaries and client too. This way delays risks could be minimized due to onerous variations and lack of project details that were quite recurrent during the project as the field visits and the SARs its elves have revealed.

The final evaluation for the relevancy ranks as *fair* [5] (see Chart D.4).

D.2 EFFICENCY

Pretty efficient has been the project in the initial phases of formulation and defining the project implementation agreements even because well compliant with the Ethiopian Water Policies. The one year timing of this preliminary phase, up to the signing of the Intergovernmental Agreement, fit properly.

The project was efficient in its aim of carrying out in all of the 5 selected sites the works realization process, although with the registered in the SARs criticalities that have heavily delayed the project. For sure, the project, started 5/10/2010, with a duration of 36 months, according to the *Project Implementation Schedule*, with completion date set on 05/12/2012, has been completed, in its works part, only in 2014. Although at that time all of the WASH systems were at least partially running, the administrative part, when the field visits were done, was not completed because some of the supplies had not reached the TWUs in the first place: the HDPE welders, the IT billing. The signing of the *Final Hand Over* of the works by the TWUs was postponed due to the lack of some works that should have been done by the contractors. The project ended 5/12/2015, with a 3 years delay and a 2 years operational delay. About such big delays, it could be said the project has assumed the role of a sort of *pilot* project in the on-going decentralization process in the WASH sector due to the ambitious water policies of GoE. Furthermore it started when the "machine" didn't seem properly ready due to the recent establishment of the WRDF as Executive Agency. Other issues are the fragmentation of the project in more areas and the physiological delays embedded in such processes that involve public tenders.

The *project cycle* envisaged the completion of the *Feasibility Studies* and the flow tests at some boreholes' sites, passing to the designing of the works with the necessary tenders for the selection of the consultants and the supervisors together with the technical assistance to the TWUs, the construction of the works, after the tender, and the supply of materials and equipment to be delivered from AA. Last but not least a financial and outlays audit. As the SARs bear, custom procedures and selection of the engineering services providers have delayed the project together with variations due to poor design in the first place, and also to not collaborative or absent works supervision and unsuitable financially weak contractors. In reference to the timing, a delay of 8 months in the selection phase of the consultants for the design went way too far while the works underwent delays of 4 to 15 months, excesses that, their causes being known, should be avoided in the future projects keeping into account the lesson learnt and the recommendations listed in the Section "E" of this Report.

Although a project whose completion is delayed by 100% of the contract duration couldn't be easily defined as *efficient*, the above assumptions enable the adoption of a more prudent evaluation of this criterion, otherwise to be considered as negative. Needless to say the deployments of the numerous UTL experts would have contributed to a more flexible implementation by tackling the causes of delay in their early stages.

[5] Score list: *Excellent, Fair, Sufficient, Insufficient and Scarce*

In conclusion, the contract timing of three years to fully complete the tasks for such kind of WASH project is adequate and to be confirmed even if some improvements should be studied according with the Recommendations listed in Section "E" of this Report. Taking also into account the debate of the Workshop presentation of the Draft Report held on 05/07/16 at DGCS premises, the final evaluation for the efficiency ranks as *sufficient* (see Chart D.4).

D.3 EFFECTIVENESS

Referring to the summary table of Chart D.3, the intervention was effective and incisive in its effort to follow the addresses of the national policies in the WASH sector; fairly effective (70/100) to achieve the project objectives but insufficient in reaching the expected results, with different scores varying from Limu G. with the highest score and Huruta and Durame sharing the lowest ones.

Chart D.3: Indicators of Objectives and of the expected results - Score percentage

Town	Objectives	Results	Average
Huruta	66/100	44/100	55/100
Durame	66/100	44/100	55/100
Shire	66/100	55/100	60/100
Limu G.	84/100	66/100	75/100
overall	**70/100**	**50/100**	**60/100**

A greater effectiveness should be also looked after in future projects supporting the ongoing decentralization process in Ethiopia by the involvement of the TWU also in the preliminary phases. With such an aim in mind, a revision of the composition of the Boards of the TWUs would be advisable supporting merging forms among the towns so to strengthen the underlying financial structure itself that would better sustain the upgrade of the service as a whole, technical and administrative management included. A greater participation of the consumers in the boards – presently there are just 2 consumers in a total of 9 members – should also be encouraged through the creation of free associations of water users with the role of bringing the voice of consumers inside the boards, much looked after by the population as 100% of the interviewed declared (Annex 3).

The women' participation to the TWU Boards should be encouraged according to the MDGs on equal opportunities, because they are quite fully excluded nowadays. In such way the greater interest of women on the improvement of the WASH facilities and health conditions at home and at work will be leveraged.

In some TWUs the presence was noted of too many municipalities' representatives that, on the one hand, ease the decision process of the TWUs but, on the other, can limit the freedom of the outfit itself and its managing orientation.

The efficacy must also be strengthened by the speeding up of the *Project Cycle*. This is feasible because the works are similar and the kind of interventions is repetitive allowing a homogenization/standardization approach for the services tenders, the works and the supply. Filled in advance, or partly so, tender documents could be used by the TWUs provided with standard ToRs for the design services, works supervisions, audits and technical specifications for works and supplies. The WRDF could be the most suitable technical tool to start such *homogenization* of the WASH implementation process. All of the donors should join and set up a panel of experts with the aim of supporting the WRDP in such process.

In conclusion, the evaluation of the effectiveness criterion, as shown in Chart D.4, is variable at the different sites, summarized as follows: Huruta: *Insufficient*; Durame: *Insufficient*; Shire: *Sufficient*; Limu: *Fair*.
The overall effectiveness score is *Sufficient*.

D.4 IMPACT

The impact of the WASH project in Ethiopia has been by all means a big one influencing many aspects of the life of the population: healthcare, economy, quality of life etc. Such deep impact emerged during the field visits and the interviews when the importance was perceived by the Team of the presence of just a simple running water tap in a compound that greatly changed the life of the families and particularly of the women that are generally in charge for the collection of water. The warm appreciation of the project by the population has been unanimous and the need for the water service provision always stressed out (but in Shire because of the drying of two wells and of the dimension of the town).
The increase of the water tariffs, linked to the financial pledge, has been particularly felt in small rural towns (Huruta e Limu).
The increases suffered from the poorest consumers – 3 m^3/month – reached the 150% in Huruta, the 100% in Durame and the 83% in Limu – only in Shire a decrease of 20% has been registered. As was also reported in the based on a WB survey *Guidelines for TWUs Tariff Setting* issued by MoWE in 2013, tariffs increases, particularly when they reach the 100% or more, are evidently unsustainable, particularly for the poorest sectors of the population. The *Guidelines* suggested to protect the poorest consumers by introducing social tariffs based on family incomes and to hit instead more endowed consumers.
According to the federal water policies, the minimum consumption level of 3 m^3/month, 20 lcd, destined to standard 5 people families, should be assured to each household, regardless of their income. The WB survey capped to 5% of the family income the maximum outlay for the water service provision to be affordable for the consumer.
Another aspect that impacts on the quality of life of the population is the location of the fountains/WPs. Such location must be carefully studied in the design phase – and not during the works as has happened in Huruta. Barycentric locations, at no more than 1-2 km distance or 30 minutes walk inside the whole serviced area, should be chosen, also preferably located uphill in order to ease the downward trip of the full "*jerrycancan*" carriers, usually women and children. Such trip would be made still easier by the provision of trolleys.
The project sanitation impact discloses some constrains: in two visited sites (Huruta and Durame) the public latrines were still out of order totally and only in Shire properly managed. The TWU managers of Huruta and Durame have stated the agreement with the two Municipalities is undergoing and quite ready to be signed. Nothing was done at the school sites and Universities despite the expected result n. 5.
Generally speaking, such works pose no threat to the environment. Water losses and waste of fuels should be carefully avoided and in the future renewable energies or energy retrieving based systems could be adopted in the break pressure tanks distribution works.
Moreover, about sanitation, to reduce the risk of pollution of the shallow water tables by the infiltration of the organic sludge from the domestic latrines, some stimulus must be studied because pretty more cheaper for the householders is to dig a new latrine when the old one is full, instead of paying unaffordable collecting service

(since the toilets remain in the open compound). In any case the project latrines have been always provided with sludge tanks.

A negative impact could be related to the doubled timing duration of the project already discussed in the Efficiency criterion (D.2).

The final evaluation on the project impact is estimated with no choice but forgetting about the result n. 5 (sanitation in the schools) and trusting in the Huruta and Durame latrines getting in service rapidly. With these assumptions the overall score is "Fair" (see Ch. D.4), mainly for the WS systems, even if with the borehole failure at Shire and partially functioning at Durame.

D.5 SUSTAINABILITY

The project sustainability is based on two conditions i) the financial and economic sustainability of the project; and ii) the technical sustainability of the design choices.

D.5.1: Financial and economic sustainability

It is based on the possibility of implementing the same project, or close to, in other towns tank to the rotating funding fed by the redemption by the TWUs of the soft loan obtained by the WRDF for the construction of the WS network and of the sanitation works.

The loan redemption is carried out according to the "*on-lending agreement*" signed between the TWUs and the WRDF, and it is fed by the tariffs collection from the consumers. As already noted, the tariffs have undergone dramatic increases in order to sustain the financial pledge of the TWUs. Such increase have been criticized by the consumers especially by those that were already connected, at a lower price, and by those that had not been informed in advance. Furthermore, there still lingers a misunderstanding among the local authorities regarding the loan that some of them consider a free grant. The TWUs that bear the redemption pledge should be more involved in the project choices that inevitably fall upon the consumers, and even more so upon those that live in smaller towns, making it necessary to inform them before and during the implementation.

The by the WRDF and the TWUs signed *on-leanding agreement*, together with the decentralization policy adopted in the project, represent by all means an excellent combination that makes the final beneficiary aware of the most suitable choices in order to meet the community's necessities. This approach should be sustained involving the TWUs also in the design and works supervision phases.

The economic sustainability could be improved with the Capacity building, including in it the education of TWU plumbers, that missing totally in the visited towns, in order to "sell" plumber 'services to the costumers, in particularly in the bigger towns where householders and commercial activities are suffering this lack, as it was confirmed at Durame main Hotel still without running water in the rooms but buckets.

In all of the surveyed sites, the difficulty of the TWUs in the loan redemption has surfaced. Such financial shortage brought to dramatic tariffs increases that have hit the lower sector of the consumers (3 m^3/m for 5 people families), the greater part of them, actually, low income families included that, according to the federal water policies, should instead be safeguarded. None of the 4 visited in December 2015 TWUs, had paid the first instalment envisaged in the agreement while the population lamented steep tariffs increases.

D.5.2: Technical and design sustainability

The best choices in the WS network designs are those that place at the top the following issues:

- *The maximization of the works lifespan;*
- *The minimization of the water losses and dispersion especially in case of energy fed systems (wells, pumping station);*
- *The minimization of O&M costs.*

Wash projects are implemented in different sites and conditions but envisage a similar range of works and interventions. It would then be advisable to work out a Technical Manual containing typology standards for civil works and supplies, provided with check lists orienting the project choices. Such manual, updated when necessary, would also be helpful in the implementation of the WASH over the whole Ethiopia that is now underway. Here below there are some examples:

A. Water sources:

A.1 *from springs*: one or two types of intake manholes, that could be implemented everywhere, in order to prevent the inefficiencies or potential disservices that occurred for example in Huruta (filling up with gravel of the manhole and possibly transmission pipe obstruction)*;*

A.2: *from well field* i) selection of the site through flow tests according to longer standards in order to prevent what happened in Shire (drying up of 2 new boreholes); ii) submergible pumps, better if stainless steel and easily removable; iii) at least 1 spare borehole, to be used in rotation with the others, in order to prevent the overheating of the pumps and the risks of damaging the engines; iv) protection against the atmospheric electricity shocks or lightning (see Limu Gennet).

B. Boosters: water hammer protection systems for the rising pipe are essential;

C. Conduits and pipes

C.1: *Rising pipe:* plastic materials (HDPE, PVC-U) are not the best solution particularly in the case of rising pipes subjected to unsteady/varied flow and water hammer overpressure caused by the frequent electric blackouts. Air valves should be properly installed along the pipe course reduce depression stress. Welded steel or cast iron pipes should be preferred.

C.2 *Transmission and distribution pipe*: the HDPE pipes, substituting the old galvanized iron pipes, have been particularly appreciated by the TWUs. In reference to the use of HDPE pipes, the distance from the feeding sites (pipes and special parts), the quality of the material (polyethylene) and the strict rules regarding their underground laying (bedding and back filling) are factors that must be carefully taken into account in the design specification: pipe supply and laying phases in order not to compromise their resiliency. Among materials, polyethylene is sure enough the easiest one to counterfeit, so that it appears on the market at a strongly discounted price. Factory tests, therefore, should never be overlooked in the Specification and, during the works supervision, approvals should be given after the tests directly at the pipes and fittings production factories. In any case, being the price of HDPE fittings (special pieces, spigot, TEE etc…) very high, the designer should try and check if cast iron fittings, even needing less maintenance, could be used instead. The cross static security of the plastic pipes must be always stressed in the strict tender specifications. The supervision surveys should also be directed to verify the good quality of the backfilling soils (sand and gravel) and compaction. The works supervisor should be always on

site during the laying of the pipes net. Water test should be done according to the Specification before the works handover certificate.

C.3 Equipment and valve

In the pipes' design profiles, the location of the usual valves, such as wash out and air valve, must be always indicated. Such systems are of a fundamental importance in the running and conservation of the work.

D. Tank and break pressure tank

In order to stop the water from pouring into the tank once it is filled up, the inlet pipes should be always provided with float valves. Such hydraulic equipment also triggers the closing of the u/s pumps reducing water losses and saving energy.

Generally speaking, in the break pressure tank, provided as well with float valve, the installation of a Micro Hydro plant should also be taken into consideration in the design phase.

E. Sanitation work

E.1 Latrines: the most suitable type of latrine is the *Aqua privy,* varied only in the number of WC seats and showers.

E.2 Location of the latrines: to be analyzed and decided during the design phase together with the municipality.

E.3 Management agreement: sanitation works should be subjected to predetermined agreements between the TWUs and the municipalities regarding their management. Durame and Huruta are both lessons learned.

E.4 Health care standard: the Ministry of Education standards envisage the provision of improved sanitation works in the schools, with quality hand wash basins, WC seats, each block divided on a gender basis. Despite the project indicators, the field visits showed that the schools weren't interested at all by sanitation works and that students and teachers were still using old and antigenic wet latrines.

D.6 - OVERALL CRITERIA EVALUATION

For each selected town the overall evaluation of the OECD/DAC criteria, based on the score: *Excellent, Fair, Sufficient, Insufficient and Scarce*, is summarized in Chart 5.4.

The average evaluation of the whole project marks between "Fair" and "Sufficient".

Chart D.4: OVERALL CRITERIA EVALUATION

Town	*Relevance*	*Efficiency*	*Effectiveness*	*Impact*	*Sustainability*	*TOTAL*
Huruta	Fair	Suff.	Fair	Fair	Fair	**FAIR**
Durame	Fair	Suff.	Insuff.	Suff.	Insuff.	**SUFFIC.**
Shire	Fair	Suff.	Insuff.	Insuff.	Insuff.	**INSUFF.**
Limu G.	Fair	Suff.	Fair	Fair	Fair	**FAIR**
Overall	**FAIR**	**SUFFIC.**	**SUFFIC.**	**FAIR**	**SUFFIC.**	**F/S**

SECTION "E"

LESSONS LEARNED AND RECCOMENDATIONS

E.1 – LESSONS LEARNED

The lessons learned in the course of the present evaluation can be summarized as follows:

1. Decentralization: technical and managerial decentralization works very well in such small, low budget interventions with a strong social impact: it speeds up the project realization and makes aware the final beneficiaries of the responsibilities in the management of the works (TWUs). The process could benefit from the standardization of the *Project cycle* (methodologies and typologies).
2. Soft loan redemption: the *on leanding agreement*, oriented to feed the rotating fund, is a virtuous circle in itself, but it must be more thoroughly studied in reference to the sustainability of the redemption plan and the situation of the community of the consumers. In line with the 2013 federal Guidelines, the redemption plan should envisage modest tariffs increases for the low bracket of water consumption (3 m^3/m) and/or discount for the poorer sectors of the population.
3. TWU organization: the visited TWU showed to be up to their role of proponents and executors, although they surely need to increase their technical expertise and skill. They furthermore are to strengthen their management capability and reduce the decisional power of the politicians that have a final say in the selection of the staff and on the turn over. The board should include a stronger presence of the civil society also through the *Water User Associations*, as said by the 100% of the interviewed.
4. Equal opportunities/gender: the information gathered on the recruited staff at the surveyed TWUs show a positive balance among the employers. The employed women rate ranges between a maximum of 62% in Huruta and a minimum of 16.2% at Durame (Chart E.1), with an overall average of 35% over the total. Such percentages include the O&M workers too, in charge of manual tasks that women can't perform. Thus, these rates increase.

Chart E.1: EQUAL OPPORTUNITIES IN THE 5 TWUs EMPLOYEES BY GENDER

TWU	Total	male	female	% female
Huruta	26	10	16	62
Durame	33	27	6	16
Shire	66	46	20	30
Limu G.	27	16	11	44
Tot.	152	99	53	35

During the survey it was noted that women perform as cashiers or are in charge of as billing readers, secretariat and accountancy tasks, but they are little involved in the Boards, where men dominate, and only represented in the female bodies appointed by Proclamation. A larger women participation in the Boards should be encouraged.

5. Preliminary studies: p.s. regarding the water supply, the demography projections and the water consumption should be conducted at a higher level than the TWUs (*Regional* or *Zone Water Bureau*) and should be made according to national university or ministry prepared standards. The preliminary studies should always been finalized before the project starting.

6. Supplies and materials: in the design phase it should always be taken into account the fact that supplies, materials and maintenance services are locally irretrievable and must be therefore ordered from major far away cities (e.g. Huruta and Limu Gennet).
7. Sanitation: in the sanitation works, the municipality should always have a say even before the project implementation. The management agreements between TWUs and Municipalities, for the sanitation work management, should be signed always before the tender of the works.
8. Toilets and Fountains management: in this service the civil society, women groups particularly, should be directly involved also through a Service Chart of the service, to be prepared.
9. Design: both the design and the works supervision are essential professional services. During the mission, these services showed some technical deficiencies in the choice and the quality of the realization also causing delays. The technical drawings and technical specifications should be encouraged. Particularly, deficiencies in the design of minor works and details (intake works, manholes, river crossings, fittings, valves, protection facilities) emerged that should be taken care in future projects.
10. Works supervision: as the TWUs reported, the work supervision has been poor. The scarce presence on the work sites, caused the supplies and the finishing touches to be of low quality. The TWUs new buildings particularly suffered from such poorness.
11. Protection facilities of the works: the electro-mechanical equipments (boreholes, pumping station/Booster) resulted to lack the protection system both against the varied elastic flow (water hammers and depressions) and the atmosphere electricity shock.
12. Tank: at the pipe inlet, the lack of the float valve to stop the water from pouring in once the tank is filled up causes water and energy dispersions and consequently a cost increase for the TWU.
13. Tariffs: the tariff increases that the *on-lending Agreement* generated, result to be too high and unsustainable especially for the low bracket of consumption of the water supply (up to 3 m^3/month). A basic supply of water should instead be assured to all the population with no limitation to be paid on an income basis (*Guidelines* 2013).

E.2 RECCOMENDATIONS

The recommendations for the forthcoming WASH projects can be summarized as follows:

1. Standardization of services, works, supplies: taking into account the similarity and the high number of the interventions to be implemented in the following years in order to meet the OWNP targets, the standardization of the whole process is highly advisable, in all of the project's aspects: services, specifications, works, supplies, of which more has been said here in the Sustainability chapter. Such standardization would also help the TWUs in taking more technical and administrative confidence in these type of interventions also allowing them to play a more decisional role in the *project cycle*.
2. On lending Agreement: the redemption mechanism should envisage more stringent rules in order to assure the on time reimbursement of the instalments. Such redemption, that activates the rotating fund, is a major factor in the project sustainability and the meeting of the federal Water Policy targets.

3. Equal opportunities/gender: the women' participation in the Boards should be encouraged because they are quite totally missing nowadays, but only as representatives of the Women Association, included in the Board as per Proclamation.
4. Economic stimulus: with the aim of boosting their professional growth, the TWU staff should be economically motivated on the basis of a performance based evaluation to be prepared by the Board. In this way the TWU would more effectively respond to the challenges posed by the project cycle and prevent them, once enough trained and skilled, from leaving their places for more lucrative jobs.
5. Design: Resistance and durability of the works and of the supplies are always to be rated in the first place. The choice of the materials for the pipes, for example, should never disregard this principle to be also reported in the design, especially when the project site is far away from major cities where supplies and maintenance services are based. Minor works should also be designed.
6. Validation of the design: taking into consideration what the SARs mark, a technical validation of the final designs should be envisaged before putting out the tender, based on a performance check list. A validation mission by a WASH expert, the designer, a *Regional/Zone Water Bureau* and a TWU representatives should be organized before the tender. In the design contract the payment clearance should be given only after such validation in order to compel the designer to make the eventual necessary changes in the designs.
7. Works supervision: backed by the TWUs the use of plastic pipes in this kind of interventions, envisages a very careful approach in the underground laying stage and in the filling up with earth of the trenches in order to assure the much needed cross static security according to the *Technical Specifications*. During such activity the works supervisors must be therefore present. Such presence, to be included in the TdR, could be assured by young during the works locally resident engineers.
8. Audit: the Audit was really too poor and certainly not up to the International standards foreseen in the first place due also to the too poor outlay earmarked for such activity. The ToR for this service should be more binding to international standards, otherwise probably better a Ministerial Commissioning.
9. Tariffs: the t. increases, in line with the directives of the *on-lending Agreement,* that became necessary in order to meet the financial obligations of the TWUs, should agree with the federal *Guidelines*[6], assuring the service also to poor consumers using not more than 3 m^3/month (for a 5 people family=20 l/d per person), in line with the right to water of the federal *Water Policy*.
10. Sanitation: in accordance with the standards of the Ministry of Education that takes into account the poor situation of the sanitation services in schools and universities, each one of the future WASH interventions should also envisage the placing of at least one sanitation service in school buildings.
11. Tanks: all tanks and break pressure chambers should be provided with float valves to stop the inlet flow once the tank is filled up, avoiding water losses and energy costs.
12. Protection of the systems: the electro-mechanic equipments (borehole and pumping station/Booster) should always be provided with protection systems against the water hammer and lighting shock.
13. Public fountains: their location should be decided together with the municipality on the basis of the served areas. They should be placed within a maximum of 1-2 km radius (30 minutes walk with a load of 20-25 kg).

[6] GoE- Ministry of Water and Energy: *National Guideline for Urban Water Utilities Tariff Setting* – March 2013

The location should be carefully chosen in the design phase, selecting, if possible, an uphill location in order to ease the transport downhill – that is usually carried out by women and children. The location of the fountains cannot be decided in the construction phase (e.g. Huruta).

14. Sand filters: it emerged that in houses sand filters are rarely present. The use of such very simple tools should be encouraged also envisaging their sale at a wholesale price and supporting their employment in the intervention's adjoining areas, with no service and more than 1 km far from the nearest fountain.
15. IT equipment: being the delivery of the IT (hardware and software) close, it is advisable to provide a UPS (uninterruptible power supply) in order to protect the IT from the electricity shocks and from the recurrent energy supply blackouts. All of the IT equipment should be provided with holders due to the high level of dust in the air especially when the Offices are close to unpaved main roads.

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