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FWC BENEFICIARIES 2013 - LOT 1 RURAL DEVELOPMENT AND FOOD SECURITY

EuropeAid/132633/C/SER/multi

Specific Contract 352-461

Impact Assessment on the Development of a Major Afghan Urban Centre through the Provision of Better Water Services

Afghanistan

Draft Final

Prepared by:

Jelle Beekma, Team Leader

May 2015

This technical assistance is funded by
The European Union

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READ & APPROVED
20/08/2015
Wali FAROOQI

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KEY DATA

Name of Project:	**Impact assessment on the development of a major Afghan urban centre through the provision of better water services**
Contractor:	**CARDNO EMERGING MARKETS (UK) LTD** Address Oxford House, Oxford Road, Thame, Oxon, OX9 2AH, UK Phone +44 1844 216500 Fax +44 1844 261593 Web www.cardno.com/emergingmarkets
Contracting Authority:	Delegation of the European Union to Afghanistan
Beneficiary:	Government of Afghanistan/ Ministry of Urban Development Charikar Strategic Business Sub-Unit of the Afghan Water Supply and Sanitation Cooperation, inhabitants of Charikar and particularly Block 11
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DISTRIBUTION LIST

ToR: "The work plan, assessment methodology, impact assessment and summary presentation described in the section "Required outputs" must all be presented in English, according to the specific timeline and in 2 copies each."

Recipient	Copies	Format
EU Delegation Afghanistan	1	Electronic copy

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Report Quality Controlled by **Framework Contractors' Project Director**

Signature: **Signature:**

Impact Assessment of the Development of a Major Afghan Urban Centre through the Provision of Better Water Services

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LIST OF ABBREVIATIONS

ACF	Action Contre la Faim (Action Against Hunger)
AFN	Afghan afghani
AUWSSC	Afghan Urban Water Supply and Sewerage Corporation
BRCC	Bakhtaryan Road Construction Company
CAWSS	Central Authority for Water Supply and Sewerage
CFU	Coliform Unit
CSO	Central Statistical Office
FIDIC	International Federation of Consulting Engineers
JICA	Japanese International Cooperation Agency
KAP	Knowledge, Attitudes and Practices
LCD	Litres *per Capita* per Day
l/s	Litres per second
MEW	Ministry of Energy and Water
MRRD	Ministry of Rural Rehabilitation and Development
MUDA	Ministry of Urban Development Affairs
O&M	Operation and Maintenance
ORS	Oral Rehydration Solution
PPP	Public-Private Partnership
PRT	Provincial Reconstruction Team *(civil cooperation based in military camps)*
PUWSSC	Parwan Urban Water Supply and Sewerage Corporation
SBSU	Strategic Business Sub-Unit (of the AUWSSC)
UNICEF	United Nations Children's Fund
WASH	Water, Sanitation and Hygiene
WTP	Water Treatment Plant

Executive Summary

Project

The project titled ***Development of a major Afghan urban centre through the provision of better water services***, hereinafter referred to as the Project, was carried out from 2009 to 2011 and intended to provide Charikar with an affordable and sustainable supply of safe drinking water. Charikar city is the capital of Parwan province and was characterised by fast growth and the settling of a large amount of returnees, particularly during the period from 2005 to 2010. Charikar was thus in dire need of the extension of services, particularly of the water supply system.

The project had five main components. The first addressed the piping of water from the Dare Kalan spring (approximately 5km to the west of the existing urban water supply treatment plant) to this water treatment plant, thereby increasing the water supply and eliminating the risk of contamination during transmission (the water having previously been transmitted from the spring to the treatment plant via a combination of deteriorated cast iron pipes and an open ditch). The second component addressed the rehabilitation of the treatment plant (including improving the pumps, replacing the sand filter and rehabilitating the building and all water conducts). The third addressed the construction of a water supply network in Block 11 of the city which thus far had had no access to drinking water (Including the construction of kiosks to ensure water supply to all residents). The fourth component focused on capacity building for operation and maintenance (O&M) and awareness raising among staff of i) the Charikar Strategic Business Sub-Unit of the Afghan Urban Water Supply and Sewerage Corporation; and ii) the kiosk committees. Lastly, the fifth component focused on the raising of awareness and hygiene promotion among the population of Charikar, particularly of Block 11.

New Developments

After the project closed, the inhabitants of Block 11 (the key beneficiaries) were not satisfied with the developed kiosks and the Shura and Governor arranged for a private company (the Bakhtaryan Road Construction Company) to extend the system to home connections. BRCC now operates and maintains the system and receives a service fee from its customers, the final beneficiaries of the project. 20% of the service fee is paid to the Charikar Strategic Business Sub-Unit (SBSU, formerly the Charikar Authority for Water Supply and Sanitation under the Central Authority and part of the Ministry of Urban Development) of the Afghan Urban Water Supply and Sewerage Corporation (AUWSSC) for the O&M of the main system and as repayment of the capital costs of the network in Block 11. 60% of the fees are used for O&M and small repairs of the network, including pumping costs, staff salaries and top-ups for SBSU staff as well as a small profit margin.

During the last 5 years the roles and mandates of the AUWSSC have been expanded and most of its SBSUs are recovering the costs of O&M through user fees. This is not yet the case in Charikar.

There are new plans to capture and conduct additional water from a spring in Sartikacha in the Koklami valley (about 35km north of Charikar in Salang District), which would supply the entire city with high-quality water. The project has an estimated cost of 8 million USD (of which 2 million has been pledged by the Indian government). Tendering is on-going.

Water supply to the treatment plant has been reduced due to the deterioration of pumping stations in the canal. This makes the rehabilitation of the treatment plant potentially less effective.

Current Status

The kiosks have been abandoned, but the system for the capture and transmission of water to the treatment plant and the network in Block 11 appears to be in a reasonable state. The treatment plant was observed to have a lot of foam on the surface of the slow filter, which is potentially an indicator of impurity. This was confirmed by samples taken on 16 May 2015, which showed considerable amounts of coliforms even after treatment. A second sampling was done on 23 May 2015 to confirm these results, since such results significantly affect the impact of this component (and all other components) of the project.

The kiosks have largely been replaced by house connections, which is more in line with the wishes of the population. The provision in the network to make it easily convertible to house connections is probably one of the main strengths of the network that has been constructed under the project.

Knowledge of and attitudes to hygiene have considerably and durably improved compared to the situation before the project. Knowledge, attitudes and practices (KAPs) prior to the project were documented in a survey done in 2008, since which time the incidence of diarrhoea has been notably reduced. However in comparison with the KAP survey done immediately after project closure in December 2010, the incidence of diarrhoea has since increased again and the practice of boiling water has fallen dramatically. This decrease is probably based on the perception of safe water supply through the network. However, sampling indicates an unexpectedly high level of total coliforms (56-80 coliform units (CFUs) per 100ml in Block 11 of the city during the first sampling and 8-18 CFUs per 100ml during the second sampling), which indicates that the quality of the water does not meet drinking water standards. The sampling results were received at the end of the mission and a second sampling was conducted to confirm them since this level of contamination would largely affect all aspects of the project.

Impact, Effectiveness, Efficiency and Sustainability

The strength of the project lies in the flexibility of its approach, which is exemplified through a network that could easily be transferred from kiosk-based to home connections. Another example is that a borehole and pump installed by the Provincial Reconstruction Team (PRT) shortly before the project started was used as the source of water, thereby providing high-quality, safe drinking water to the network rather than the water of a more debatable quality originating from the dilapidated city network.

The good quality of the water from the PRT borehole was confirmed by sampling (indeed this was the only sample taken that did not contain any pollution by coliform organisms).The rest of the samples all showed contamination. Water in the Block 11 network had become contaminated, possibly due to improper cleaning of the storage tank or by a breach in the pipes releasing pressure and drawing contaminated water (though this could not be verified). The Dare Kalan spring showed relatively better water quality than other points, but still had between 35 and 44 CFUs per 100 ml during the two sampling campaigns undertaken (far above the Afghan water standard of 0 CFUs set in 2011). The second round of samples was also tested for faecal coliform colonies and showed the presence of 6 per 100 ml. This shows that the spring is not safe and that better protection should be imposed.

The canal water was, as expected, quite seriously contaminated, but was discovered not to have been fully purified during transition through the Water Treatment Plant. This is a very serious issue and potentially threatens the majority of the households connected to the main city network. The observed low quality of water invalidates most of the project's objectives since the first and foremost objective of safe drinking water is not met. It even jeopardises

the messages transmitted by the hygiene promotion campaign since one of its main aims was to enable beneficiaries to distinguish water sources and learn what is safe and what needs boiling. Tap water was classified as safe and if the sample results are correct, this is not the case. Proper chlorination of water before it enters the storage reservoirs, possibly in combination with a disinfection of the networks, may address this problem. Also essential are regular monitoring of the water quality and the development of a response and mitigation system in the case of sub-standard water.

Reduced diarrhoea is a positive impact that is still observed, but will also be affected in the long term by poor water quality if no measures are taken. Other limitations to the impact include insufficient training of the Charikar SBSU, which makes cost recovery difficult and affects O&M due to lack of funds. It needs to be emphasised however that training in cost recovery alone is not sufficient and that training in O&M (including chlorination, disinfection, sampling, routine maintenance and small repairs) is equally essential. This did not form part of the project design.

Efficiency is negatively influenced by the poor quality of the kiosks, which according to interviews were virtually imposed on the population. Today they are completely dysfunctional and the 10% of funds invested in their development have therefore been lost. Additionally, considerable human resources have been spent on training kiosk committees in various O&M, cost recovery and kiosk management skills, when it might have been better to focus this training on the Charikar SBSU. The capacity building of the Charikar SBSU has been useful as a computer-based system is being maintained; however, the database developed by the German consultancy RODECO is no longer working properly since the computers crashed and the database was improperly re-installed. Staff have mitigated this by installing their own system, but the laborious method of data entry and the splitting of data across both Word and Excel files make the process inefficient and prone to (typing) mistakes.

Sustainability seems to be good for the awareness campaign; however with the network delivering sub-standard water quality, total sustainability is limited if contamination cannot be addressed.

Future Prospects

The sampling campaign conducted on 16 May 2015 and verified by sampling and analysis on 23 and 24 May 2015, indicates serious contamination of the water at all locations except for the well water at the PRT source. Immediate action is required to identify the cause of the contamination and devise a solution (e.g. chlorination at a number of strategic locations).

It would seem that in the long term, a complete overhaul of the water supply in Charikar is required. This would also include the eventual sourcing of water from a safe water supply such as the proposed spring at Sartikacha in Salang District, although the water sample from the Dare Kalan spring also shows contamination and treatment will still be needed. Also recommended is the renewal of parts of the central water supply network, particularly pipes that are leaking and do not comply with the new standards set in 2011. Further equipping, training and capacity building of the Charikar Strategic Business Sub-Unit of the Afghan Urban Water Supply and Sewerage Corporation will be necessary to improve i) the water supply of Charikar in the long term; and ii) the management of the SBSU.

It is not currently possible to identify the cause of the observed contamination or how long it has been present. For both short-term and long-term options, the installation of various chlorination points will be required (which should be dimensioned and located according to standards depending on the method of chlorination used). Strict adherence to chlorination

guidelines and regular monitoring of water quality will also be required in order to ensure timely action where necessary.

Main conclusions and recommendations

1. The Project was carried out largely to schedule and almost within its budget and the infrastructure seems to be in good condition, with the exception of the kiosks and possibly the canalside pumps. The tender documents seem to indicate this was part of the project, but further information obtained during field visits was contradictory;
2. The tender documents (Result 1) are generic and the technical specifications do not have the level of detail and precision that would normally be required. The apparently good condition of the system is probably mainly attributable to professional and committed Contractors and effective supervision. It cannot however be excluded that serious shortcomings do exist;
3. Serious contamination with coliforms was detected at all points (with the exception of the PRT well) of the rehabilitated and newly constructed elements of the Project during a water quality sampling carried out on 16 May 2015. A second sampling campaign carried out on 23 May 2015 confirmed the contamination, but indicated lower amounts. The reasons for the contamination could not be established and may relate to either defects in the technical system, erroneous management of the water supply systems or a combination thereof;
4. For future projects, it is recommended that bid documents be compliant with general, internationally accepted technical specifications, design and contract standards (such as the contracting conditions of the International Federation of Consulting Engineers (FIDIC). The development of such designs, specifications and standards is a highly technical job that is probably best done by (or in close cooperation with) engineering consultants;
5. The current treatment of water done at the WTP is not sufficient and the water needs further purification, possibly through chlorination or a longer treatment period;
6. In order to better benefit from unplanned activities such as the involvement of the private sector through the BRCC there seems to be a need for better guidelines on the operational procedures, financial mechanisms and quality control of PPPs. This is outside the context of the current Project but could be a contribution of future EU-funded projects.

1 Introduction

Charikar is the capital of the Afghan province of Parwan and lies approximately 55km to the north of Kabul city. Because of its geographical location on the main road axis linking Kabul to the north of the country, Charikar is an economic centre for the province of Parwan. The city has grown rapidly since 2002 due to natural growth, internal migration and the arrival of returnees from Pakistan in the area. The majority of this growth however seems to have occurred from 2002 to 2008, since the new Nationla Risk and Vulnerability Assessment (NRVA) data from 2011/2012 obtained from the Central Statistical Office (CSO) do not show many more inhabitants than estimated in 2008.

Due to insufficient investment and the occurrence of conflict in recent decades, the provision and the delivery of basic social services have not followed the same trend. This is particularly true of drinking water and sanitation. In 2008 there was an obvious gap between supply and demand in the city, which prompted the launch of a project for the ***Development of a Major Afghan Urban Centre through the Provision of Better Water Services*** (this is the subject of the current impact assessment and is hereinafter referred to as the Project. The Project was carried out from 2009-2011 and details are provided in the paragraphs below.

The population of Charikar was estimated by Action Contre la Faim (ACF) to be at least 50,000 in 2008. Official CSO figures indicate 54,800 inhabitants in 2011/2012 (the Afghan year 1390). In 2008, many urban dwellers in Charikar drew small quantities of water from the irrigation canal, or unsafe boreholes and open wells, which impacted their living conditions and resulted in a precarious sanitary situation with a high incidence of water-related disease. The Project was implemented to improve this situation, particularly in Block 11 (one area of the city in which many recent migrants have settled). Prior to the implementation of the Project no safe water supply was available in this block, except for a well that was installed by the Provincial Reconstruction Team (PRT) and located north of the block on the other side of the irrigation canal.

1.1 Water Source(s)

The city has a number of water sources, including a spring located about 5km to the west (named Dare Kalan), various boreholes (both private and public) and an irrigation canal on its northern perimeter.

A Knowledge, Attitudes and Practices (KAP) survey conducted in Charikar in 2008 using a cluster sampling method identified the following points:

- Only 41% of the population was connected to the distribution network (whether this be through public tap stands (20%), household connections (19%) or taps located inside mosques (2%);
- The remaining 59% of the population uses water sources that cannot be considered either safe or fully sustainable. These include streams/irrigation canals (28%), springs (27%), *karezes* (2%) and private suppliers/tankers (2%).

The project has targeted this through the improvement of the main water supply system and the provision of new coverage of the Block 11 area of the city.

The main city water supply system, managed by the Parwan Urban Water Supply and Sewerage Corporation (PUWSSC), has two sources that are connected to a slow sand filter treatment plant with a 1,000m^3 reservoir. The first source is the spring at Dare Kalan which flows continuously throughout the year with a discharge varying from 6 litres per second (l/s)

during the driest months to over 20 l/s in winter (Eng. Qaseem, personal communication, 2015). The water is tapped at the source and flows by gravity through 6-inch High-Density Polyethylene (HDPE) pressure pipes, fittings and valves to the treatment plant. The second source is the Shamali irrigation canal. A set of three pumps abstracts the water from the irrigation canal and pumps it through asbestos pipes to the treatment plant located at an elevation of 110m above the canal. The two water sources are mixed, lead through a slow sand filter and are chlorinated after filtration, after which they are stored in reservoirs. From these reservoirs the water enters the main Charikar water supply network.

The Consultant could only obtain qualitative data on the status of the main network. The main water distribution network was implemented in two stages, with the older section serving approximately 50% of the 3,812 customers and the newer section (installed in two new loops) serving the other 50%. The older section in particular is considerably degraded, with various leakages and a high susceptibility for contamination a considerable proportion of the network is in need of replacement. The Charikar Strategic Business Sub-Unit (SBSU) of the national Afghan Urban Water Supply and Sewerage Corporation (AUWSSC) estimates that almost all of the older section of the network has to be replaced (which is considerably less than the portion of the newer loops). Many residential areas, particularly the new ones that have been built as a result of large amounts of returnees having settled in the city, are not connected to the main distribution network.

Two boreholes form the water sources for various smaller water supply networks. One borehole is intended to serve the population in Blocks 11 and 13 (the network for Block 11 having been installed under the assessed project, while the connection to Block 13 has not yet been set up). The network is connected to the above-mentioned PRT well which has a discharge of approximately 6 l/s. The final house connections in Block 11 are being provided by a private company, the Bakhtaryan Road Construction Company (BRCC), which is also in charge of the management of the network, including its operation and maintenance (O&M), through a contract with the PUWSSC. The other network is proposed to serve Blocks 8 and 12 and to be managed by another private company, Bakhtar. However, SBSU staff informed the Consultant that these connections have not yet been made.

1.2 KAP

The poor water supply and sanitation system in Charikar causes poor hygienic conditions and leads to a high incidence of waterborne diseases, particularly diarrhoea and gastro-intestinal diseases. This is further aggravated by the generally poor awareness of hygiene and related practices, particularly among people who recently settled in urban areas. In order to assess levels of hygienic awareness the above-mentioned KAP survey was undertaken by ACF in Block 11 in 2008. This survey indicated limited awareness in general, poor hygienic practices and a high incidence of diarrhoea, leading to the determined promotion of the use of Oral Rehydration Solution (ORS) by the hygiene campaign under the Project. In December 2010, immediately following the hygiene campaign but before the new water sources became available, a second KAP was conducted by ACF the results were very positive showing a tremendous improvement in all aspects. The table below shows the main indicators of the 2008 and 2010 surveys.

Table 1: KAP indicators before and after the project

Subject	2008 KAP	2010 KAP
Frequency of washing storage/transport containers	53% once a week	78% once a day
Practising of water boiling	18%	81%
Hand washing:	85%	100%

Subject	2008 KAP	2010 KAP
After defecation		
After bathing children	57%	99%
Before eating	88%	100%
Before cooking	81%	100%
Before feeding children	26%	97%
Use of soap for hand washing	49%	98%
Number of children having had diarrhoea in the last 15 days	53%	18%
Use of ORS in the case of diarrhoea	6%	83%
Cleanliness of latrines	35%	73%
Washing facilities at latrines with water and soap	1%	87%

As shown in Table 1, the December 2010 KAP survey indicates a dramatic improvement in the indicators even prior to completion of the water supply.

1.3 Operation and Maintenance and Cost Recovery

As indicated above, the water supply network was in a poor state in 2008. This was largely due to the absence of funds and materials for the maintenance, repair and extension of the network. The Charikar Water Supply Authority was understaffed and run based on subsidies received from the central Government. The concept of cost recovery was only just being introduced; however, the various surveys conducted indicated a high level of willingness to pay for reliable water services.

A KAP survey conducted in 2008 revealed a clear relationship between payment for water services and the amount of water received. Those paying more than 100 AFN per month had received a considerably higher amount of water, with a usage rate of 37 litres *per capita* per day (LCD), compared to those that paid less than 100 AFN per month, who received only about half that (18 LCD). Willingness to pay varied from 68 AFN per month per family among people who already paid for water services to 48 AFN per month for those who had not paid so far. With these figures it may be questioned whether full cost recovery would be a viable option since a standard of 25 AFN/m^3 (as determined by the AUWSSC), a consumption rate of 25 LCD and an average family size of 7 would result in approximately 130 AFN per month per household, or almost double the highest amount that people are willing to pay.

1.4 Project Objectives and Results

The Overall Objective of the Project is to improve living conditions and reduce the prevalence of water-related diseases in major urban centres in Afghanistan. The Specific Objective of the Project is to provide urban dwellers in the city of Charikar with an affordable and sustainable supply of safe drinking water (estimated at 50,000 people in 2008).

This was to be done through the achievement of five (5) results:

- Result 1: Exhaustive narrative reports as well as a set of various maps and bills of quantities, describe the works to be achieved for the rehabilitation and extension of the water supply scheme;
- Result 2: Kiosk committees are established and made operational;

- Result 3: The capacities of the Central Authority for Water Supply and Sewerage (CAWSS) to conduct O&M of the water supply scheme are strengthened;
- Result 4: The water supply scheme is rehabilitated and extended;
- Result 5: Hygiene-related knowledge, attitudes and practices are improved among clients of the kiosks.

The Project was designed to be complementary to another World Bank-funded project (through the Afghan Reconstruction Trust Fund) carried out in Charikar whose main objective was the improvement of the main transmission and distribution network. This project was implemented by Fichtner Consulting Engineers, but was abandoned (for unknown reasons) at some stage during the project assessed in this report. This has affected the potential benefits that the Project could have achieved.

Various detailed activities were carried out under the above results and will be reviewed in Chapter 3, in which the results are broken down into discrete practical steps and questions are answered as to the degree to which the results were achieved by the project (including which elements were successful and which were less so).

1.5 Changes during the Last Four Years

The present impact assessment takes place more than four years after the completion of the Project. This provides the Consultant with an excellent picture of the impact, but complicates the analysis of more detailed issues such as effectivity and efficiency since many project staff and their counterparts are no longer in the area or have been assigned to different positions. An external evaluation was also carried out by ACF immediately following Project closure and differences between the status observed at that time and that observed today may provide some additional information and help draw lessons learnt.

1.5.1 Project

The main difference over the last 4 years has been the completion of the project. The whole of Block 11 is now served by a new water supply network that distributes water from a PRT-installed well and reservoir. The total number of households served is approximately 850, far fewer than initially planned (although the exact number of households has proven difficult to establish). The reservoir could also provide water to Block 13; however, these connections have not yet been set up and the water supply does not seem to be enough for this, although the local managers insist that sufficient water is available.

This option was not further explored during the present assessment but obviously, to include Block 13 would considerably increase the number of beneficiaries. Block 11 has mostly been provided with household connections through the intervention of a private company at the request of the Shura (the traditional community organisation). Each house connection builds on the installed network and thus contributes to better water distribution and social equity through cost sharing. The cost of water supply services has however increased considerably from 25 AFN to 60 AFN per m^3. The original Project target was 150 AFN per family at kiosk level, which is slightly higher than 25 AFN per m^3.

1.5.2 Charikar

It appears that the most significant growth in the population of Charikar occurred before the Project was implemented. The population was estimated at 50,000 in 2008 and official data three years later indicated 54,800. Similarly, rapid growth of the population of Block 11 is both reported and foreseen in the narrative reports of the Project. The final report mentions

1,800 households in March 2010, 2,604 in December 2010 and a total amount of 3,287 plots that were expected to be developed into households. Based on an average family size of 7 per household this would result in more than 23,000 people. The same figures were used in the third-party evaluation. In addition a total of 1,493 families were registered through a kiosk ID card at the end of the project, which represents only about 57% of the reported households.

The above figures could not be independently verified; however, during discussions with the SBSU, Shura and other beneficiaries much lower numbers of households were mentioned. The total number of households was indicated to fall somewhere between the 870 currently connected to the water supply to the 1,200 households given as a total. The head teacher of the only public mixed school reported 1,800 students for a combination of Blocks 11 and 13. Assuming that 20% of the population comprises children of primary school age this would be equal to a population of approximately 9,000 in each block.

There is a well advanced plan to extend the water supply to Charikar city by tapping the Sartikacha spring located in the Koklami valley of Salang District approximately 35km north of Charikar. This spring has a discharge of approximately 250 l/s, which is more than enough to supply the city with 65 LCD (considered to be the norm for home connections at present by the Ministry of Rural Rehabilitation and Development (MRRD). The MRRD and the AUWSSC will cooperate in the development of this project, with the AUWSSC taking responsibility for surveys and technical design and the MRRD acting as implementing agency. Following its completion the scheme will be managed by the AUWSSC through the Charikar SBSU.

Bid documents for the new project were finalised in 2014 and the works have already been tendered. The total projected cost of this new project is approximately 8 Million USD of which at present 2 million has been pledged by the Indian Government. Other financing is still being sought.

With a capture of approximately 163 l/s, the new project would supply the projected water requirements of the entire city of Charikar in 2039, taking into account expected population growth, but keeping the water demand *per capita* at 2012 levels (i.e. 65 LPC per day). As urbanisation increases, income levels *per capita* are expected to rise and water consumption should do the same. In a 2009 study, the Japanese International Cooperation Agency (JICA) projects a *per capita* consumption of 130 litres per day. In this case the required diversion would be double this amount.

1.5.3 Nationally

During the last 4 years the transition of the Central Authority for Water Supply and Sewerage to the autonomous Afghan Urban Water Supply and Sewerage Corporation (AUWSSC), which was launched during the execution of the Project, has been fully completed. The five Government agencies listed below are shareholders of the AUWSSC:

1. The Ministry of Finance (40% of the shares);
2. The Ministry of Urban Development (35% of the shares);
3. The Ministry of Economy (10% of the shares);
4. The National Environmental Protection Agency (10% of the shares); and
5. Kabul Municipality (5% of the shares).

In 2009 the AUWSSC ran on a subsidy of 650 million AFN. Today it is able to run on full cost recovery in accordance with modern business principles. Between 2009 and 2015 AUWSSC management expanded from 14 to 43 cities. Assets were liquidated from the Ministry of

Urban Development Affairs(MUDA) and taken over by the AUWSSC; however, there is no proper valuation system due to the absence of a depreciation formula. Current AUWSSC assets have increased from the liquidated assets of an assumed value of 4.5 billion AFN[1] to more than 9 billion AFN and the annual budget has also substantially increased. At national level policies are developed, major management decisions are taken, donor coordination is carried out and major procurements are conducted.

At sub-national level, the AUWSSC is subdivided into six Strategic Business Units (SBUs):

1. Central (Kabul and surrounding provinces);
2. South (Kandahar and surrounding provinces);
3. West (Herat and surrounding provinces);
4. Northwest (Mazaar i Sharif and surrounding provinces);
5. North (Kunduz and surrounding provinces); and
6. East (Jalalabad and surrounding provinces).

On a national scale full cost recovery is being achieved, although this has not been the case with all SBUs in the last 5 years. Regular capacity building efforts are being undertaken at the national office and new management equipment is being procured such as leak detectors, special pipe cameras and a fully equipped modern laboratory.

The Charikar Urban Water Supply and Sanitation branch of the AUWSSC falls under the Parwan SBU and is considered a Strategic Business Sub-Unit (SBSU). Modern management principles are gradually being adapted by all SBSUs. Herat and Kunduz are often considered to be excellent examples of city-level business units. This is largely due to the long-running support provided by GIZ and implemented by the German consulting company RODECO, which includes both an intensive capacity building programme and the development of a client and expenditure database in combination with the long-time embedding of international specialists in the SBUs.

1.6 Methodology

The current assessment was done through a review of the Project documents, particularly the original description of the action by ACF and the final narrative, financial and auditing reports. Also studied were the water resource policies of the MUDA and various web-based AUWSSC documents. The implementing agency (ACF) was visited and interviews conducted with the Water, Sanitation and Hygiene (WASH) coordinator and various key national organisations were visited and interviewed, particularly the AUWSCC, MRRD and the Ministry of Energy and Water (MEW).

The assessment mainly focused however on field visits during which the adduction line from Dare Kalan, the water treatment plant (WTP) and the storage reservoir were all visited and inspected. In Block 11 the network was observed, house and school connections inspected and the well and pump house visited. A visit was also made to the offices of the PUWSSC at which interviews were conducted with key staff. In order to obtain an institutional benchmark the SBU of the Herat Water Supply Corporation was visited. A national enumerator, Mrs. Wahida Alawi, was contracted and carried out a household survey in line with KAP indicators. Samples taken were tested for water quality according to AUWSSC guidelines at various key locations. These included the network in Block 11, the new adduction line to the WTP from Dare Kalan, water from the irrigation canal and water that had been processed by the WTP. Samples were initially taken on 16 May 2015. The AUWSCC kindly provided a laboratory and personnel in Kabul for the analysis. Due to the considerable contamination

[1] This is however highly overestimated since a proper depreciation system was not applied (personal conversation with Baheer, 2015).

encountered in the samples taken on 16 May 2015, it was decided to conduct a second sampling to verify the results. This sampling was conducted on 23 May and confirmed the contamination.

The analytical strategy followed was mainly a change analysis, combined where possible with a meta-analysis from a previous external evaluation and comparison with another project (and when assessing impact an attempt was also made to conduct an attribution analysis). The Consultant also attempted to compare the situation to that prior to the Project, although the contamination of the water is a dominant factor affecting the very specific objective of the Project.

2 Description of the Current Situation and Questions Answered

The entire system was visited (including sections that were newly constructed, rehabilitated or improved under the Project as well as other elements of the main water supply system) and the rehabilitation carried out. The general impression is that the work carried out under the Project has been of reasonably good quality and that the choice to use materials easily available on the local market seems to have positively influenced the ability to maintain the system well[2]. The new system in Block 11 has been adopted by the Bakhtaryan company, who have provided home connections to those who can afford the combined cost of a water meter and the connection pipe (approximately 10,000 AFN).

Levels of hygiene awareness in Block 11 were generally good and have improved since the installation of the new water supply system, with the 2010 KAP survey suggesting that since the Project's hygiene campaign the incidence of diarrhoea has significantly decreased. This was confirmed by the visited schools, health clinics and individual households. However, the observed contamination of the water is certain to reduce the positive effects shown by the decreased incidence of diarrhoea.

2.1 Status of the Spring Capture and the Water Treatment Plant

The current status of the spring capture and WTP are somehow an amalgamation of Results 1 and 4 of the Project. Result 1 is formulated as: ***Exhaustive narrative reports as well as a set of various maps and bills of quantities describe the works to be achieved for the rehabilitation and extension of the water supply scheme***. The description of Result 1 is long and wordy; however, the main result is (or should be) bid documents of professional quality, e.g. according to International Federation of Consulting Engineers (FIDIC) standards. Result 4 is formulated as ***The water supply scheme is rehabilitated and extended****.*

The original bid documents of the Project represent Result 1 and determine the design and quality standards requested of the Contractor. The actual piping of water from Dare Kalan, rehabilitation of the WTP and the extension of the water supply scheme to Block 11 represent Result 4 and are the physical results of the works done on the basis of the bid documents. The bid documents are not very well structured and the quality of civil works and elements are not described according to generally applicable standards. A strength of the documents is that they contain a number of simple illustrations which may be helpful to local contractors, while a weakness is that none of the details follow general design conventions. One of the major shortcomings seems to be that no chlorination is foreseen (the bid documents do not mention this at all). This may be due to the fact that the WTP has its own chlorination facility; however the WTP chlorination facility has apparently not been

[2] While this approach worked well for the project and is possibly still the best option in rural areas, the availability of high-quality imported materials is not a limitation, particularly to the water supply systems under AUWSSC management. The warehouse of the Kabul SBU, under which the Charikar SBSU falls, is well stocked with a wide variety of spare parts.

rehabilitated or fitted with any new equipment. In retrospect this should be considered a serious oversight.

Notwithstanding the generic character of the bid documents and the imprecise definition of technical specifications, the conditions of the spring capture, the piped conduct and the WTP give a surprisingly good impression. This seems to indicate that the Contractors were of a good professional quality and that supervision was carried out skilfully. However, despite the good appearance of the system, the quality of the water after it has been processed through the WTP does not comply with the 2011 quality standards of the AUWSSC.

Recommendation: *For future project bid documents it is recommended to ensure compliance with internationally accepted design standards and where possible, with contract standards (such as FIDIC).*

2.1.1 Spring Capture

A detailed inspection was done of the spring capture, the transmission system, the pressure break chambers, the wash valves and the outlet in the WTP. The spring at Dare Kalan seems well protected from contamination by undesired substances as it is captured in an adequate protection box and covered by a concrete slab (which is attractively finished by masonry work using local rock). The pictures below show the source area and the spring capture. The spring capture is accessible by a removable cover; however care has been taken to avoid easy access by covering it with large rocks in order to avoid misuse of the access. Misuse is however unlikely since the importance of the spring and its protection seems well understood and owned by the local community.

In order to further improve ownership, it might be considered (if control is possible) to install small facilities for access to water between the spring capture and the WTP for certain non-threatening activities (such as the watering of livestock, provided this applies to local livestock only (see also the text box below)). An analysis of the quality of the water at the spring was carried out, which showed contamination by coliforms and faecal coliforms. This indicates that sources of contamination are present and that better protection of the capture area is needed, particularly upstream of the spring. According to the 2013 right of way regulation of the Ministry of Energy and Water (MEW), a 500m protection zone is needed; however, the Consultant doubts that a protection zone of this size would be sufficient among the coarse sediment and general rocky outcrops at the source area.

Figure 1: Pictures of the spring capture and pipeline

View of spring source area looking in upstream direction

The spring at Dare Kalan

Spring protection and masonry cladding

Pipeline marker

Box 1: Social infrastructure and local watering points

While inspecting the source area it became clear that the area surrounding the spring has been declared as a protected area and that this protection is widely accepted by the community. When the Consultant was travelling with the water supply corporation manager Mr. Qaseem, he was informed by a local worker in the quarry on the way to the spring that a shepherd had entered the valley and that sheep were being herded to the spring for drinking and that this should be prevented. Immediate action was taken by the manager who spoke to the shepherd and explained to him the importance of clean water. The shepherd diverted his sheep in a different direction.

The pipeline to the treatment plant seems to function well and is equipped with pressure break chambers and wash valves at each 100m of elevation as per design. These chambers are easily accessed through covered and locked manholes. The entire system was inspected where possible and was confirmed to function well and to be in good condition. The pipe location is well marked by small concrete markers which enable access for repairs and replacement (should this be necessary). The photos above show the reasonable condition of the concrete and masonry work after enduring more than five years of harsh meteorological conditions; this clearly indicates that the system is technically well constructed and can be expected to be sustainable.

During the external evaluation conducted by Bedran in May 2011, the risk of diversion of water to a newly developing area of the city adjacent to the pipeline was highlighted. However, at the time of this assessment in May 2015 there is still no diversion to this area and little development of houses has taken place, although road infrastructure has been developed. Consequently it may be concluded that the risk of this diversion is limited, at least for the foreseeable future.

Water quality was measured at the spring and the entrance to the treatment plant after being transported through the piped system for more than 5km. The quality was found to be poorer than expected since the spring is contaminated by coliforms (including faecal coliforms). Hence the water is unfit for consumption unless treated. The results of the water quality sampling tests are given in Table 2 on page 17.

2.1.2 Water Treatment Plant

The WTP receives relatively high-quality water from the Dare Kalan spring as well as a larger quantity of canal water of a considerably lower quality. The two sources of water are mixed.

The water from the canal is pumped from a pump house equipped with three pumps, each with a capacity of 40 l/s. The pump house was visited and inspected as according to the bid documents, the pump house formed part of the Project. However, both Charikar SBSU staff and ACF representatives maintain that the rehabilitation of the pumps did not form part of the project that was actually carried out. The final narrative report is equally unclear on this and simply states in one sentence (ACF, 2011, final narrative report, page 15) that:

- Pumping house:

  - The pumping house was cleaned and painted,

    Defective pumps have been repaired

While the appearance of the pump house is quite good, since (according to Mr. Qaseem) it was recently painted with funding from the United Nations Children's Fund (UNICEF), the condition of the pumps is very poor. Two pumps are completely out of use and are not even connected to the system, while the only functioning pump is leaking severely and losing at least 50% of the water pumped. If the third pump also fails, the largest source of water for the WTP will become unavailable and emergency repairs are immediately needed (although it is not known whether the AUWSSC has any funds available for such repairs). Whatever may be the case, the effectiveness of the Project is at least partially dependent on the continued supply of canal water since the WTP has a far higher capacity than the discharge from Dare Kalan alone. The pump house is shown in the photographs below.

Figure 2: The pump house at the canal

The pump house at the canal (note that the first and last pumps are not connected)

The functioning pump in the middle (note the leakage under the cloth, estimated at 50% of the capacity)

The WTP has clearly been upgraded, as is immediately obvious from the appearance of the building. However, the rehabilitation was not limited to external appearance and when visited, the pumps were all found to be in good working condition and the system to be functioning well. The aeration basin was functioning well and the sand filters appeared in good condition. Some foam was however observed on the water surface above the sand filter. When asked why, the staff explained that this was related to leakages of the filter floor, which require staff to enter the basin in order to plug them (thus the disturbance of the sand in the filter results in the observed foam at the surface). The pumps were in good working condition without any observable leakage and the connections and valves all functioned similarly well.

As with the spring capture, the water treatment plant is working well after more than 5 years (rehabilitation of the spring capture and WTP having been conducted during the first year of the Project). This proper functioning points at good design, construction and an appropriate choice of materials, although the observation of foam indicates that there are some concerns with the condition of the floor of the filter. The aeration channels and filter house are shown in Figure 3 below.

Water quality was sampled before and after being processed through the WTP. While water quality improved significantly during the treatment process, the quality of the water ultimately entering the city system could not be considered fit for consumption. During the first sampling campaign of 16 May 2015 the improvement of the water by the treatment plant was shown to be very limited. The second sampling of 23 May 2015 showed a better improvement in water quality through the treatment, but coliform colonies were still observed.

Figure 3: Aeration galleries and slow sand filter of the treatment plant

The aeration galleries of the treatment plant

The sand filter of the treatment plant

2.1.3 Conclusions and Recommendations

1. *The tender documents are generic and the technical specifications do not have the level of detail and precision that would normally be required. The apparently good condition of the system is probably mainly attributable to professional and committed Contractors and effective supervision. However it cannot be excluded that serious defects are present in the system;*
2. *It is recommended that future project bid documents be compliant with internationally accepted standards for design, specifications and contract documents (these would likely be best elaborated by development and engineering consultants);*
3. *In projects that include the tapping of water from springs, small controlled water diversions for local water users may be considered (such as for local livestock herds). These could be located close to the pressure break chambers or wash valves in the system;*
4. *The capture area at Dare Kalan needs to be better protected since the spring water is currently contaminated by coliforms. According to the 2013 right of way regulation of the MEW a 500m protection zone is needed, although the Consultant doubts that a protection zone of this size would be sufficient given the coarse sediment and general rocky outcrops at the source area;*
5. *The quality of the water sourced from the Dare Kalan spring is insufficient for human consumption and needs treatment;*

6. *The current treatment of water done at the WTP is not sufficient and the water needs further purification, possibly through chlorination or a longer treatment period;*
7. *Improvement of the water treatment is immediately required and regular sampling needs to be carried out in order to monitor the effectiveness of the treatment and to ensure that the treated water is compliant with consumption standards.*

2.2 Status of the Network in Block 11, Pumping Station, Storage and Kiosks

2.2.1 Network

The network was designed with EPANET software and was verified by Fichtner Consultants, who were in charge of another section of the Charikar water supply. The layout of the water supply system (including the required pipe sizes and the resulting pressure in the network) is shown in Figure 4 below. The use of EPANET is standard in the industry and is evidence of a professional approach.

Originally the network was designed to be connected to the main water supply of Charikar city and to receive water from the rehabilitated WTP. However due to poor network conditions in the main Charikar system and the availability of a well and storage reservoir installed by the Provincial Reconstruction Team (PRT) before the project started, the decision was made to connect the system to the PRT well and storage reservoir instead. This has resulted in an independent water supply system in Block 11 that uses high-quality well water. In principle the area around the well should be protected from any pollution risks according to new right of way regulations developed by the MEW in 2015 and at the moment, the source area does seem to be free of any immediate sources of contamination. However its location close to Charikar city renders it very sensitive to future activities likely to violate the protection zone. Monitoring and enforcement of compliance with this regulation are thus highly recommended.

The tender documents for Phase 2 of these works are generally of better quality than those for Phase 1, possibly because there are fewer civil works involved. A strength of the technical specifications is that they include practical detailed drawings and examples and figures that are easy to understand.

However, the technical specifications do not include appropriate numbering of the various categories (e.g. general requirements, earthwork, concrete, masonry, metal works, pipes and valves) and sub-articles are missing. This complicates supervision and reference to issues identified during quality control. Another element that is prominently missing is reference to specific measurements (e.g. concrete strength, masonry stone size and mortar strength).

Given the shortcomings of the specifications of the bid documents it is encouraging that the final results of the physical works carried out are quite good, and their present condition (which is still generally good) points to excellent quality control during construction. However, this could not be further verified as the Consultant was not supplied with any supervisory documentation.

Lastly and most critically, the bid documents (as well as the proposal and the final narrative report) make no mention of any disinfection other than during rehabilitation and prior to the operationalisation of the network. The only moment that at which the system was disinfected was thus during rehabilitation and at the end of its initial construction.

This lack of disinfection facilities is possibly due to the assumption that the system would be connected to the main supply of Charikar city and that enough residual chlorine would

remain in the system[3] to keep the water free of bacteriological contamination. Another reason may be that it was assumed that additional treatment would take place at the kiosks if needed.

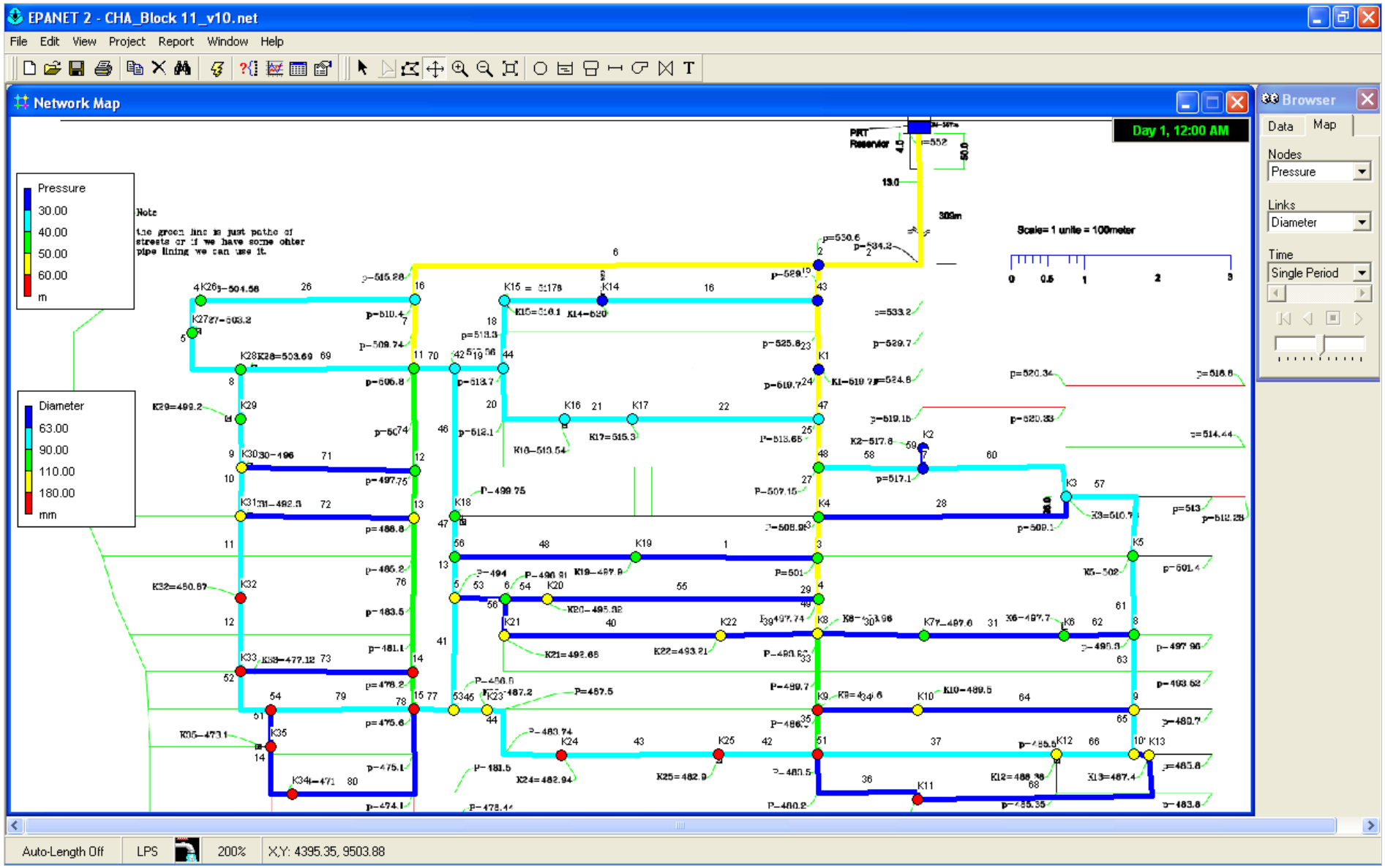
The water samples taken on 16 May 2015 (see Table 2 on page 17) clearly indicate serious contamination of water from the storage tanks throughout the entire network. Approximately the same amounts of coliform units were found in the storage tank, household taps and household water storage. The second sampling on 23 May confirmed this contamination, although this time levels were lower. Due to non-functioning of the taps during the sampling, water quality at household level was sampled from household water storage facilities only. These storage facilities also showed less contamination; however the water was still unfit for consumption according to national standards.

The absence of any chlorination or other disinfection facility has become critical, particularly since the system was connected to the PRT well and the related storage tank (a system that apparently lacks any disinfection facilities). Additionally, as household connections have been established and the kiosks are non-functional, treatment at kiosk level is not possible either. *It is therefore highly recommended to install a chlorination facility before the water enters the storage reservoir, in which case the storage reservoir will function as a holding tank in which the disinfection occurs.* Due to the separate water source for Block 11, which is of excellent quality (in fact it was the only sample that consistently showed good bacteriological results), improvement of the water quality could easily be achieved. *It is however recommended to conduct a detailed and comprehensive analysis of the chemical characteristics of the water in order to avoid further unpleasant surprises.*

The network also needs to be inspected for leakages and repairs carried out where leakages occur (or else contaminants can enter the system). Some leakage was observed in Block 11 during the field visits. *It may thus be necessary to carry out disinfection of the transmission and distribution system of the network in parallel to (i.e. during or immediately before) the operationalisation of a new chlorination facility.* Without such disinfection it is unlikely to be possible to ensure safe water supply through the network.

[3] Even if the system were connected with the main water supply this would not be the case, as clearly indicated by the samples that show bacteriological contamination even after passage through the WTP.

Figure 4: The network in EPANET



During the field inspection one location with a leakage was encountered. The Consultant was unable to establish the cause or severity of the leakage but it seems some remedial action was taken. This action was confirmed during the workshop that was conducted at the end of the mission on 17 May 2015, but could not be qualified. It is recommended to carry out an inspection and/or pressure test to identify the integrity of the system and also to conduct timely repair of leakages. To this end the BRCC could invest in some inspection equipment. The condition of the storage reservoir and of some elements of the network can be seen in Figure 5 below.

Figure 5: Condition of storage reservoir and some elements of the network

Storage reservoir and manhole

Outlet from reservoir with water meter

Standpipe (right) and water meter (left) in school

Leakage in upstream distribution pipe

2.2.1.1 Conclusions and Recommendations

1. *Monitoring and enforcement of compliance with the regulation on right of way for the protection zone around the PRT well is highly recommended;*
2. *It is highly recommended to install a chlorination facility at a point just before the water enters the storage reservoir, in which case the reservoir will function as a holding tank in which the disinfection occurs;*
3. *It is however recommended to conduct a detailed and comprehensive analysis of the chemical characteristics of the water in order to avoid further unpleasant surprises;*

4. *Disinfection of the transmission and distribution system of the network needs to be carried out in parallel to (i.e. during or immediately before) the operationalisation of a new chlorination facility;*
5. *It is recommended to carry out an inspection and/or pressure test to determine the integrity of the system and carry out timely repairs of leakages. To this end the BRCC could invest in some inspection equipment.*

2.2.2 Kiosks

Result 2 of the Project reads: ***Kiosk committees are established and made operational***. While this was the case by the end of the Project, the level of functioning immediately after Project closure was far from optimal. Only about 60% of households were attached to a kiosk as indicated above and only 386 of the 1,493 families with kiosk ID paid their contributions (this being equal to a fee recovery rate of only 26%). Bedran's report (2011) attributes this to the unreliable water supply as a result of poor availability of electricity in Charikar. However the kiosk system did not survive this initial period and since today there is almost full-time power, the kiosks no longer exist.

In fact the Consultant was informed that despite the pump being functional most of the time, water is supplied to Block 11 on the basis of three one-day rotations. This points to an under-design of the system. The *per capita* water consumption for which the system was designed is 25 litres *per capita* per day (LCD). This is the standard for rural households, although even this is very low as many studies in this case suggest a standard of 50 LCD in rural areas. For urban households the standard is 65 LCD and is expected to rise to approximately 130 LCD by 2030 according to a study conducted by JICA in 2009. *As such, in the case of urban water development projects it is recommended to assume a higher per capita water consumption than rural per capita water demand.*

The condition of the kiosks is very poor. All functioned for only a few months immediately after the closure of the Project and were abandoned within a year following the installation of house connections through the intervention of a private company (BRCC).

The kiosks are now partially dismantled and some have been vandalised. Some even serve as public toilets and are apparently used for open defecation. The Charikar SBSU is trying to salvage useful material such as steel pipes and various other elements. There is a general negative feeling toward these kiosks among Charikar SBSU staff, the traditional Shura and the majority of interviewed households. The main problems mentioned were that i) everybody paid the same price, but only influential people would get a good amount of water; ii) children and women had to queue (which was culturally sensitive, particularly in the latter case); and iii) water supply to the kiosks was erratic and people did not feel comfortable with having to pay the kiosk managers. It should be noted however that it was difficult to get any consistent information, and also that there were quite a few people who were not in the area during the implementation of the Project or had no recollection of it. The current condition of the kiosks is shown in the photographs below.

The most disconcerting element of the kiosk approach followed is perhaps that many people interviewed mentioned that they objected to the kiosks. In response to this they were told that the project would be carried out in another location if the kiosks were not accepted. Also, the *per capita* water consumption for which the system was planned was not of an appropriate standard (see above). This lack of consideration of opinions and standards is quite surprising, particularly at a time when participatory planning and project management, as well as the involvement of stakeholders at various levels, has become a standard.

The reasons behind the installation of the kiosks were further discussed during the workshop held on 17 May 2015, at which ACF representative Mr. Federico Soranzo argued that house connections can be very exclusive and can lead to inequality. This is an important argument since some of the interviewed beneficiaries mentioned that they had only recently been connected having finally amassed the required cash, while a few others have still not been connected at all. Eng. Aziz Ahmad of the MRRD however maintained that solutions such as higher own contributions could be implemented. *In any case it is strongly recommended that discussions with beneficiaries be taken more seriously and a constructive solution sought. A strength of the system however is that the network allowed for home connections which have been installed by the BRCC through a public-private partnership (PPP)*.

2.2.3 Conclusions and Recommendations

1. *In the case of urban water development projects it is recommended to assume a higher per capita water consumption than rural per capita water demand;*
2. *Discussions or differences of opinion with beneficiaries must be taken more seriously and a constructive solution sought in the case of differing opinions;*
3. *One of the main strengths of the network in Block 11 is the fact that it enabled home connections (which have been installed by the BRCC through a PPP).*

2.3 Sustained and Affordable Safe Drinking Water

2.3.1 Water Quality

In order to evaluate the most important part of the Specific Objective of the Project, namely ***the provision of safe drinking water***, sampling was carried out of all elements improved or constructed thereunder. Sampling was done according to the procedures prescribed by the AUWSSC laboratory and using their equipment. An earlier sampling, carried out in May 2011 during an external evaluation of the project done at the request of AFC, showed zero coliform presence in the water at 12 of the kiosks. These samples were analysed at the AFC lab. The exact methods used for the sampling and analysis are unknown.

The new samples were analysed at the AUWSSC laboratory. An initial sampling of the water quality across the entire network (as well as at the Dare Kalan spring, the irrigation canal and the water treatment plant (WTP)) was done on 16 May, just prior to the end of the mission. The results showed considerable contamination and it was agreed with the Delegation of the European Union to conduct a second sampling for verification. The results confirmed the first sampling and are shown jointly in Table 2 below.

Table 2: Water Quality Analysis

Location/ date	16/05/2015				23/05/2015				
	pH	EC (µS/m)	NTU	Coliform colonies CFU/100ml	pH	EC (µS/m)	NTU	Coliform colonies CFU/100 ml	Faecal Coliform colonies FCFU/100ml
Dare Kalan	8.1	209	0.15	44	8.5	206	0.22	35	6
Canal at pumps	8.2	179	4.0	200	8.4	178	4.0	120	90
WTP canal-pumped water before treatment	8.2	171	4.0	200	8.4	148	4.0	110	80

Location/ date	16/05/2015				23/05/2015				
	pH	EC (µS/m)	NTU	Coliform colonies CFU/100ml	pH	EC (µS/m)	NTU	Coliform colonies CFU/100 ml	Faecal Coliform colonies FCFU/100ml
WTP after treatment	8.5	288	1.3	120	8.4	286	0.18	20	0
PRT well	7.9	452	0.14	0	8.1	451	0.12	0	0
Storage reservoir, Block 11	7.7	450	0.28	80	8.2	446	0.18	7	0
Household tap	7.8	458	0.22	70	N/A[4]				
Household storage	8.0	447	0.18	56	8.2	456	0.35	18	11
School tank	8.0	483	0.18	70	8.3	453	0.18	8	0

Note: All samples were collected for disinfected sources, fully filled, stored in a cooler and tested the same day at the AUWSSC laboratory. pH was measured with a Hach pH meter, electrical conductivity with a Hach Electrical Conductivity Meter, turbidity using a Hach turbidity meter and coliform analysis using Delagua test kits.

The results in the table above show that only the water in the well built by the Provincial Reconstruction Team (PRT) was not contaminated. All other sources or points in the network showed contamination. The results of the second sampling indicate a slight reduction in the level of contamination (particularly in the Block 11 system), but there remains a presence of coliforms in the water which renders it unfit for consumption. These results negatively impact the entire project and its effects. The best short-term solution may be to add a chlorination facility to the storage tank in Block 11 and below the WTP for the central water supply system. It is quite likely however that the entire system will need to be disinfected before full compliance with standards can be achieved. Due to there being a separate network for Block 11, the contamination here should be eradicated relatively easily (although this assumes that the transmission and distribution network is intact and that no recontamination occurs in the network below the storage tank).

In the main system below the WTP, the solution is possibly even more straightforward. The WTP has a chlorination facility and dosage (or possibly exposure time) should be increased and regularly monitored. This will likely solve the problem immediately downstream of the WTP, though contamination may also occur in the distribution system due to poor conditions.

2.3.2 Institutional Aspects and Capacity Building

2.3.2.1 The Charikar Water Supply, or Charikar Strategic Business Sub-Unit (SBSU)

This subject strongly relates to Result 3 of the project logframe, namely: ***The capacities of the CAWSS to conduct operation and maintenance of the water supply scheme are strengthened.*** As mentioned in section 2.4 the CAWSS has since been converted into a sub-unit of the Kabul Strategic Business Unit of the AUWSSC. In this report it is therefore referred to as the Charikar Strategic Business Sub-Unit (SBSU) rather than the CAWSS. The conditions at the Charikar SBSU are further illustrated in the pictures below.

The Charikar SBSU has 40 employees and 5 departments. The sub-unit is managed by Eng. Qaseem with Eng. Yar Mohammed (Head of the Operations Department) as his deputy.

The departments of the Charikar SBSU are:

[4] The system was not operating.

1. **An Operations Department** with 9 plumbers, 5 generator mechanics/electricians and 1 mechanic;
2. **A Human Resources Department** with 9 guards, 2 drivers, 1 gardener and 1 worker;
3. **An Accounting and Finance Department** with 2 managers, 2 stock keepers and 1 controller;
4. **A Revenue Department** with 1 manager and 2 assistants; and
5. **A Customer Relations Department** with 2 meter readers.

The prices (shown in Table 3 below) that are charged for water supply are either volumetric or based on pipe size. For household connections the current price (set by the AUWSSC board) is 25 AFN per m^3, while for commercial connections 35 AFN per m^3 is charged. This is sufficient to recover all costs, which are in the order of 19 AFN per m3, provided that a supply of electricity from the national grid is available. Where pumping is required in the absence of an electricity grid, costs are around 35 AFN per m^3 (Baheer, 2015, personal communication). Approximately 1,700 of the 4,000 clients of the Charikar SBSU have metered connections.

Table 3: AUWSSC water service fees for Urban Water Supply

Type/size	Household	Commercial
Volumetric	25 AFN/m^3	35 AFS/m^3
½ inch pipe	2,850 AFN/year	N/A
¾ inch pipe	5,760 AFN/year	N/A
1 inch pipe	11,520 AFN/year	N/A

The capacity building of Charikar SBSU staff focused mainly on the manager of the Revenue Department and one of the two meter readers, who were trained in the use of the database established by RODECO. The departments were also provided with two desktop computers to run the database. This database is a powerful tool and efforts are currently being made by RODECO, who continue to support the AUWSSC through German funding, to combine the database with other financial information (such as expenses and staff costs) and to develop a financial scenario model. Once fully developed, this model will enable the users i) to access comprehensive information on income, expenses and recurrent costs at any time; and ii) to analyse the financial consequences of various strategic management choices. However, in the case of the Charikar SBSU, there has not yet been a connection with RODECO and there have been no conducting of regular refresher courses or provision of updates to the trainees or the revenue department. In all, training has not been sufficient.

During interviews the two trainees indicated that the training they received had been excellent and the database was very useful; however, they had only finished training in the registration of customers and not in the use of the entire package. Due to a computer crash a few years ago followed by an incomplete re-installation, the computers at the Charikar SBSU no longer run the database (the database welcome screen is visible, but the database itself cannot be opened). As an alternative, the newly computer-literate staff have innovatively developed their own system, which combines Word files with meter readings and calculates charges and outstanding amounts (an example is presented in Figure 6 below). The monthly data are then consolidated in an Excel worksheet.

Figure 6: Word-based meter reading file in Charikar

Meter Reading Report							راپورملاحظه میترهای عوارضی(پارچه هفتم تپه شهدا)								
ملاحظات	کوتاهی درجه	وجوه اجرات قیمت قلبه و میتر	جمع صرفیه	مکعب صرفیه قیمت فی متر	صرفیه	درجه گذشته	درجه حالیه	نمبر میتر	تاریخ	نمبر کارت	نمبر خانه	شهرت		شماره
												ولد	اسم	
	-			25	0	414	641	300867	10.1.94	2080	524	غلام عثمان	مبارز	1
	-			25	0	107	141	101385	10.1.94	3353	525	محمدحسین	محمداحسان	2
	-			25	0	803	882	300868	10.1.94	1148	526	محمدنسیم	محمدسرور	3
	-			25	0	281	306	300855	10.1.94	2075	527	محمداسلم	محمداعظم	4
	-			25	0	168	عوار ضی	502015	10.1.94	2076	528	محمداکبر	عبدالقدوس	5
	-			25	0	283	300	500728	10.1.94	1722	529	حاجی امام الدین	نظام الدین	6
	-			25	0	592	638	500891	10.1.94	1327	531	حبیب الله	حمیدالله	7
	-			25	0	369	420	500729	10.1.94	837	531	محمدعلم	محمدعمر	8
	-			25		122	عوارضی	300900	10.1.94	2086	532	گل آقا	خیرمحمد	9
	-			25	0	551	608	500807	10.1.94	2125	533	عبدالرازق	عبدالنبی	10

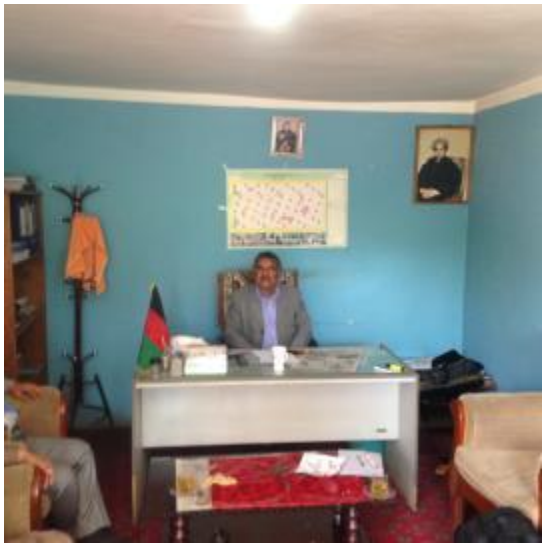
آمریت زون   چک کننده   اسم میترخوان   ) از مشترکین غرض اجرات بعدی تقدیم است   قرار شرح فوق راپور عواید تعداد(

While the self-developed system is commendable and the supply of computers and training has clearly achieved results, there are a number of observations. Firstly the use of separate programmes (Word for the recording of meter readings and Excel for the maintenance of final payment data) causes inefficiency as the data have to be entered twice. Secondly, the filing system on the computers is not very structured, leading to the risk that files may be lost. Lastly, the repetitive re-entry of numbers will likely result in typing mistakes and thus incorrect data. *In order to continue benefiting from the training and tools developed by RODECO, it is highly recommended to conduct regular follow-up, either through a special capacity building project or through funding by the AUWSSC (or by the Charikar SBSU itself).*

It has certainly been useful for staff to be trained in revenue collection and the maintenance of a revenue and income database; however, this is not the only element of O&M. *It would also have been useful to develop standard operational procedures (SOPs) and maintenance programmes as well as some form of asset management tool.* The latter does not have to be highly sophisticated or complicated but can consist of a straightforward register of hardware, operational procedures, conditional testing requirements, routine maintenance and regular repairs. Preferably such a tool should document the number of spare parts in stock and be linked to a consumables purchase plan.

A clear example of lack of capacity building is the lack of a routine inspection of water quality and appropriate disinfection procedures. This is directly related to operation and maintenance capacities. *It is thus recommended to extend training in Operation and Maintenance beyond revenue collection only*.

Figure 7: The Charikar Strategic Business Sub-Unit office and pump house



The Director's office

Customer service office and paper-based readings

The start page of the customer management system or database

The pump house and electrical panels

2.3.2.2 PPP with the Bakhtaryan Road Construction Company

A Public-Private Partnership (PPP) was formed after the Project which may serve as a useful example for joint private and public sector initiatives in water supply. However, procedures seem to be poorly adhered to and the storage tanks show contamination, thus bringing into question the operation and usefulness of the entire system. The user database of the BRCC company is fully paper-based. The BRCC office and some of the personnel are shown in the pictures below.

Interviews with management staff indicated that about 50% of customer payments are behind schedule. The company expects that these payments will only be made after harvest time since many people receive their only income from agriculture. The price for water services charged by the company is 60 AFN per m^3 (this being quite a high price for Afghanistan and more than twice the price set by the AUWSSC). Such a price might bring into question the affordability of the drinking water, which is one of the targets expressed in the global and specific objectives of the Project. An additional problem is that of equitable access to water. The user has to pay both the cost of a water meter and the cost of connection to the network. The average price is about 10,000 AFN, which for many households is too expensive. Moreover, the cost is not the same across the board. The

network constructed under the Project allows house connections to be made, but transmission lines are not available in all streets or at all locations and the further a house is from a transmission line, the higher the cost of a house connection. This throws serious doubt on the initial premise of equal water access for all.

At present, there seem to be no clear procedures according to which private companies may set prices in the water sector. Nor is there a clear guideline for monitoring the conditions of the system, the quality of the water or the reporting of findings to the AUWSSC*. It is thus highly recommended to set up procedures in general and for private sector water services, in particular with respect to pricing, monitoring and reporting on the condition of the system and water quality*. Such procedures would improve the potential involvement of private companies in the water supply sector; a wise choice considering the funding challenges involved in the provision of drinking water to all.

The pricing of water supply services has been a difficult issue throughout the project. Using as a baseline the price set by the AUWSSC of 25 AFN per m^3, water supply through the Charikar SBSU would be slightly cheaper than the original project design using kiosks (which would have charged 150 AFN per family (using 25 LCD and a household size of 7) rather than the 130 AFN charged by the SBSU). However this was based on a wholesale price of 6 AFN per m^3. At present the BRCC receives the water at 12 AFN per m^3 and delivers water to households for 60 AFN (USD 1.04) per m^3. This would equate to a monthly charge of 315 AFN with all other conditions unchanged.

Figure 8: Office and staff of the BRCC (private company managing the water supply in Block 11)

The BRCC office building

Inside the BRCC office building with (from left to right): the manager, deputy manager, a kiosk committee member, the head of the local Shura and local Shura member

2.3.2.3 Comparison with Herat

The Herat Strategic Business Unit (SBU) of the AUWSSC is in charge of the water supply in Herat city. The Herat SBU is a professionally managed organisation which operates based on modern business principles. The atmosphere is positive and staff take pride in their work and its results. In each department there is a pinboard featuring a description of the department's function and individual job descriptions. Monthly progress is monitored and reported and annual performance evaluations conducted. As recognition of good performance a bonus is proposed and may be approved by the Director General of the AUWSSC. The conditions of the office and some other elements of the water supply system in Herat are shown below.

The Herat SBU has 11 departments and 178 staff, of which 7 are women. This information was immediately available at the human resources department, which is excellently run and follows an active career path development approach. The various departments are:

1. Human Resources;
2. Coordination of other provinces;
3. Operations;
4. Technical design;
5. Materials;
6. Training;
7. Maintenance;
8. IT;
9. Laboratory;
10. Finance; and
11. Customer service.

Training of staff is conducted daily and the IT department has received an updated income and cost overview based on the RODECO database but extended with Excel applications. All departments have an overview of their activities and progress, usually available in diagram format on their pin boards. The warehouse (which was recently built at a very reasonable cost) is systematically and well stocked and is equipped with an up-to-date paper-based inventory. The groundwater pumped is systematically chlorinated through a well dosed system before being held in the overhead storage tanks. The Consultant was shown various borehole locations across the city and observed the repair of some leaking pipes. There is a well-coordinated information and awareness campaign and maintenance services are easy to contact, thus assuring that leaks or other malfunctions are identified effectively and repairs carried out before any damage occurs to the system or to the quality of the water.

Data on well pumping, electricity consumption, water delivered to the system and the water distributed through the system are readily available. Data on water quality are also available, but were not shared with the Consultant. The only clear shortcomings in the system are that there is still no good system in place to monitor the payment of service fees and there are no sanctions for late payments. Notwithstanding this flaw in the cost recovery system, the Herat SBU meets all its costs and even makes a small profit that is re-invested in the system or used for cross-subsidy at national level.

Other problems relate more to technical issues. Herat SBU staff mentioned the following:

1. The poor quality of the main elevated storage reservoir, which deviates considerably from normal construction procedures. The reservoir is leaking and cannot currently be used; if it were, the population of the surrounding area would be put at severe risk of breaching of the reservoir and flooding. It is thus strongly recommended to replace the reservoir with one of a more conventional design and better strength;
2. The need to replace 83km of old pipes which are not standardised, are not in good condition and frequently leak (and are thus a potential risk of contamination); and
3. Lastly there is a need for extension of the system using at least 50km of additional pipes to areas not yet covered.

The Herat SBU represents a benchmark of the new water supply corporation and *it would be recommended to hold regular exchange visits, particularly for projects involved in urban water supply in other cities*. One of the reasons why the Herat SBU functions so well and runs so smoothly is that international experts were embedded for a long time in the

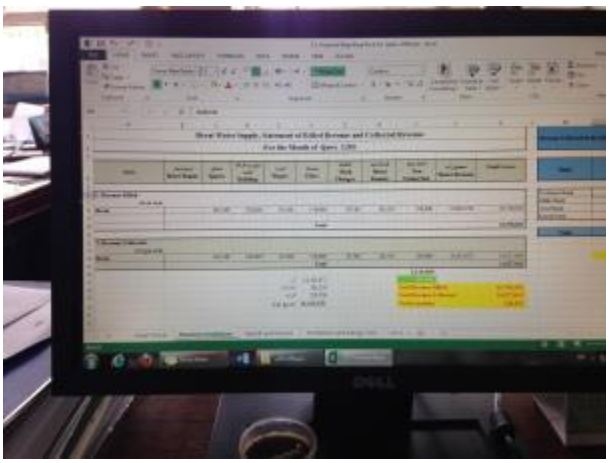
organisation and have been supporting the development of practical management procedures from inside.

Figure 9: The Herat Strategic Business Unit office

The Director's office with (from left to right): Finance Manager, Head of IT, Head of Technical Design, Deputy Director and Customs Manager, IT Technician and Operations Manager

The operations department (note the graphs on the pinboard)

The water quality laboratory and lab personnel



Screenshot of the financial overview, with worksheets for detailed checks, revenue breakdown, payroll and pensions and energy costs

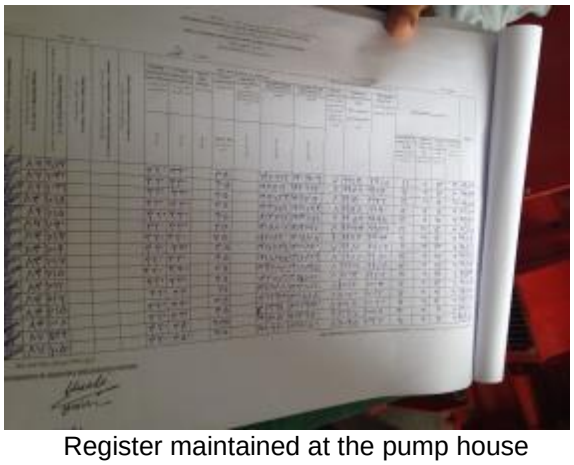
Figure 9: The Herat Strategic Business Unit office

Figure 11: Illustrations of operational practices in Herat

Leakage reported and (well equipped) maintenance crew soon at location

Chlorination at the pump unit

Central pump monitoring unit (self-made)



Register maintained at the pump house

Notwithstanding the good practices observed in Herat, the locations of the boreholes visited by the Consultant were in the middle of the city, in areas surrounded by houses. This is not in line with the MEW regulation on right of way or the specific rules governing well protection, which forbid the potentially polluting use of land around the well and prescribe zones of non-activity in the immediate vicinity. The risk of the present locations in a densely built-up area is that there are numerous sources of pollution and in the long term it may therefore become necessary to develop better source areas.

2.3.3 Conclusions and Recommendations

1. *The best short-term solution to the observed contamination may be the addition of a chlorination facility to the storage tank in Block 11 and another below the WTP for the central water supply system;*
2. *It is quite likely however that the entire system will need to be disinfected before full compliance with standards can be achieved;*
3. *The fact that Block 11 has a separate system with an independent source and its own transmission and distribution system means the contamination can probably be easily solved through installing a chlorination facility;*
4. *For the main city water supply below the WTP, good follow-up of the use of the existing chlorination facility may solve the immediate problem;*
5. *In order to continue benefiting from the training and tools developed by RODECO, it is highly recommended to conduct regular follow-up, either through a specific capacity building project or through funding by the AUWSSC (or the Charikar SBSU itself);*
6. *It is recommended to extend training in Operation and Maintenance beyond revenue collection only;*
7. *It is highly recommended to set up procedures in general and for private sector water services, in particular with respect to pricing, monitoring and reporting on the condition of the system and water quality;*
8. *The Herat Strategic Business Unit represents a benchmark for a professionally run utility and would be recommended to conduct regular exchange visits, particularly for projects involved in urban water supply in other cities.*

2.4 Status of the Charikar Water Supply and Future Plans

The Charikar water supply is in need of improvement, extension and a better management structure. The independence of the Block 11 system has a big advantage in that a source of good-quality water is available that is not combined with the mixture of canal and spring water at the central WTP. Due to its standalone character and the flexibility of the system designed, it was easy to upgrade the system in Block 11 in line with the users' requirements and to establish a PPP arrangement. There are also comparable plans to make PPP arrangements for other areas of the city (for example in Blocks 8 and 12).

This strategy allows for stepwise development and can avoid the disadvantages of the central system. However the fragmented nature of the system and inconsistent operational rules, as well as the vast difference in tariffs between the supply provided through the Charikar SBSU and that provided by the PPP companies, combine to cause a number of problems. These problems include supervision of O&M, water quality control and issues around social equity, to mention a few. Therefore the plan to connect the Charikar water supply system to a well in Salang District is probably the best solution.

The Sartikacha springs consist of a complex system of various springs located in the Koklami Valley of Salang District. Since only one of the springs will be tapped for the water supply system, there should be no undesirable environmental impacts. One of the main advantages of the new water source is that it is located at an elevation high above Charikar city, which will allow the water to be supplied by gravity without additional pumping costs. The plans are already well advanced and tender documents have been developed by the AUWSSC. The project will be implemented through the Ministry of Rural Rehabilitation and Development (MRRD) and will be handed over to the AUWSSC or its Charikar SBSU once completed.

It will be essential to replace the old network as part of this capture project since it seems impossible to guarantee high-quality water, sufficient pressure and other essential technical properties using the degraded system that is now located downstream of the WTP. At the same time it is of fundamental importance to develop a good institutional structure and supply the Charikar SBSU with good quality control and O&M capabilities both before and during the project. Modelling the institutional framework on of the Herat SBU is highly recommended (though obviously with a leaner structure since Charikar is a strategic business sub-unit and covers only one city).

2.5 Hygiene and Health

This element relates to Result 5: ***Hygiene-related knowledge, attitudes and practices are improved among clients of the kiosks.*** Due to its relation to the kiosks this result cannot really be investigated; as such, the Consultant has instead studied the results of the hygiene KAP survey in more general terms.

Based on house-to-house surveys and various interviews conducted with key groups it can be concluded that the extensive hygiene campaign carried out under the Project continues to have a good influence on knowledge, attitudes and practices. This became clear during the rapid survey carried out as part of this impact assessment. Particularly, hand washing has become standard practice and hygiene in houses, water availability and the cleanliness of latrines have all durably improved. The relatively better-quality water also continues to have a positive influence on heath, as the incidence of diarrhoea is well below the situation observed before the Project (when approximately 30% of children had suffered in the last two weeks).

Of course, the reduction in diarrhoea is not as large as it could have been since the water in the new supply system is slightly contaminated. Moreover, the popularity of the practice of boiling water has fallen, possibly because the new piped water is considered to be clean and safe. The promotion under the hygiene campaign of how to distinguish between the various water sources and adopt the required practices to ensure their safety might well have had the risky behaviour of not boiling the piped water as an unintended consequence.

The results of a house-to-house survey are shown in Table 4 below.

Table 4: Results of the KAPs and rapid assessment (N=19)

Subject	2008 KAP	2010 KAP	2015 rapid assessment
Frequency of washing storage/transport containers	53% once a week	78% once per day	30% once a week, 40% once every two weeks

Subject	2008 KAP	2010 KAP	2015 rapid assessment
Practising of water boiling	18%	81%	43%
Hand washing: After defecation	85%	100%	93%
After bathing children	57%	99%	100%
Before eating	88%	100%	100%
Before cooking	81%	100%	100%
Before feeding children	26%	97%	8% (92% sometimes)
Use of soap for hand washing	49%	98%	64%
Number of children having had diarrhoea in the last 15 days	53%	18%	28%
Use of ORS in the case of diarrhoea	6%	83%	100%
Cleanliness of latrines	35%	73%	64%
Washing facilities at latrines with water and soap	1%	87%	64%

The consultant also had a long discussion with the head teacher of the primary school. The head teacher has been in Block 11 for the last eight years but could not recall anything of the hygiene campaign. There is considerable attention paid to hygiene in schools as part of the normal curriculum. In primary schools a specific hygiene curriculum has been in place for a few years and all teachers attend an annual 3-day retreat at which hygiene and hygiene teaching are refreshed and renewed and new ideas included in the curriculum. During term time a 20-minute hygiene class is held every week.

A well developed timetable was hanging on the head teacher's wall when the Consultant visited. The head teacher also reconfirmed that the incidence of diarrhoea has decreased significantly since the installation new water supply system. Defecation in class hardly ever happens now while it was almost routine about 5 years ago.

The messages and influence of the Project hygiene campaign were also discussed with the traditional Shura, who remembered the campaign well and considered it useful. One of the problems identified however was that many of the messages were theoretically sound but difficult to implement due to the unavailability of material (for example sealable and washable water storage containers) and the inconsistent possibility of follow-up (no example given).

In general it can be stated that the hygiene campaign was useful and has contributed to better hygienic conditions. Most important however is the easy availability of relatively high-quality water, which has significantly improved opportunities for washing and cleaning.

3 Overall Assessment

The assessment described in this chapter is based on the descriptions of the various Project components and results described in the previous section, as well as on the discussions held at the workshop conducted on 17 May 2015. A description of the presentation given at the workshop, along with the key points discussed and agreed or debated, is provided in Annex 3 to this report.

3.1 Relevance

The Project can be considered relevant to highly relevant. It is highly relevant in terms of the obvious needs it addresses; however, this is partly reduced due to the observed contamination.

Lack of reliable water supply is a major source of disease and the fetching of water remains a burden (mainly for women and children). The Project design was in logical coherence with and complementary to on-going projects in the water supply sector. The logical framework could however have been more specific, particularly for Result 1: ***Exhaustive narrative reports as well as a set of various maps and bills of quantities describe the works to be achieved for the rehabilitation and extension of the water supply scheme.*** This result could have been more simply defined as the elaboration of tender documents according to international standards.

The flexibility and adaptability of the project can be questioned. While it is difficult to verify the exact process over four years after the completion of the project, the Consultant received very clear indication that the kiosk approach was not in line with the expectations of the community. Instead of looking at alternatives, beneficiaries were (according to interviewed stakeholders) simply given the choice to "take it or leave it". It is understood that home connections can consequently exclude poorer social groups. However, there are lessons to be learnt from other water supply projects in Afghanistan where communities paid for water meters and connections to the distribution system through their own cash contributions.

While Result 3: ***The capacities of the CAWSS to conduct operation and maintenance of the water supply scheme[5] are strengthened*** foresees O&M training of professional staff. Not enough inputs were devoted to this and only one outsourced (albeit excellent) training course was conducted. In contrast, the time and input devoted to the training of community members to form kiosk committees and run the kiosks according to small business principles seems out of proportion. This is particularly regrettable since far less time and energy was spent on the training of Charikar SBSU personnel in operation and maintenance. With the disappearance of the kiosks the training efforts have had little benefit for the O&M of the water supply system.

In general, coordination between the AUWSSC and the Charikar SBSU, with the exception of the shortage of capacity building inputs, has been good. This coordination has resulted in clear ownership of the hardware elements of the project, which was one of the aims of Result 4: ***The water supply scheme is rehabilitated and extended***. Due to this excellent coordination, the Project seems to have been well supervised, notwithstanding the relatively vague definitions in the tender documents.

Hygiene awareness has been given appropriate attention under Result 5: ***Hygiene-related knowledge, attitudes and practices are improved among clients of the kiosks*** and has

[5] This is now the Charikar Strategic Business Sub-Unit (Charikar SBSU).

been extended from kiosk clients to the larger community. This is a valuable contribution to the global and specific objective under any condition.

3.2 Effectiveness

The Project can be considered fairly effective. While at first glance about 60% (3 of 5) of the results have been delivered, there are serious issues with essential elements. The main issue here is the contamination of water at delivery points and residual contamination after passage through the WTP, which brings into question the entire specific objective of the Project. While it may be possible to mitigate the contamination through well-targeted chlorination and disinfection and while the contamination might be caused by poor maintenance activities (which could not have been foreseen during Project execution), implementation of the Project could also have caused the observed problem.

Immediately following the Project, water quality was sampled and was found to meet standards at the kiosk outlets (Bedran, 2011). However, sampling was not carried out of the Dare Kalan spring or of the water delivered by the WTP. It is thus difficult to establish the exact reasons for the contamination. However, there are a number of concerns:

- The tender documents (Result 1) do not contain precise descriptions of the materials used or of any testing to be carried out to confirm that specifications are followed. This leaves the supervisor at the mercy of the Contractor;
- There is no reference to disinfection apart from during the initial delivery of the system;
- Monitoring of water quality is not specified under any of the actions. Monitoring instead mainly focuses on the functioning of the kiosk committees (Result 2);
- The capacity building of professional staff at the Charikar SBSU focuses on the client database and ignores issues such as routine operational procedures, maintenance and quality control.

What could not have been foreseen was the completion of the system by the company BRCC which installed the house connections and now runs the system in Block 11. It could be that some of the contamination observed in Block 11 is due to sub-standard hygienic procedures. It must be noted however that the operational staff are partially contracted from the Charikar SBSU and that at least one is an inhabitant of Block 11. Had this staff member been trained in the O&M of the system the risk of improper procedure would have been reduced.

It should be emphasised here that it has *not* been established that the BRCC is to blame for the contamination. In fact the intervention of the BRCC guarantees the use and management of the network and is thus crucial.

Firstly, the kiosk committees (Result 2) received too many resources (primarily, almost 10% of the construction budget). Secondly, all documents are full of extensive discussion of the kiosks and kiosk committees. Ultimately the kiosks did not survive and it would have been far better to find an alternative solution rather than waiting for the community to organise a private company to complete the house connections.

Results 1 and 4 have been achieved, taking into account the above remarks on the precision and appropriateness of Result 1. The piped spring capture system is functioning and delivering relatively good-quality water to the WTP. The network in Block 11 is also functioning and has to some extent been salvaged by home connections.

One of the most effective results may be Result 5: ***Hygiene-related knowledge, attitudes and practices are improved among clients of the kiosks****,* but in a more generalised way that applies to all inhabitants of Block 11. A household survey clearly indicated that hygiene-related knowledge, attitudes and practices are still significantly improved as compared to the pre-project situation.

In order to better benefit from unplanned activities such as the involvement of the private sector through the BRCC there seems to be a need for better guidelines on the operational procedures, financial mechanisms and quality control of PPPs. This is outside the context of the current Project but could be a contribution of future EU-funded projects.

3.3 Efficiency

The Project can be considered only partly efficient. While it was generally well managed and finalised almost within the timeframe, and a comparatively efficient 72% of the budget has been spent on hardware (the piped adduction line, rehabilitation of the WTP and the installation of the network in Block 11), some of the hardware provided was rejected and did not contribute to the objectives at all. This is partially due to considerable co-financing from the city of Paris, which provided 296,957 EUR (or 22.6% of the approximate total of 1.316 million EUR). Even against the total budget about 52% is spent on hardware. There is however no detailed breakdown of all costs, since the various sources do not entirely correspond and the final auditing report does not give a detailed breakdown of (for example) the three lots in the construction project.

It has been difficult however to find any information on Project supervision. This is not provided in the narrative reports and it was not possible to obtain any field forms, partial or provisional acceptance certificates. Possibly due to the timing of this assessment (more than four years after the end of the Project), no photographic material could be found either (such as of sites before, during and after construction). This lack of information makes it difficult to comment on the conditions of the system. At first glance and based on a rapid inspection of the various accessible elements the condition would seem to be good, but leakages observed in the upper parts of the Block 11 network and the disappointing results of the water quality sample analysis have a negative effect on the final results.

A major element affecting the efficiency of the project is the deterioration and disappearance of the kiosks (despite a considerable amount of time having been spent on the training of kiosk members). Almost 20% of the hardware budget, or 13% of the total EU contribution, was spent on the construction of the kiosks, which no longer exist. Additionally a considerable amount of personnel resources have been spent on the training of kiosk committee members. Hardly any of these resources have been spent usefully, although the understanding of business principles acquired by some of the trained kiosk committee members may go on to have positive external benefits.

The capacity building of Charikar SBSU staff was needed and has resulted in the presence of computer-literate personnel in the customer services department. Due to incomplete training in the customer management system the capacity building has however been less efficient than it might have been. Another limitation was that training focused on customer management only and did not cover technical issues related to the operation and maintenance of the network and various facilities.

The hygiene promotion campaign conducted under the Project had a cost of only 11,600 EUR, less than 1% of total project costs. It is not clear if this refers to materials only or also includes the related staff costs. It can in any case be considered one of the most efficient results of the Project.

Bedran (2011) mentions a low cost per beneficiary based on the numbers provided in the final narrative report of ACF (2011). However, these numbers could not be verified in the field and based on the number of household connections (800), attendance at the primary school (1,800 boys and girls for Blocks 11 and 13 combined) and the membership of kiosks mentioned in the final narrative report (1,493), the number of beneficiaries is estimated to be between 5,000 and 9,000. This would equate to a cost of between 146 and 260 EUR per beneficiary. This is within the normal costs for comparable projects, but is certainly not low.

Continuation of the project by the BRCC is an unforeseen additional output that has enabled the extension of the system to cater for household connections. Provided that the observed problem of poor water quality through contamination by coliforms can be addressed effectively, this extension of the project in fact increases its efficiency.

3.4 Impact

Potentially the project could have had a larger impact since it was planned to deliver more water to the main storage reservoirs of the Charikar city water supply, thereby potentially improving the life and health of approximately 54,000 people (CSO, 2011). However, from the outset this potential impact was slightly reduced due to the discontinuation of the concurrent project targeting the main water supply network that was under implementation by the World Bank and supervised by Fichtner Consulting Engineers. The result of this discontinuation is that the improvements made to the spring capture and WTP under the assessed project will continue to be affected by the poor condition of the main network being fed by the WTP. Moreover, coverage of the network has hardly increased and piped water is only presently reaching 4,000 households and some public places.

The Project has had considerable impact due to the additional provision of water to the major water treatment plant (WTP) at Charikar. While the observed low water quality undoubtedly has a negative effect, the overall impact of the Project is certainly not lost and the Project has definitively contributed to a larger amount of high-quality water entering the WTP. The piping of water from Dare Kalan has decreased infiltration, while the replacement of deteriorated GI pipes with high-pressure polyethylene and the transition from open-ditch to piped water over almost 3 kilometres has significantly reduced the contamination and potential contamination of water. The repairs and upgrading of the WTP have also improved the purification of water, which again has increased the availability and quality of the water supplied to the people who are connected to the network.

The connection of a network for the water supply of Block 11 of Charikar city to the borehole installed by the Provincial Reconstruction Team (PRT) in 2008 has provided a new source of high-quality water to approximately 800 households, or more than 5,000 people. The direct home connections that were installed at the end of the Project and following the disintegration of the kiosk system provide additional free time to the beneficiaries, mainly to women and children. Women are thus able to focus on other issues, including skills building and training programmes that have the potential to facilitate access to economic activities through (for example) cottage industries, while children's attendance at school has improved significantly. This has a potentially long-lasting impact on the economic conditions of households and thus on the future prospects of the children who live in Block 11.

Notwithstanding that some of the positive impact of the project has been negated due to the contamination of the water as evidenced by the two water sampling campaigns conducted in May 2015, there remains a clear indication of a reduced incidence of diarrhoea, particularly among primary school children. This has a positive impact on household finances since fewer resources have to be spent on medicines while the economic outputs, particularly those paid on a daily basis, increase. Children are better equipped to attend school and thus

to prepare for their futures, while school itself has at the same time become less of a source of disease. This aspect could be verified in Block 11 through the various interviews conducted; however, no reliable data could be obtained on a city-wide scale.

Although unintended, the involvement of the private Bakhtaryan Road Construction Company (BRCC) in Block 11 has improved the Project's impact through the connection of households to the network installed by the Project. These home connections avoid the initial problems experienced at the kiosks in which influential people were obtaining more water than poorer groups despite payment being equal for each family. It has also reduced the need for women to queue for water at the kiosks (which is socially problematic) and as mentioned above the household connections also reduce the time required to fetch water, thereby allowing women and children to concentrate on more productive activities.

Household connections in an urban environment certainly seem to be the most appropriate solution; however, they also lead to problems with equity. The poorest households can often not afford the cost of the meter and the connection to the distribution network, which in the case of Block 11 is almost 10,000 AFN. This has resulted in about 30% of the population not yet being connected to the water supply system. In addition, the price of water services has become considerably higher than originally intended and is now at the level of approximately 315 AFN per household per month (assuming 25 litres *per capita* per day, a household size of 7 and a service fee of 60 AFN per m^3) rather than the planned 150 AFN per household per month. Given the original willingness of beneficiaries to pay 68 AFN per month, it might be questioned if the specific Project objective of providing affordable water has been met.

The involvement of private companies in water supply through public-private partnerships could well be an effective long-term strategy; however, the current situation in Block 11 also clearly indicates a number of potential problems with the PPPs. The administration, operation and maintenance of the network and household connections currently carried out by the BRCC are not apparently up to the required standard. There is a relatively poorly organised paper-based system for payments, which is difficult to share and is likely to lead to problems with transparency. More seriously, it seems that no criteria exist for the pricing of services or for the monitoring and maintenance of water quality. In order to increase the potential of the private sector to develop water supply, regulations are required: firstly to ensure that the water supplied is of good quality, and secondly to guarantee a transparent pricing system. In case the pricing of services transpires to be too high, measures should be taken to improve affordability.

3.5 Sustainability

Experience to date would indicate the Project to be "less likely sustainable". The sustainability of the action depends strongly on its success in improving water quality. The only element that is reasonably sustainable is the hygiene awareness campaign, since the household surveys show a clear improvement in comparison to the situation before the Project. However, it is not possible to distinguish whether this is entirely a result of the Project or whether other processes have also improved awareness of good sanitation (for example, the Charikar primary school has a structured and well-planned hygiene education component and other projects are also on-going).

Assuming the observed contamination can be addressed by chlorination, the sustainability of the specific objective and the physical systems (Result 4) will significantly improve, provided that a durable and reliable source of chlorine can be found and the system can be disinfected *effectively. It is highly recommended to develop a strict water quality monitoring system that measures water quality on a weekly basis in order to verify that it remains within standards*.

A further capacity building programme at the Charikar SBSU would also be useful in order to consolidate the clearly increased computer literacy of the two trainees. In contrast to Herat, the Charikar SBSU does not have sufficient resources or an in-house training centre; thus, without further training the capacity building element will not be fully sustainable.

3.6 Coherence and Added Value

The Project is clearly in line with the general policies of the EU and of the United Nations in general. It also contributes to the achievement of Millennium Development Goal target 7C (to halve the population without access to safe drinking water and basic sanitation). The Project is also complementary to a number of other EU projects in the same field such as the GIZ-funded, RODECO-implemented Water Supply Improvement Project. This (as with most other evaluated elements) is of course subject to eradication of the observed contamination.

4 Conclusions and Recommendations

4.1 Conclusions

1. The Project was carried out largely to schedule and almost within its budget and the infrastructure seems to be in good condition, with the exception of the kiosks and possibly the canalside pumps. The tender documents seem to indicate this was part of the project, but further information obtained during field visits was contradictory;
2. The tender documents (Result 1) are generic and the technical specifications do not have the level of detail and precision that would normally be required. The apparently good condition of the system is probably mainly attributable to professional and committed Contractors and effective supervision. It cannot however be excluded that serious shortcomings do exist;
3. Serious contamination with coliforms was detected at all points (with the exception of the PRT well) of the rehabilitated and newly constructed elements of the Project during a water quality sampling carried out on 16 May 2015. A second sampling campaign carried out on 23 May 2015 confirmed the contamination, but indicated lower amounts. The reasons for the contamination could not be established and may relate to either defects in the technical system, erroneous management of the water supply systems or a combination thereof;
4. The water from the spring at Dare Kalan is (surprisingly) contaminated, was declared not to be of sufficient quality for human consumption and thus needs treatment;
5. In order to achieve any of the objectives of the Project it is essential to establish the causes of the contamination and to address them. It is probable that chlorination of the storage reservoirs in the main water treatment plant (WTP) and of the Block 11 storage reservoir will be sufficient, but it is likely that the entire network will need to be disinfected as part of this process;
6. The contamination seen at the Dare Kalan spring suggests that the level of protection of the upper catchment is not sufficient, notwithstanding ownership of the water supply system by the local population. It is thus likely that a full protection zone will need to be established upstream of the capture;
7. The kiosks did not function well and seem to have been imposed on the beneficiaries rather than being agreed on in a participatory manner, although house connections themselves entail the risk of lack of equity. In future, solutions need to be sought with the participation of the users and a range of options identified as too many resources have now been spent without any results;

8. Capacity building of the Charikar Strategic Business Sub-Unit (SBSU) of the Afghan Urban Water Supply and Sewerage Corporation (AUWSSC) has effectively enabled the two trainees to use IT for the registration of users and meter readings even though a computer crash has since frozen the Customer Management System developed by RODECO. Strengthened capacity of the Charikar SBSU personnel for the operation and maintenance (O&M) of the water supply system requires more than just the use of a customer database and revenue control;
9. The Herat Strategic Business Unit is a good example of a professionally functioning water utility that should be used for effective exchange visits by the various strategic business units and sub-units of the AUWSSC;
10. One of the main strengths of the network developed in Block 11 is that it enables home connections, which have been installed by the Bakhtaryan Road Construction Company (BRCC) through a public-private partnership (PPP);
11. The hygiene promotion campaign has been successful and looks to have sustainably increased awareness and improved practices. At such it was one of the most efficient elements of the Project. In addition, the easy availability of water of reasonable quality in sufficiently high quantities has significantly contributed to improved hygiene and is therefore another important impact of the Project.

4.2 Recommendations

1. For future projects, it is recommended that bid documents be compliant with general, internationally accepted technical specifications, design and contract standards (such as the contracting conditions of the International Federation of Consulting Engineers (FIDIC). The development of such designs, specifications and standards is a highly technical job that is probably best done by (or in close cooperation with) engineering consultants;
2. In projects that include the tapping of water from springs, small controlled water diversions for local water users may be considered (such as for local livestock herds). These could be located close to the pressure break chambers or wash valves in the system;
3. The capture area in Dare Kalan needs to be better protected since the spring water is contaminated by coliforms. According to the 2013 right of way regulation of the Ministry of Energy and Water (MEW) a 500m protection zone is needed, although the Consultant doubts that a protection zone of this size would be sufficient among the coarse sediment and general rocky outcrops at the source area;
4. The current treatment of water done at the WTP is not sufficient and the water needs further purification, possibly through chlorination or a longer treatment period;
5. Improvement of the water treatment is immediately required and regular sampling needs to be carried out in order to monitor the effectiveness of the treatment and to ensure that the treated water is compliant with consumption standards;
6. Monitoring and enforcement of compliance with the regulation on right of way for the protection zone around the PRT well is highly recommended;
7. It is highly recommended to install a chlorination facility at a point just before the water enters the storage reservoir, in which case the reservoir will function as a holding tank in which the disinfection occurs;
8. It is however recommended to conduct a detailed and comprehensive analysis of the chemical characteristics of the water in order to avoid further unpleasant surprises;

9. Disinfection of the transmission and distribution system of the network needs to be carried out in parallel (i.e. during or immediately before the operationalisation of a new chlorination facility);
10. It is recommended to carry out an inspection and/or pressure test to determine the integrity of the system and carry out timely repairs of leakages. To this end the BRCC could invest in some inspection equipment;
11. In the case of urban water development projects it is recommended to assume a higher *per capita* water consumption than rural *per capita* water demand (in principle in line with established standards for urban areas);
12. Future discussions or differences of opinion with beneficiaries must be taken more seriously and a constructive solution sought in the case of differing opinions;
13. The best short-term solution to the observed contamination may be the addition of a chlorination facility to the Block 11 storage tank and the installation of another below the WTP for the central water supply system
14. It is quite likely however that the entire system will need to be disinfected before full compliance with standards can be achieved;
15. The nature of the Block 11 network as a separate system with an independent source, transmission and distribution network provides probable opportunities to easily solve the observed contamination through a chlorination facility;
16. For the main city water supply below the WTP, good follow-up of the use of the existing chlorination facility may solve the immediate problem;
17. In order to continue benefiting from the training and tools developed by RODECO, it is highly recommended to conduct regular follow-up, either through a special capacity building project or through funding by the AUWSSC (or by the Charikar SBSU itself);
18. It is recommended to extend training in O&M beyond revenue collection only;
19. It is highly recommended to set up procedures in general and for private sector water services, in particular with respect to pricing, monitoring and reporting on the condition of the system and water quality;
20. The Herat Strategic Business Unit represents a benchmark for a professionally run utility and would be recommended to conduct regular exchange visits, particularly for projects involved in urban water supply in other cities;
21. In order to better benefit from unplanned activities such as the involvement of the private sector through the BRCC there seems to be a need for better guidelines on the operational procedures, financial mechanisms and quality control of PPPs. This is outside the context of the current Project but could be a contribution of future EU-funded projects;
22. .It is highly recommended to develop a strict water quality monitoring system is being developed for Charikar (and if needed, also on a national scale) which measures the quality of water on a weekly basis in order to verify that it remains within standards;
23. It would seem that in the long term it seems that a complete overhaul of the water supply in Charikar is required. This would also include the eventual sourcing of water from a safe water supply such as the proposed spring at Sartikacha in Salang District, although the water sample from the Dare Kalan spring also shows contamination and treatment will still be needed;
24. Renewal is needed of the sections of the central water supply network where pipes are leaking and/or do not comply with the new standards set in 2011;

25. Further equipment, training and capacity building of the Charikar Strategic Business Sub-Unit of the Afghan Urban Water Supply and Sewerage Corporation is required to achieve long-term improvement in the quality of the Charikar water supply and enable the efficient running of the SBSU.

Annex 1: Itinerary and Timetable

	Time	Location	People met	Main issues
28/04/2015	22:00-02:30	Kathmandu-Dubai	N/A	Travel
29/04/2015	08:00-16:30	Dubai, hotel-Afghan consulate	Support staff, Councillor	Obtain visa
30/04/2015	09:00-17:30	Dubai hotel	Announcements to support staff for Saturday interviews in Kabul, reading project documentation	Preparations
01/05/2015	afternoon	Travel Dubai-Kabul		Arrival 15:30 in Kabul, Inform security coordinators and support staff to be interviewed
02/05/2015	08:00-13:00	Kabul, Guesthouse LML, MEW offices	Various interpreters, drivers, security advisor	Establishing of project team
02/05/2015	13:00-14:30	Kabul, MEW, Water Project Planning Support Unit	[redacted] (Head Support Unit); [redacted] Ghafoor Chief Engineer)	New water resources project plans, status of the Shahtoot dam Bulk Water Supply Project
02/05/2015	14:30-15:00	Kabul, MEW, Water Project	[redacted] (Director)	Strategic Planning Water Resources; recent changes after the elections
02/05/2015	15:00-15:30	Kabul, MEW Water	H.E. S Ziayee, Deputy Minister Water.	New Ministry set up and staff, new roles of the Supreme Councils of Water, transformed to Supreme Council of Land and Water
02/05/2015	15:30-17:00	Kabul, temp. office in MEW	Support team.	finalise mission programme
03/05/2015	07:30-11:00	Kabul, AUWSSC	Eng. [redacted] DG of AUWSSC. Eng. [redacted] Head of Kabul Strategic Business Unit (KSBU); Mr. [redacted] Finance Manager of (KSBU)	Introduction to AUWSSC, strategic objectives, management, institutional structure and main strengths and needs for further development
03/05/2015	14:00-15:30	Kabul, EUD	Wali [redacted] Senior Programme Manager, Rural Development; (Eng. [redacted], Senior Programme Manager, Water and Natural Resources Management)	Discussion of programme for mission and expected outcomes

	Time	Location	People met	Main issues
04/05/2015	08:00-10:00	Kabul, LML guesthouse	[redacted] CEO Risk Visibility; [redacted], in-charge security LML Afghanistan	Develop detailed security protocol for field visits and visit to Herat, Kunduz visit cancelled due to poor security
04/05/2015	10:00-17:00	Kabul, LML guesthouse	Review of documents and new information received, contact UNICEF, GIZ, MRRD,	Set up list of field visit questions and places of interest.
05/05/2015	0830-10:30	Field visit Charikar	Eng. [redacted] SBU provincial coordinators joins and supports visit;	
5-05-2015	10:30-12:30	Meeting Charikar Strategic Business Sub Unit (Charikar SBSU)	Eng. [redacted] SBSU; Eng. [redacted]d Operations Manager; [redacted] and [redacted] meter readers/ computer operators	Explanation general system, discussion cost recovery and systems used; tour of the SBSU and its facilities.
05/05/2015	12:30-14:00	Meeting at Bakhtaryan Company Operations office for Block 11 Water Supply	Staff from Charikar SBSU; [redacted], Company Manager; [redacted], deputy manager; [redacted] Finance Manager; [redacted], Shura-head; [redacted] Water Kiosk Committee manager	Block 11 connections, involvement of company, finalisation of house connections, reasons for rejecting Kiosks, cost recovery of current system.
05/05/2015	14:00-15:30	Field visit Water Treatment Plant, various distribution points and manholes	Staff from Charikar SBSU;	Visual inspection of system, starting of pumps, checking of valves
05/05/2015	15:30-17:00	Return to Kabul (travel recommended not later than 15:30)		
06/05/2015	Morning	Visit ACF	[redacted] WASH head; [redacted] Country Director	Explanation of current WASH programme, priorities and cultural limitations some initial information on project, more to be sent
06/05/2015	Afternoon	Visit MRRD, Rural Water Supply, Sanitation and Irrigation Programme	Eng. [redacted], Executive Director; Eng. [redacted] design engineer WASH; Eng. [redacted] operation	Explanation of the new Sartikacha spring in Salang District and cooperation on such projects between AUWSSC and MRRD;

	Time	Location	People met	Main issues
			with UNICEF	MRRD heads WASH coordination meetings; A MIS/GIS system is being developed with all relevant information for all active in WASH, the URL is:
07/05/2015	08:30-17:00	Visit Charikar	Eng. [redacted] and CSBU team	Field visit to Dare Kalan, inspection source protection area, pressure break chambers and air valves, visit Canal intake point.
08/05/2015		Kabul-Herat		Review of reports and information
09/05/2015	08:00-16:00	Visit Herat SBU, left for airport in afternoon, flight was cancelled.	[redacted] Deputy head, Customer Relations Manager; [redacted], Operations Manager; [redacted] Finance Manager; [redacted] Controller Admin; [redacted] IT specialist Laboratory personnel; Store manager; RODECO adviser	Explanation pf functioning and organisation; Every department has a function description and all employees a job description, monthly reporting and evaluations; Visited all departments and saw big enthusiasm; Short field visit and observed proactive maintenance. Main problems for the department are the non-functioning (square) elevated storage tanks and problem with receiving sophisticated laboratory materials and
10/05/2015	Whole day	Review of information flight yesterday afternoon was cancelled. Herat-evening flight to Kabul		Reporting, list of additional questions to address in Charikar and with related organisations
11/05/2015	08:00-17:00	Review of information, reporting, organisation of field trip; Training of enumerators Ms Wahida Alawi		Report outline Final Questionnaire
12/05/2015	08:30-17:00	Field trip Charikar	Interviews at school, headmaster [redacted] walk through of network Block 11, inspection of storage in Block 11, met Rahmatullah In charge of	House connections strongly supported, water only every three days, because storage allegedly too small, but when visited storage was empty.

	Time	Location	People met	Main issues
			maintenance around storage tank; House visits where possible, Meeting with Shura leader; [redacted] did a house to house survey of 5 people (we interacted frequently)	
13/05/2015	Morning	Meeting AUWSSC	Eng. [redacted] Lab technicians; Storage managers	Further information on AUESSC running, arranged for sampling of water and was given expansion plans of AUWSSC in Kabul, neighbourhoods Do-Abad, Dala Almond Khan and Qarqha (Deraban)
	Afternoon	Meeting ACF	[redacted]	Further information on Charikar project particularly leaflets for awareness campaign and supervision sheets if available.
13/05/2015	Whole day	House to house visits KAP questionnaire	14 households	Further information on hygiene Knowledge, attitudes and practices
14/05/2015	Early morning	Meeting ex-advisor for infrastructure of Karzai	[redacted]	General concept of WASH and feeling about shared water supply; Strategic water supply plans of the government
14/05/2015	Morning-Afternoon	Charikar field visit, additional data collection	Qaseem, and Charikar SBSU staff, Health department	Visit of well and environment, various parts of the system, questioning of other stakeholders
14/05/2015	Late afternoon	Review of questionnaires	[redacted]	Finalise questionnaires and summary
15/05/2015	Friday	Report writing		
16/05/2015	5:30-12:00	Sampling of water at strategic points Charikar, handover of samples in AUWSSC lab		Water samples obtained
	12:00-17:00	Further field data collection	[redacted]	Final details on technical aspects of system
	Late	LML guesthouse/translators home		Preparation for workshop
17/05/2015	9:00-13:30	Golden Star hotel	Eng. [redacted] (DG. AUWSSC); [redacted] (GIS/MIS, M&E	Workshop, excellent discussions on house connections, equity issues, costs of water

	Time	Location	People met	Main issues
			MRRD WASH) [redacted]; [redacted] (Charikar SBSU head) [redacted] (Charikar SBSU customer relations) [redacted](Charikar SBSU Revenue head); [redacted] (Enumerator social/gender expert); [redacted] (ACF); [redacted] (translator, KAP expert); [redacted] (logistical support)	supply by company, technical shortcomings, involving stakeholder sin choice they make if needed by higher contributions.
17/05/2015	14:30-16:30	GIZ office Qale Fatullah	[redacted] Sector Improvement Programme Deputy Director	General issue Water Sector Development in Afghanistan; Need for protection zones around wells
17/05/2015	evening	LML guesthouse		reporting
18/05/2015	8:00-12:00	LML guesthouse		Reporting, water sample results received (poor, coliform pollution) at 10:30
	12:30-13:30	EU office	[redacted]	Results, discussion on mitigation pollutions, agreed second sampling
23/05/2015	06:30-12:30	Kabul-Charikar-Kabul (AUWSSC laboratory)		Second sampling
24/05/2015	17:00	Kathmandu, Nepal		Received results second sampling
25/05/2015	08:00-17:00	Kathmandu, Nepal		Finalise report on the basis of confirmed sampling results

Annex 2: Logframe

The logical framework (logframe) presented here uses the same rating system as in the final narrative report (AFC, 2011) and shows the rating provided by AFC in their report in brackets followed by the current rating **in bold** on the basis of this assessment. If there are any changes in achievement, these are indicated in bold after the original text of ACF (2011). Comments are new and belong to this assessment. The rating scores used are shown below:

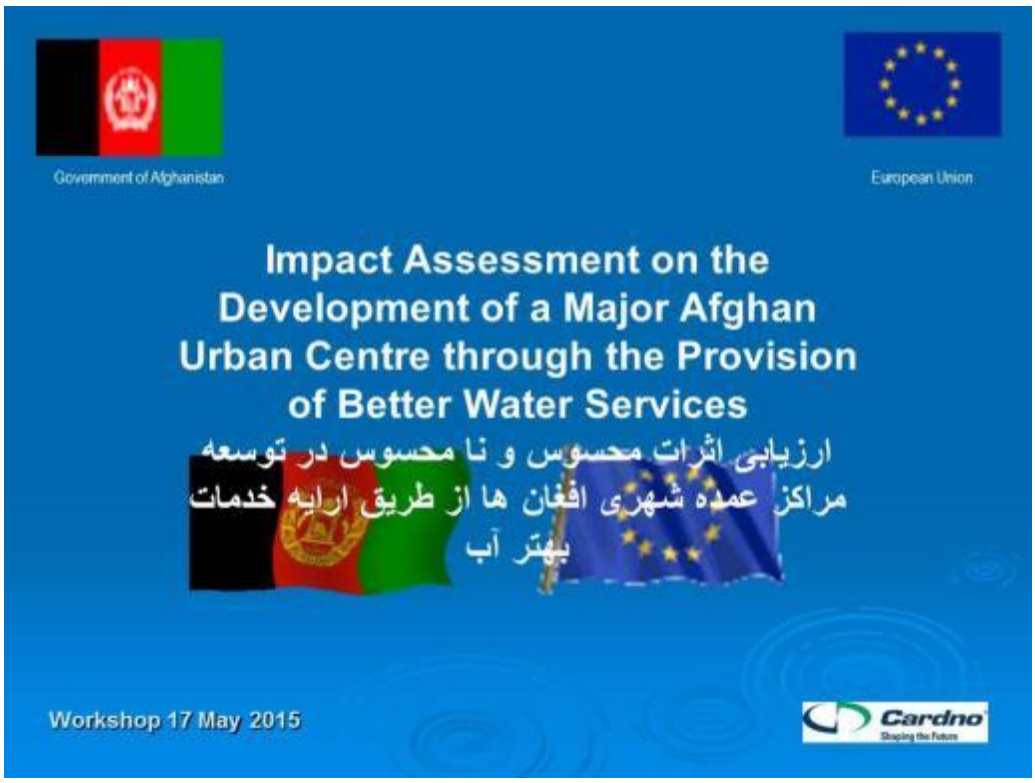
1 – Fully achieved;
2 – Largely achieved;
3 – Partially achieved;
4 – Achieved to a very limited extent;
5 – Not achieved at all;
X – Too early to judge.

RESULTS – PERFORMANCE – ACHIEVEMENT – IMPACT				
OBJECTIVES	***MEASURABLE INDICATORS***	***ACHIEVEMENT***	***RATING***	***COMMENTS***
OVERALL OBJECTIVES				
To improve living conditions and reduce the prevalence of water-related diseases in major urban centres in Afghanistan	% of households acknowledging an improvement in their living conditions at the end of the action + Average amount of household budget accounted for by water expenditure	As water access and hygiene practices are improved, the Project clearly contributed to the improved living conditions of the beneficiaries With the implementation of kiosks, water expenditures represent 2% of average household income per month which is still very reasonable	(1), **3** (1), **2**	The original indicator was quantitative, but the final AFC report was qualitative Costs have risen due to home connections and the BRCC PPP
	% of households with at least one child having had diarrhoea in the last 15 days	The % of households with at least one child having had diarrhoea in the last 15 days has decreased from 53% to 18% between KAP 1 and KAP 2. **This increased again to 28% during this assessment**	(2), **4**	As final KAP survey was conducted before the installation of the kiosks. This criterion will surely improve even more once the kiosks are in use
SPECIFIC OBJECTIVES				
To provide urban dwellers in Charikar with an affordable and sustained supply of safe drinking water (50,000 people in 2008)	Water is delivered at regular times	Connection of the borehole to the main city power ensured that the water tank is filled regularly in order to provide water to all kiosks of Block 11, **This indicator was changed by ACF; presently water is delivered in Block 11 every three days**	1 **(4)**	**This is incorrect; the water is delivered to about 5,000-9,000 people, not 50,000**

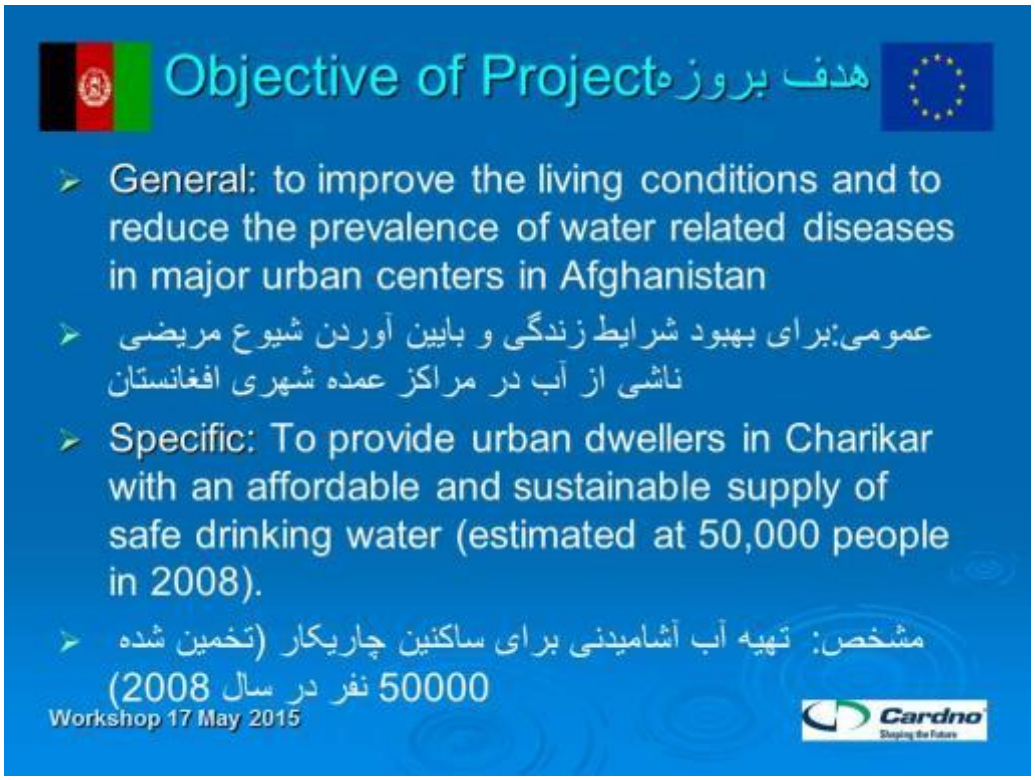
RESULTS – PERFORMANCE – ACHIEVEMENT – IMPACT				
OBJECTIVES	***MEASURABLE INDICATORS***	***ACHIEVEMENT***	***RATING***	***COMMENTS***
	Water analysis shows no faecal contamination (i.e. zero coliforms per 100 ml of water) at the delivery point	Microbiological analyses have been undertaken at 23 of the 35 kiosks and show no faecal contamination. **All samples show contamination during the new assessment**	(1) **5**	
	Water is available at the rate of 25 litres *per capita* per day (in accordance with national standards)	Water network was designed to deliver 25 litres *per capita* per day to 24,000 persons in Block 11 (18,000 today)	(1) **1**	**The numbers of beneficiaries are incorrect. It is not possible to assess this for the 50,000 people mentioned, only for the 5,000-9,000 in Block 11**
	The sale/retail price does not exceed 280 AFN per m^3.	Retail price of water per family is 27 AFN per m^3 (150 AFN per month for 25 litres *per capita* per day). **This is now 60 AFN per m^3 (approximately 315 AFN per family) in Block 11 and 25 AFN per m^3 in the central system**	(1) **1**	
EXPECTED RESULTS				
R.1. Exhaustive narrative reports as well as a set of various maps and bills of quantities describe the works to be achieved for the rehabilitation and extension of the water supply scheme	Bidding documents are prepared based on the main outputs of detailed surveys and designs	All bidding documents (3 in total) and maps have been prepared and submitted	(1) **1**	**Quality was not according to generally accepted standards**
R.2. Kiosk committees are established and made operational	Number of kiosk committees established (7)	List of the 7 kiosk committees that have been established	(1) **5**	**Kiosks have been abandoned**
	Number of kiosk committee members trained (35)	All training sessions have been conducted (5/5)	(1) **1**	**As often observed, training alone is not a good indicator**
	Number of water sale contracts signed between Committees and the CAWSS (35)	Instead of water sale contracts, a Memorandum of Understanding is signed between the AUWSSC and the Kiosk Committees to establish all procedures involved in the sale of water	(1) **1**	**No longer applicable**
R.3. The capacities of the CAWSS to conduct operation and maintenance of the water supply scheme are strengthened	2 CAWSS staff can use and run the client database for the Charikar water supply scheme	2 PUWSSC staff were trained by ACF in the use of the Customer Management Database developed by RODECO, as well as in water meter reading	(1) **3**	**Training was only completed in client registration**

RESULTS – PERFORMANCE – ACHIEVEMENT – IMPACT				
OBJECTIVES	***MEASURABLE INDICATORS***	***ACHIEVEMENT***	***RATING***	***COMMENTS***
	Data processing equipment (1 computer) is donated to the CAWSS	Given the number of existing customers at the PUWSSC, 2 computers were donated rather than 1	(1) **1**	**A customer management database and computer donation alone is not enough to strengthen O&M**
R.4. The water supply scheme is rehabilitated and extended	Length of pipes replaced and/or installed, number of kiosks constructed	Phase 1 (spring catchment, WTP) is complete (100%) Phase 2 Lot 1: Extension of water network in Block 11 is complete (100%) Phase 2 Lot 2: Construction of 35 kiosks is done (100%)	(1) **1**	**Kiosks have since been vandalised and demolished**
R.5. Hygiene-related knowledge, attitudes and practices are improved among clients of the kiosks	Number of hygiene promotion sessions organised (at least 1 session per week around each kiosk plus 8,840 home-based sessions)	One public session per kiosk has been organised for the opening day 4 rounds of sessions have been provided to all families in Block 11 with a total of 5,944 visits	(1) **1**	
	Number of murals painted on the walls of kiosks (35)	Instead of 1 mural, 2 murals were installed in each kiosk, with 2 key messages (one on hand-washing and one on safe storage)	(1) **5**	**All murals have been removed or destroyed with the kiosks**
	Number of radio and TV spots broadcasted (4 hours of spots and broadcasts in total)	5 different radio spots have been broadcasted on 2 different radios (total 13 hours) and 3 different TV spots for a total of 1 hour	(1) **1**	
	Final KAP survey shows an improvement of at least 10 points (compared to the baseline) on each of the five main messages of the hygiene promotion campaign	A baseline KAP survey was conducted in April 2010 and the final KAP survey will be conducted in December 2010	(2) **2**	**A new rapid survey shows a decrease, but this remains one of the best Project results**

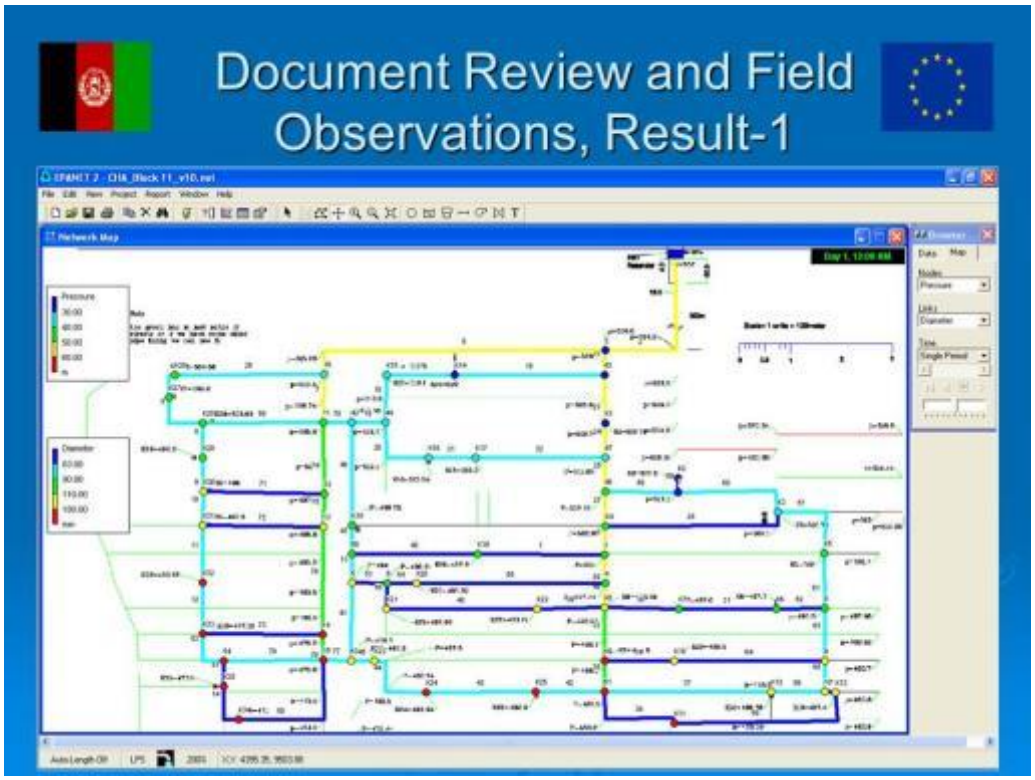
Annex 3: Workshop Presentation and Minutes

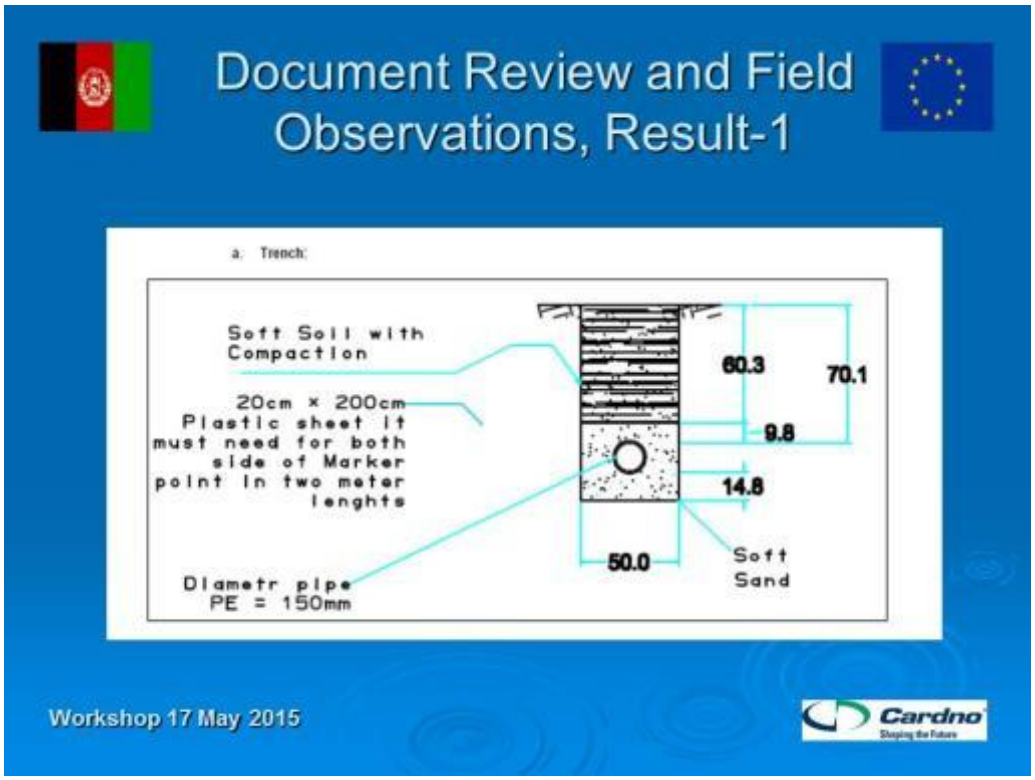



Background of Project
Fast Growth of Charikar since 2005; رشد سریع چاریکار از سال 2005
Services did not expand at same pace due to conflicts and lack of funds/investments; خدمات به علت مناقشات و کمبود بودجه/سرمایه گذاری گسترش نیافته
In 2009 ACF was granted the project 2009 در سال "بروزه به موسسه ا سی ایف اعطا گردید.
Development of a Major Afghan Urban Centre through the Provision of Better Water Services" توسعه مراکز عمده شهری افغان ها از طریق ارایه خدمات بهتر
Funds EU: 977,000 Euro, City of Paris: 297,000 Euro, AFC: 48,000 Euro بودیجه اتحادیه اروپا:
Workshop 17 May 2015
Cardno


Objective of Project هدف بروزه
General: to improve the living conditions and to reduce the prevalence of water related diseases in major urban centers in Afghanistan
عمومی:برای بهبود شرایط زندگی و بایین آوردن شیوع مریضی ناشی از آب در مراکز عمده شهری افغانستان
Specific: To provide urban dwellers in Charikar with an affordable and sustainable supply of safe drinking water (estimated at 50,000 people in 2008).
مشخص: تهیه آب آشامیدنی برای ساکنین چاریکار (تخمین شده 50000 نفر در سال 2008)
Workshop 17 May 2015
Cardno


Results to be achieved
نتایج حاصله
1) An exhaustive narrative report as well as a set of various maps and bills of quantities, describe the works to be achieved for the rehabilitation and the extension of the water supply scheme
یک گذارش روایتی و ضمنا مجموعه ای از نقشه های مختلف و صورت حساب مقادیر، کاری را برای بازسازی و گسترش طرح تامین آب توصیف مینماید.
1) Kiosk committees are established and operational
کمیته های غرفه های آب تاسیس گردیده و عملیات مینمود.
1) The water supply scheme operation and maintenance capacities of the CAWSS are strengthened
عملیات طرح گسترش تامین آب و تعمیر و نگهداری ظرفیت آن برای تقویت این
1) The water supply scheme is rehabilitated and extended
طرح تامین آب تعمیم و بازسازی گردیده.
1) Hygiene knowledge, attitudes and practices are improved among clients of the kiosks
دانش صحی، نگرش و عملکرد در بین مشتریان غرفه های آب بهبود یافته.
Workshop 17 May 2015
Cardno


Document Review and Field Observations, Result-1


Document Review and Field Observations, Result-1
a. Trench:
Soft Soil with Compaction
20cm x 200cm Plastic sheet it must need for both side of Marker point in two meter lenghts
Diametr pipe PE = 150mm
60.3
70.1
9.8
14.8
50.0
Soft Sand
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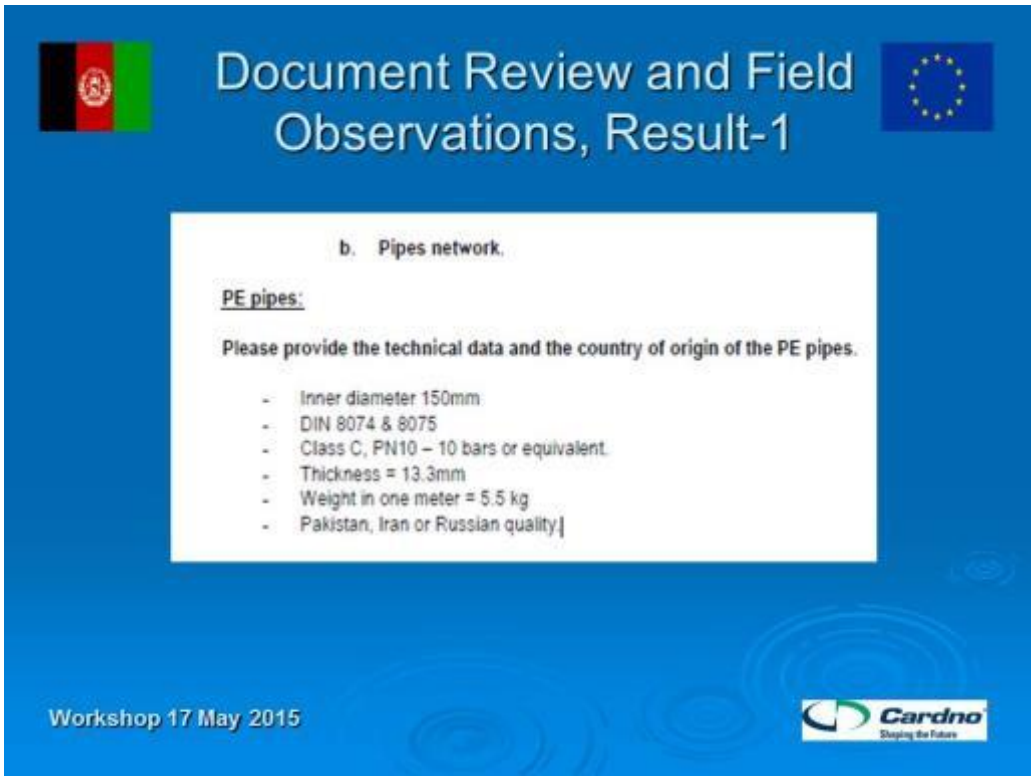
Document Review and Field Observations, Result-1
b. Pipes network.
PE pipes:
Please provide the technical data and the country of origin of the PE pipes.
- Inner diameter 150mm
- DIN 8074 & 8075
- Class C, PN10 – 10 bars or equivalent.
- Thickness = 13.3mm
- Weight in one meter = 5.5 kg
- Pakistan, Iran or Russian quality
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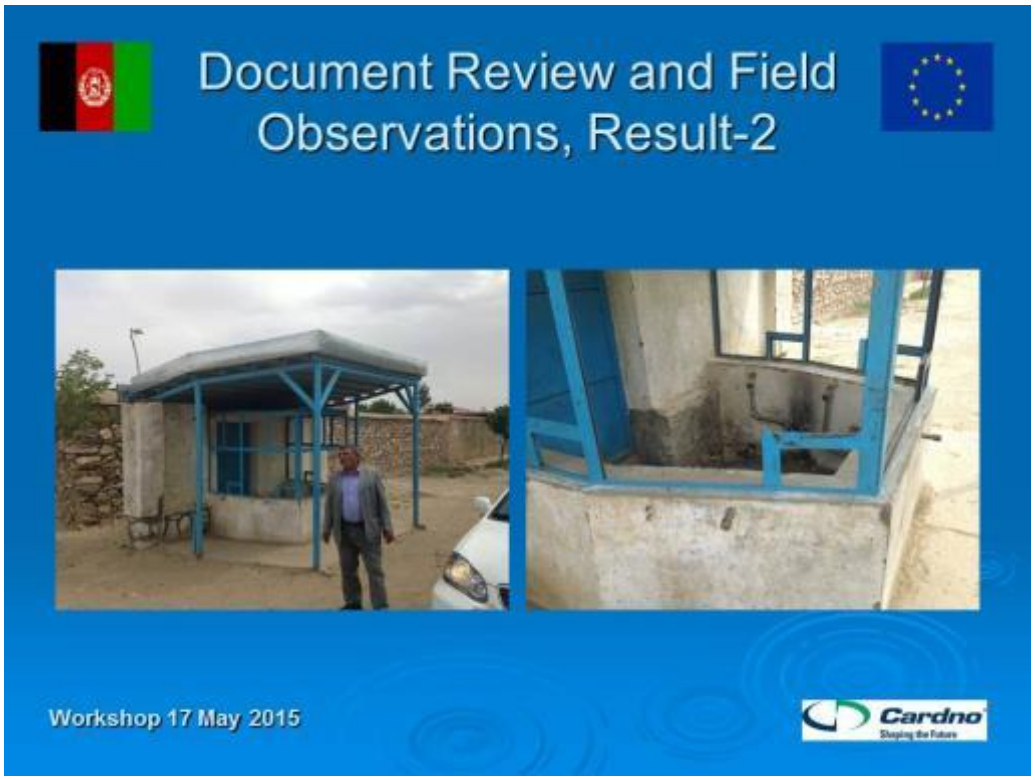
Document Review and Field Observations, Result-2
Workshop 17 May 2015
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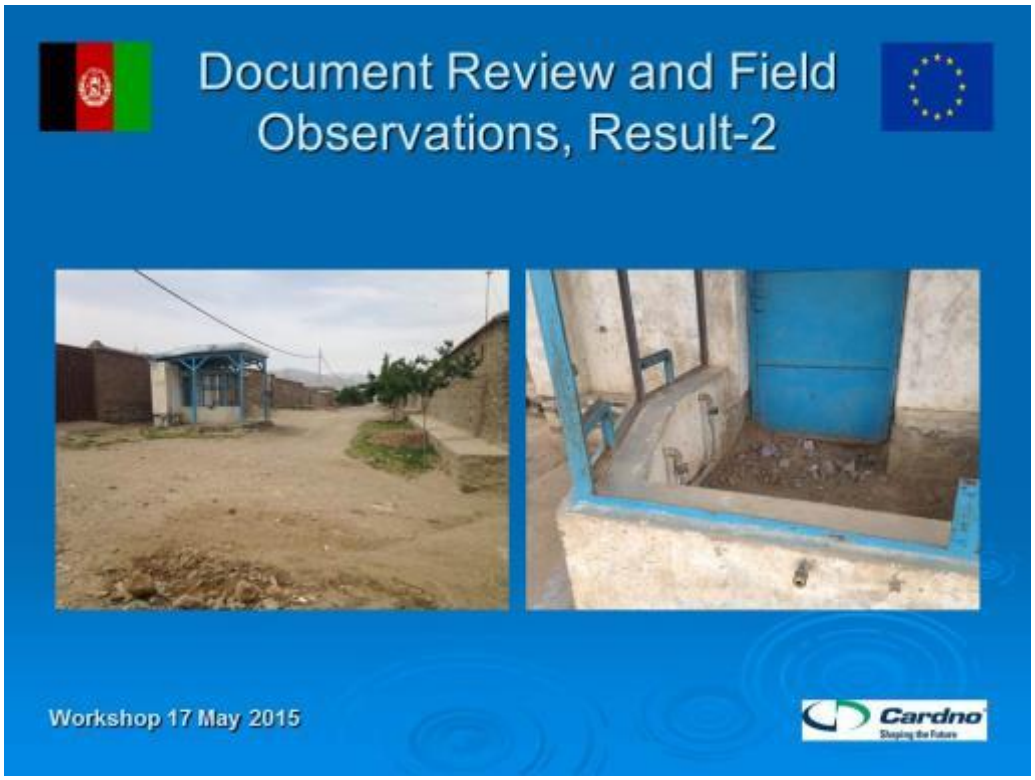
Document Review and Field Observations, Result-2
Workshop 17 May 2015
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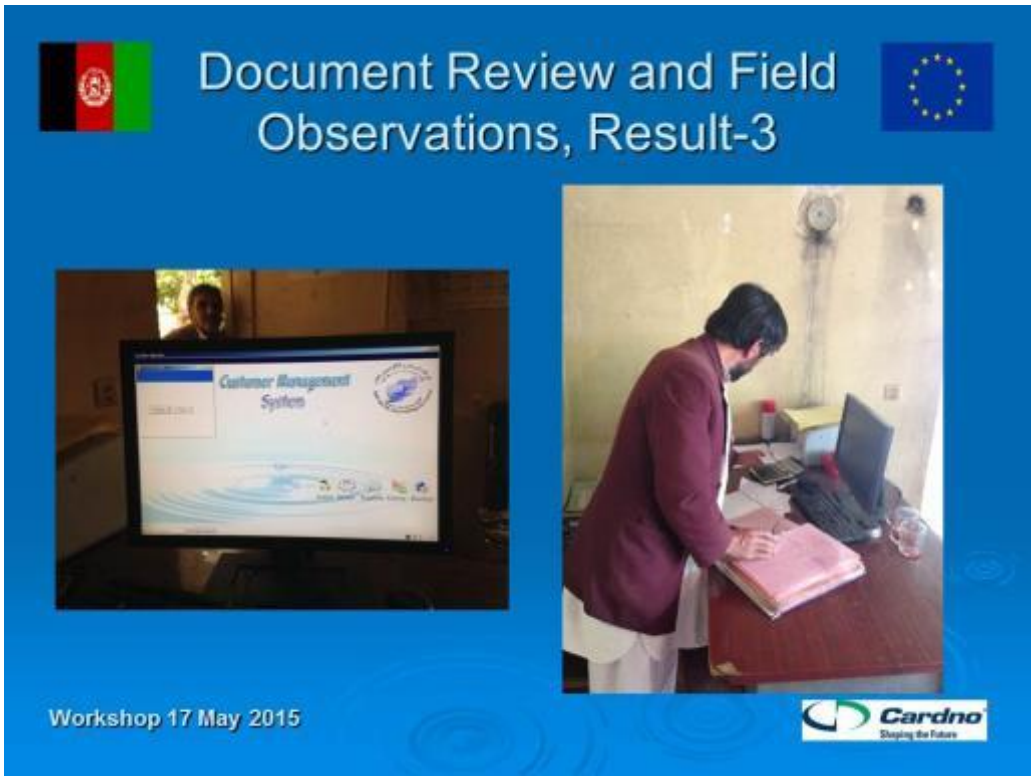
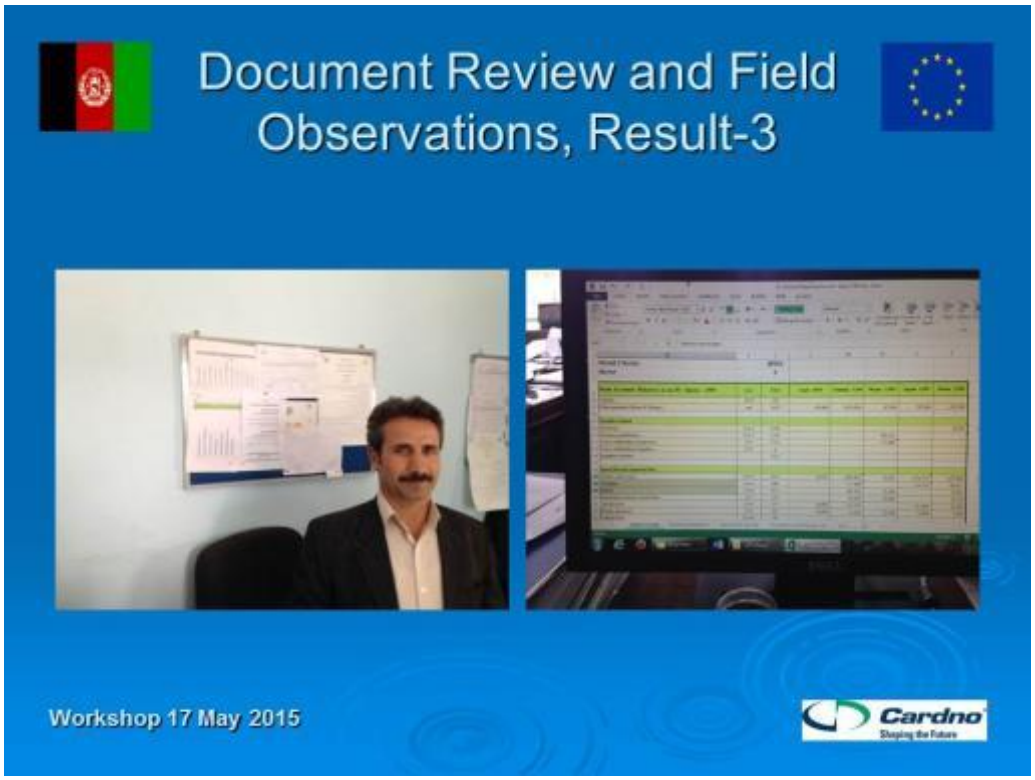

Document Review and Field Observations, Result-3
Customer Management System
Workshop 17 May 2015
Cardno


Document Review and Field Observations, Result-3
Workshop 17 May 2015
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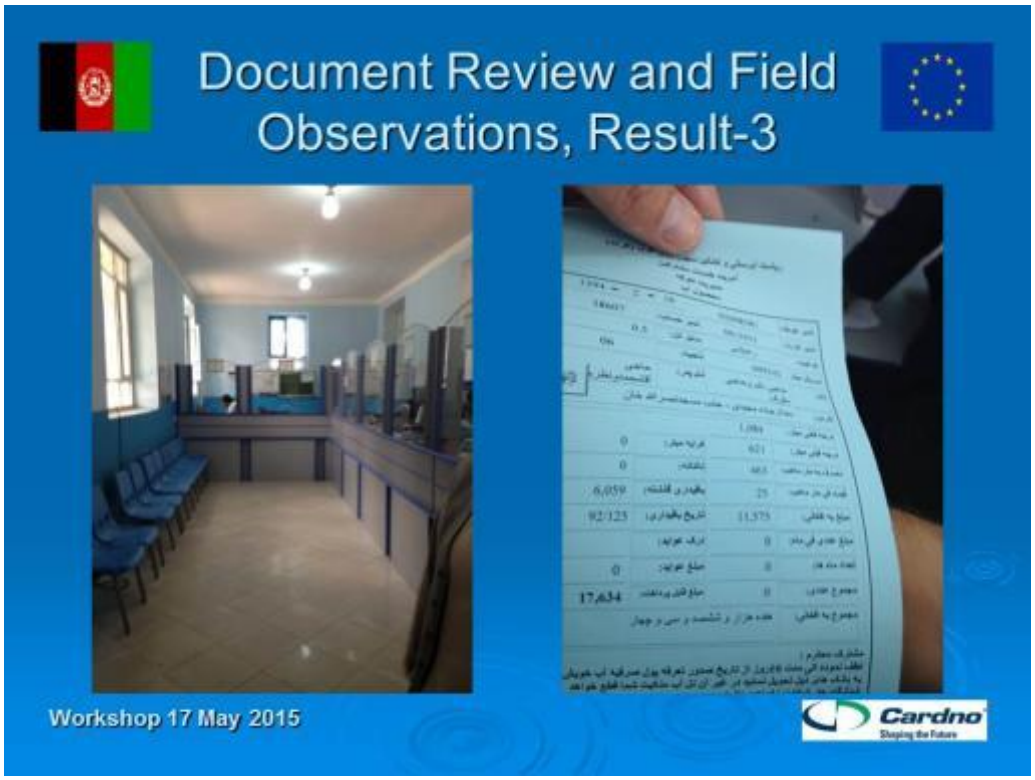
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Workshop 17 May 2015
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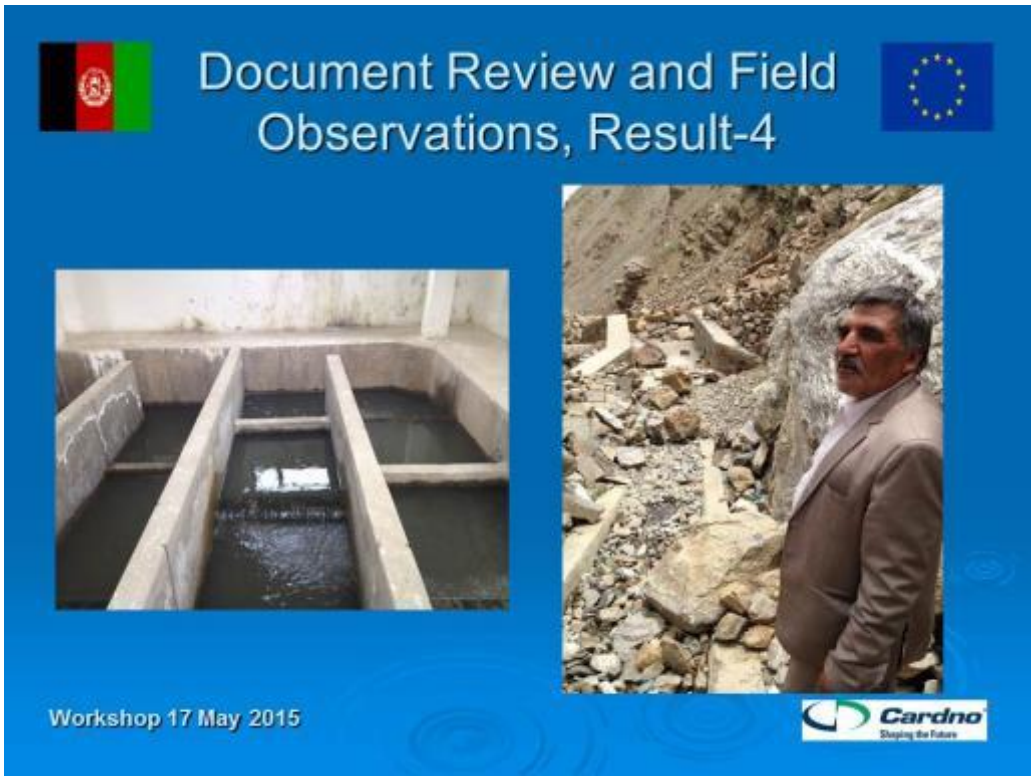
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Workshop 17 May 2015
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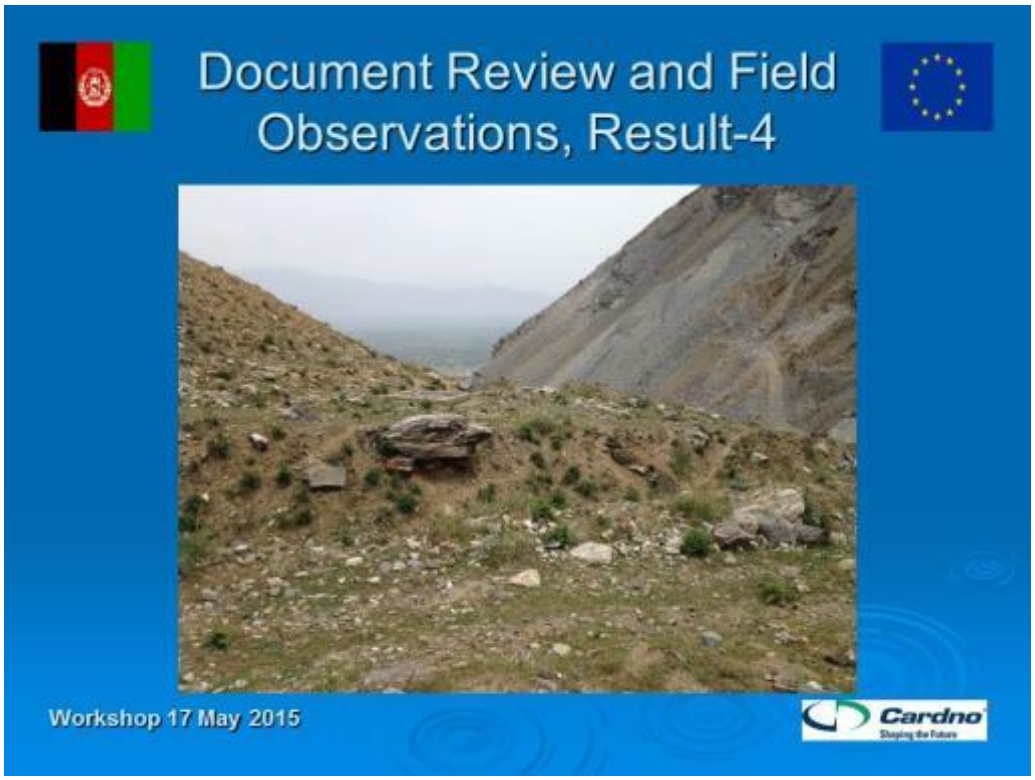
Document Review and Field Observations, Result-4
Workshop 17 May 2015
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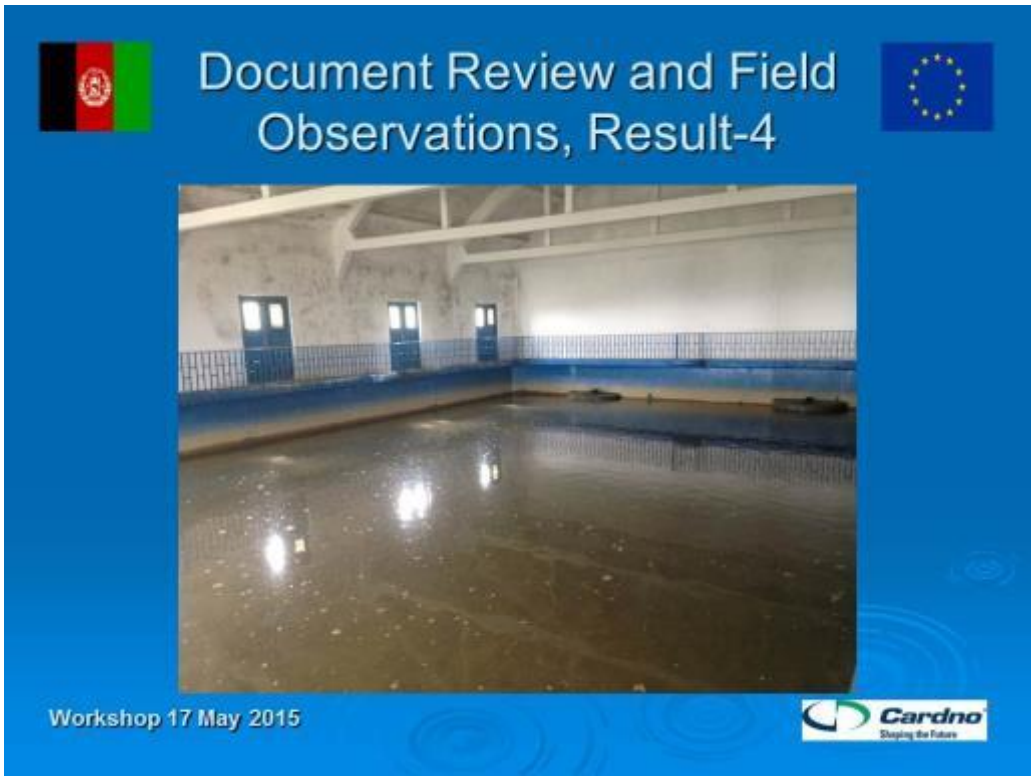
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Workshop 17 May 2015
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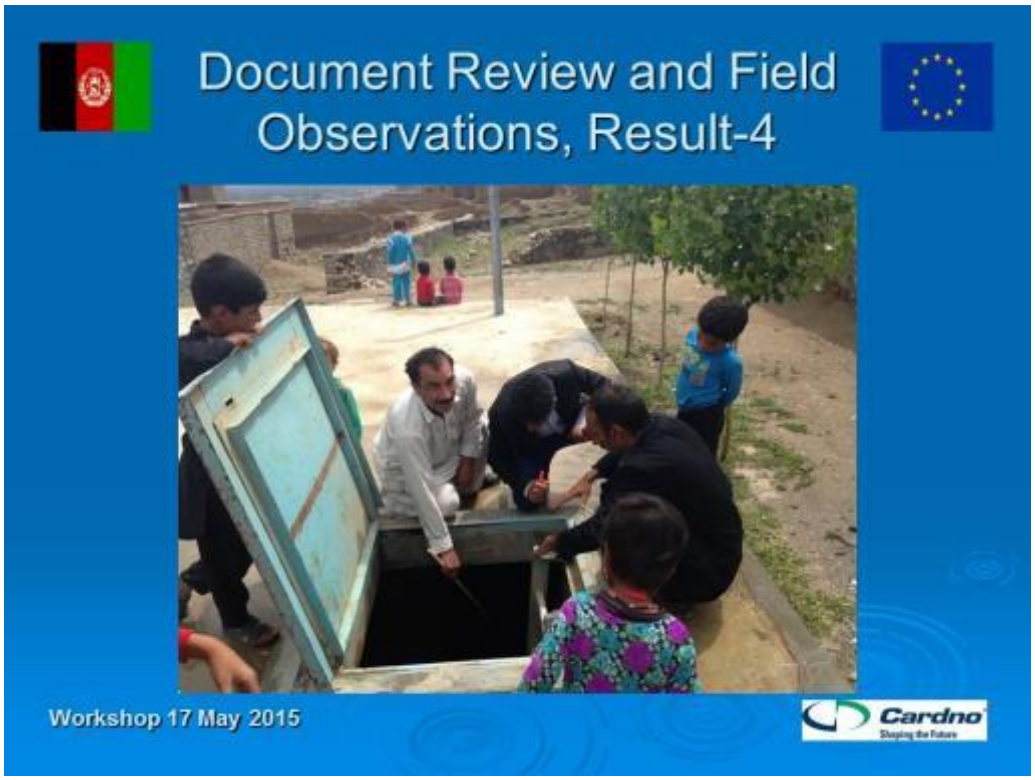
Document Review and Field Observations, Result-4
Workshop 17 May 2015
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Document Review and Field Observations, Result-4
Workshop 17 May 2015
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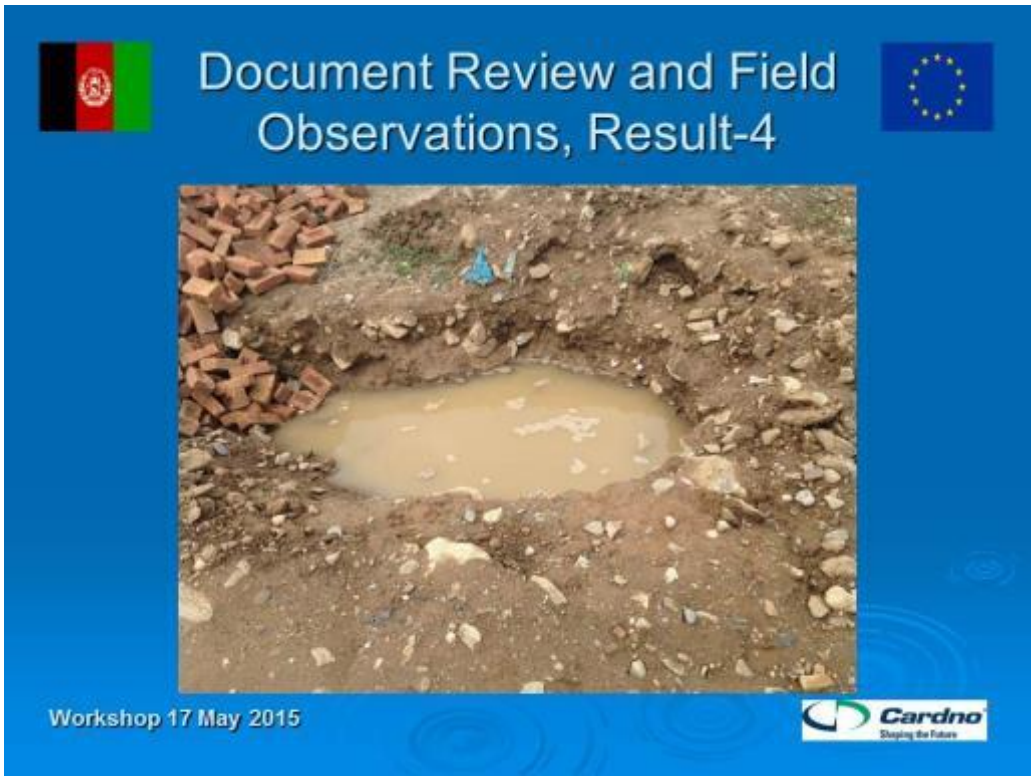
Document Review and Field Observations, Result-4
Workshop 17 May 2015
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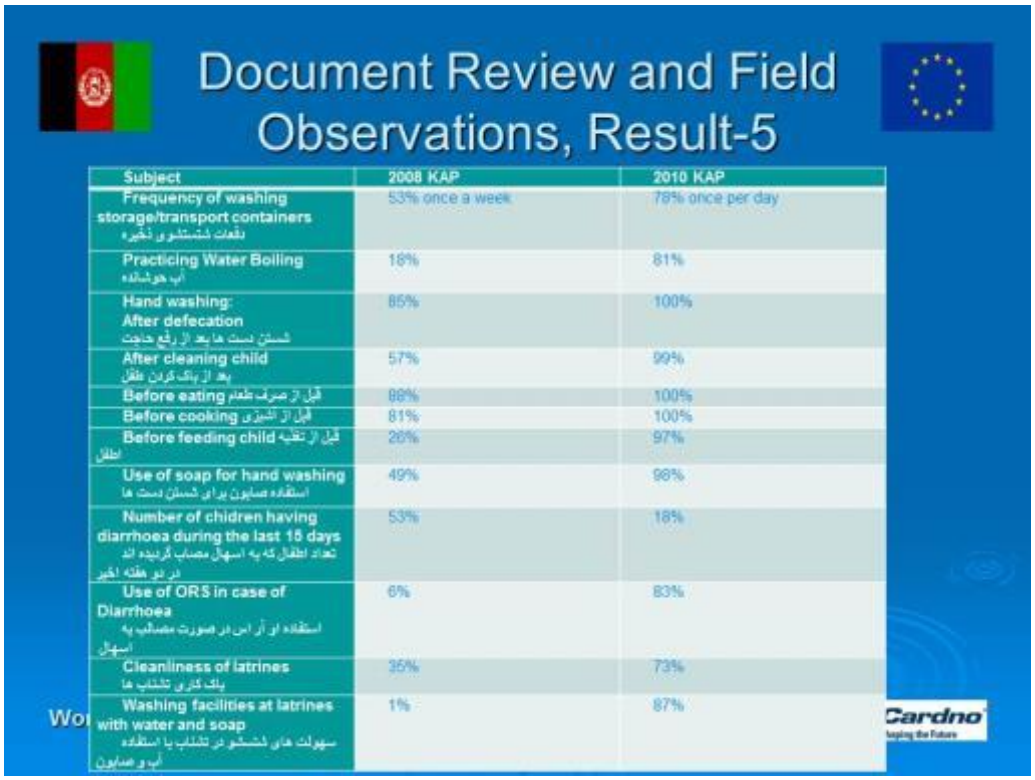
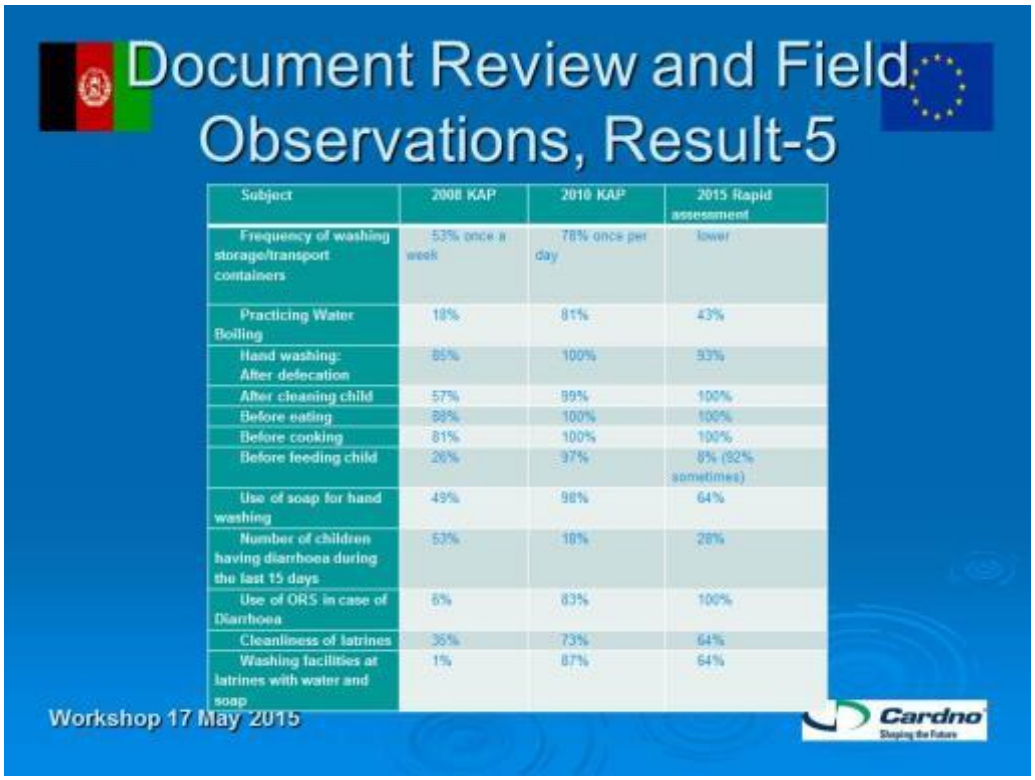
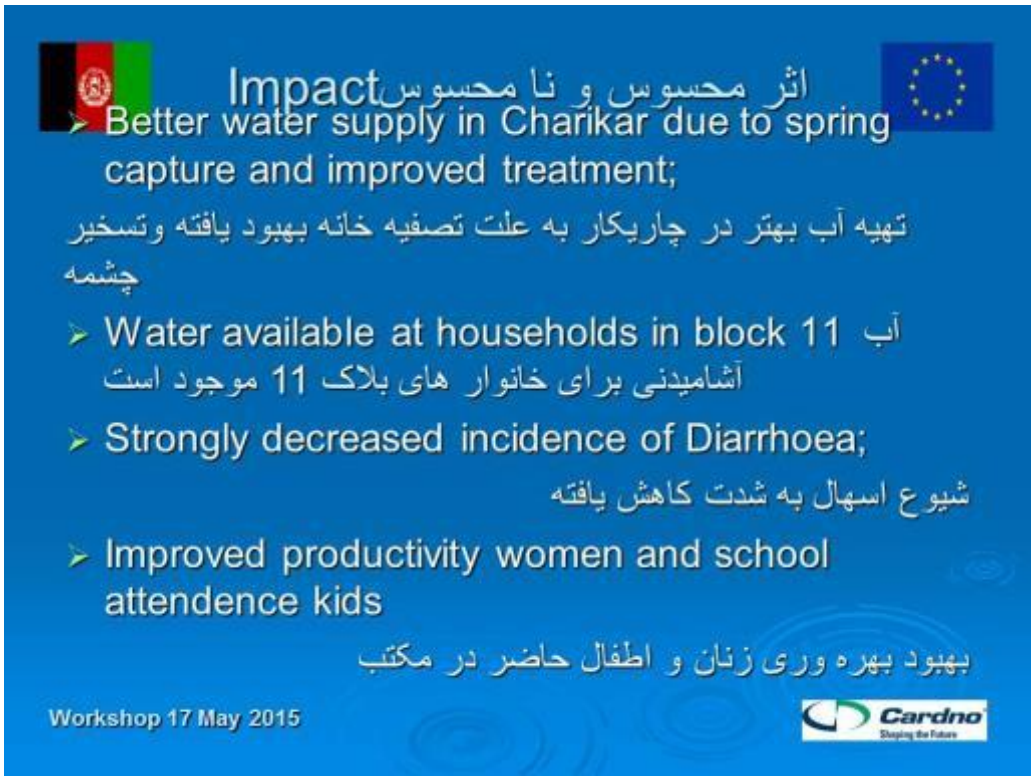
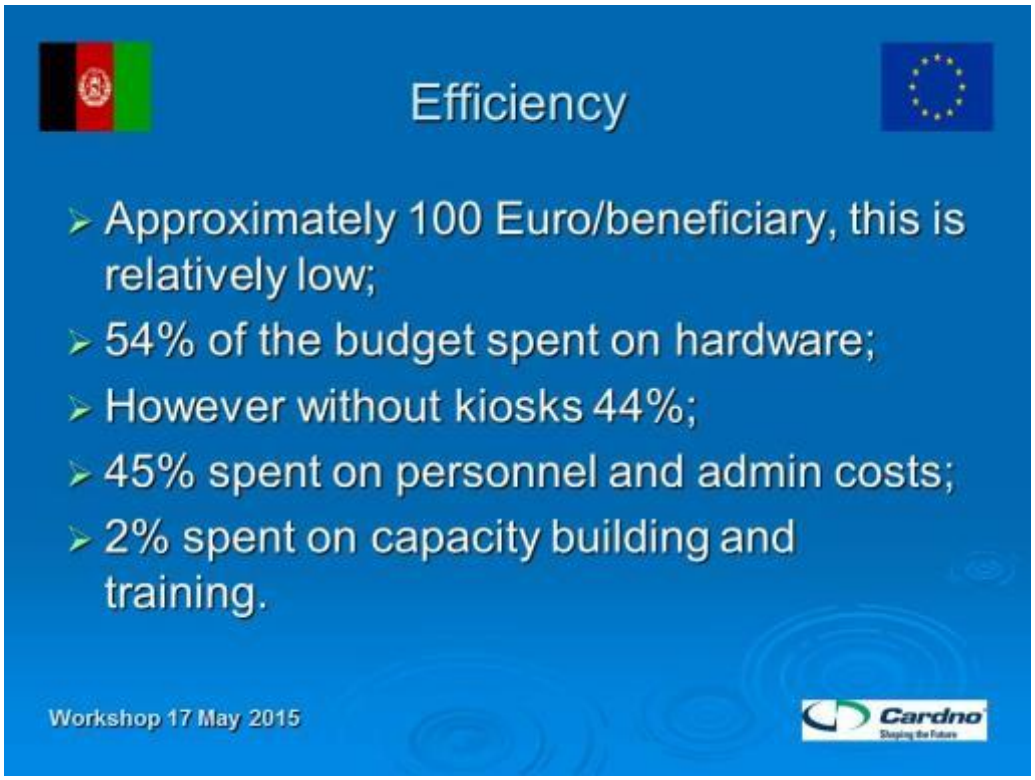

Document Review and Field Observations, Result-5
Subject
2008 KAP
2010 KAP
Frequency of washing storage/transport containers
53% once a week
78% once per day
Practicing Water Boiling
18%
81%
Hand washing: After defecation
85%
100%
After cleaning child
57%
99%
Before eating
88%
100%
Before cooking
81%
100%
Before feeding child
26%
97%
Use of soap for hand washing
49%
98%
Number of chidren having diarrhoea during the last 15 days
53%
18%
Use of ORS in case of Diarrhoea
6%
83%
Cleanliness of latrines
35%
73%
Washing facilities at latrines with water and soap
1%
87%
Cardno



Subject	2008 KAP	2010 KAP	2015 Rapid assessment
Frequency of washing storage/transport containers	53% once a week	78% once per day	lower
Practicing Water Boiling	18%	81%	43%
Hand washing: After defecation	86%	100%	93%
After cleaning child	57%	99%	100%
Before eating	88%	100%	100%
Before cooking	81%	100%	100%
Before feeding child	26%	97%	8% (92% sometimes)
Use of soap for hand washing	49%	98%	64%
Number of children having diarrhoea during the last 15 days	53%	18%	28%
Use of ORS in case of Diarrhoea	6%	83%	100%
Cleanliness of latrines	35%	73%	64%
Washing facilities at latrines with water and soap	1%	87%	64%




Efficiency
Approximately 100 Euro/beneficiary, this is relatively low;
54% of the budget spent on hardware;
However without kiosks 44%;
45% spent on personnel and admin costs;
2% spent on capacity building and training.
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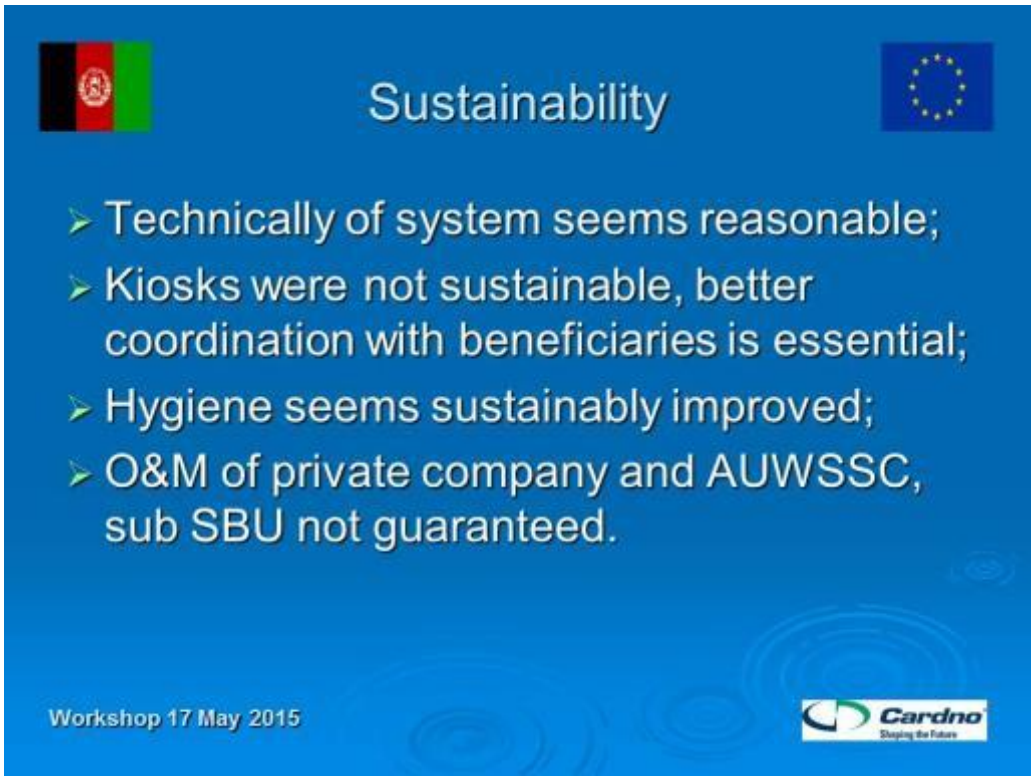
Sustainability
Technically of system seems reasonable;
Kiosks were not sustainable, better coordination with beneficiaries is essential;
Hygiene seems sustainably improved;
O&M of private company and AUWSSC, sub SBU not guaranteed.
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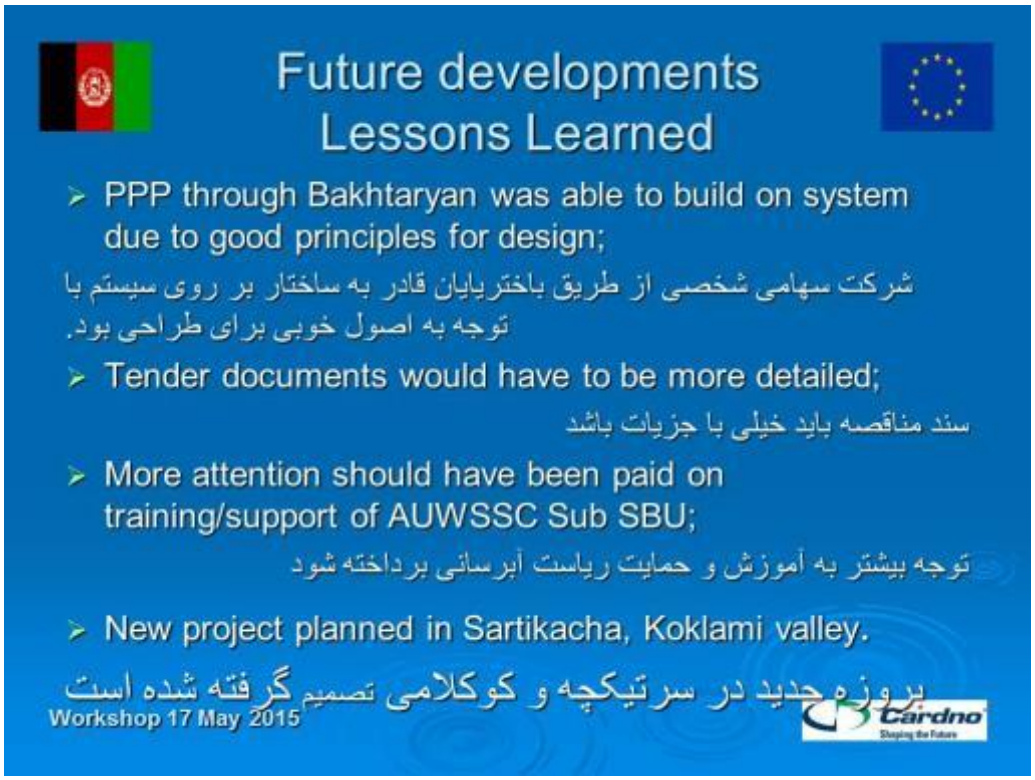
Future developments
Lessons Learned
PPP through Bakhtaryan was able to build on system due to good principles for design;
شرکت سهامی شخصی از طریق باختریایان قادر به ساختار بر روی سیستم با توجه به اصول خوبی برای طراحی بود.
Tender documents would have to be more detailed;
سند مناقصه باید خیلی با جزیات باشد
More attention should have been paid on training/support of AUWSSC Sub SBU;
توجه بیشتر به آموزش و حمایت ریاست آبرسانی برداخته شود
New project planned in Sartikacha, Koklami valley.
پروژه جدید در سرتیکچه و کوکلامی تصمیم گرفته شده است
Workshop 17 May 2015
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Thank you for your attention
ممنون از توجه تان!
The Government of Afghanistan
The European Union
Workshop 17 May 2015
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Main issues discussed during the workshop

Figure 12: List of participants at the workshop (note that the national project staff did not sign)

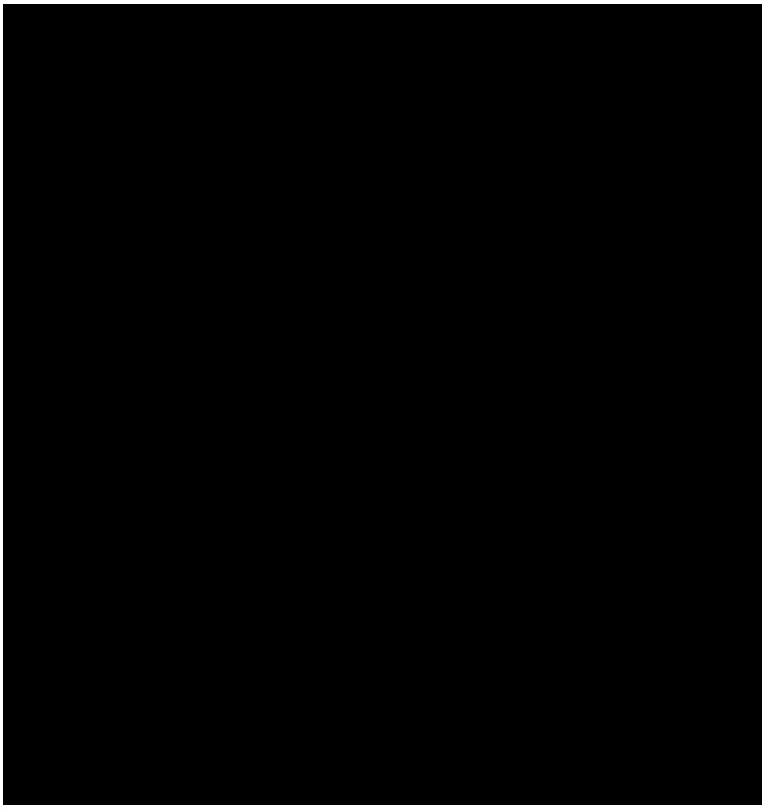
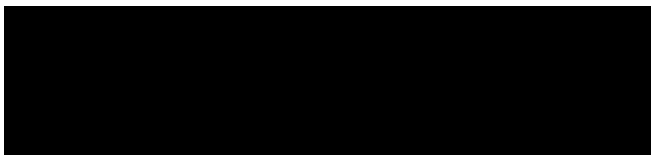


Figure 13: Participants in the workshop/seminar

The following people were present at the workshop/ seminar (anti-clockwise in the picture to the right):



[redacted]

The presentation had a generally positive character and the workshop was conducted in an open atmosphere. During the presentation various questions were asked. It should be noted that water quality data were not yet available at the time of the seminar.

Figure 14: End of the presentation

Various questions were discussed during the presentation, particularly as regards supervision, the defect liability period and the role of the private companies, including the BRCC and Naweed Noori Bagram (the main contractor for boreholes of the USA-led Provincial Reconstruction Team in Bagram. The AUWSSC Director General Eng.[redacted] promised that the re-installation of the customer management system on the computers at the Charikar SBSU would be arranged in the near future.

[redacted] also requested that future projects be conducted with a sufficiently long defect maintenance period and that there be sufficient provision of spare parts and maintenance equipment, since these are difficult to finance for the AUWSSC and its business units. [redacted] mentioned that the BRCC was presented with an entire system and simply told to operate it. He warned of the importance of transparency when conducting operations, cost analysis and recovery.

A long discussion was held of numbers of households in Block 11 and it was generally concluded that the original master plan shows 1,500-1,700 households but only 800 were actually constructed.

[redacted] of Action Contre la Faim (ACF) mentioned a number of considerations for future projects:

1. If the private sector is (or becomes) involved, ACF will not participate;
2. It needs to be acknowledged that there is a serious equity problem in the case of home connections if not all people are connected;
3. The kiosk approach was shared with the authorities and approved by them. Further analysis is required in order to understand why ultimately, this caused so many problems;
4. A current flaw in projects is that there is not enough follow-up through, e.g., training (of the Charikar SBSU). Future projects requiring intensive capacity building should be followed up as needed;

5. Diarrhoea figures are seasonal and there is generally a higher incidence of diarrhoea in summer. it could be considered to adjust figures accordingly;
6. Hygiene is related to behavioural change and longer projects are needed to support such a process;
7. Developing maintenance procedures also requires long-term engagement and this was not possible during this project.

Figure 5: [redacted] presenting ACF viewpoints

[redacted] mentioned that the AUWSSC is planning to launch new projects in Kabul in order to extend coverage of the water supply. The projects will cover the following neighbourhoods:

1. Do-Abad;
2. Qala Ahmad Khan;
3. Qargha (Deraban).

[redacted] (head of M&E at the MRRD) also asked and commented the following:

- What are the lessons learnt?
- Was there any quality control report produced during construction?
- Are supervision sheets available?
- The prevalence of diarrhoea should be compared to the last KAP survey, not the first (as this comparison shows that it has gone up again).

He also shared a lesson learnt that no matter what, people will generally be anxious to avoid public standpipes and/or kiosks. This is a cultural issue and people are willing to make considerable own contributions (as much as 50-60%) to ensure the provision of household connections. He also requested that for future projects, the MRRD WASH website be used for initial data gathering and planning.

[redacted] head of the Shura, again re-emphasised that the people in Block 11 were told to “accept the kiosks, otherwise we will go somewhere else”.

Annex 4: Methods Used

This evaluation/assessment was based on:

1. Literature provided by ACF and EU;
2. Interviews with national government and national policies provided;
3. Discussions with national and international stakeholders (ADB, EUD, GIZ,WB);
4. Interviews at the Charikar Strategic Business Sub Unit
5. Discussions with multi stakeholders in Charikar;
6. Discussion at the school, Shura and Mosque;
7. Household survey based on a questionnaire mainly related to the KAP survey (attached in English next page, but adapted into Dari by our enumerator/gender expert and logistics officer);
8. Sampling of water following the AUWSSC standard procedure:
    a. Use of polyethylene sample bottles;
    b. Use of disinfected gloves;
    c. Disinfection by methanol before sampling where possible, followed by burning off in case of steel taps;
    d. Run water for three minutes before sampling;
    e. Fill bottle completely;
    f. Keep samples in controlled temperature ice box;
    g. Transport samples to lab same day and start analysis immediately;
9. Visit of Herat as institutional benchmark area
10. Presentation of results in seminar/workshop and discussion/incorporation in report;
11. Preliminary (due to water quality results) draft report submitted 19/5/2015.
12. Final draft report (this edition).

Questionnaire (adapted in Dari)

Investigate the impact of the project:
Household, location:
How many people:
Ages:

3 columns question answer own observation

1) Visit households in Block 11 and conduct questionnaires on hygiene:
   The households to be selected randomly, preferably 1 in each street and a focus group with representatives of the 35 kiosk coverage areas. The household was ideally there already during the project and visited by the ACF (2009-2011; 1388-1390);
    a. Personal hygiene;
        i. Hand washing and when;
            1. Before cooking;
            2. Before eating;
            3. Before feeding child (maybe also body/breasts);
            4. After toilet;
            5. After cleaning child/baby;
        ii. Water boiling
        iii. Body hygiene;
            1. Any particular attention to female hygiene or not?
        iv. Teeth hygiene

2) Check the cleanliness of the houses, water points and water storage and latrines, also check the presence of soap;
    a. Water containers cleaning frequency;
    b. Water containers changing/coverage;
    c. Storage tanks available
        i. Covered?
        ii. Clean (chlorinate);
    d. Inspect (discreetly) the house is it/there:
        i. House clean;
        ii. Water/washing places clean;
        iii. Latrine clean;
        iv. Are there washing facilities at latrines;
        v. Is there a rubbish can/disposal at latrines (female hygiene);
        vi. Other issues related to female hygiene (or is this not a possible topic)?
        vii. Soap available;
        viii. Signs of use of soap?
3) Check the pressure on the water taps;
    a. High/middle/low/none, if none:
        i. How often do they get water (days/week, hours/day, regular/irregular , if regular;
        ii. Do they still fetch water from other sources;
4) Check the usefulness of the training for committees, did they do something with this, maybe in another field than water supply;
    a. Organisation of meetings
    b. leadership
5) How has time availability impacted the life of the women and children;
    a. More/equal/less (due to new duties);
    b.
6) Has health of all household members improved;
    a. Incidence of diarrhoea (during the last two weeks);
        i. Babies;
        ii. Toddlers;
        iii. Young children;
        iv. Teenagers;
        v. adults
    b. Do they know about ORS?
    c. Use of ORS in case of diarrhoea;
    d. Incidence of other stomach related illnesses (more, less, same);
    e. General health of household members (good, medium, poor);
    f. Did it improve?
    g. If yes then next question
7) Has better health resulted in more productivity/ money/school;
8) Has there been a change in your medicine expenses since 2011?
9) How much of your budget do you spend in water and is this
    a. About right;
    b. Relatively cheap;
    c. Too much.
10) Any remarks on the visits of the social mobilisers
    a. their attitude (respectful, arrogant, unpleasant)
    b. their messages (Good, medium, poor)?
11) What is their opinion of this interview/suggestion?

Annex 5: Literature and Sources Consulted

1) Action Contre la Faim. (2009). Description of the action (Proposal);

2) Action Contre la Faim. (2011) Final Narrative report (final report);

3) Afghanistan Urban Water Supply and Sewerage Corporation. (2011). water quality standards for drinking water supply;

4) AUWSSC web page: http://www.auwssc.gov.af/index.php/en/, accessed 4-05-2015;

5) Bedran, M. (2011). External Evaluation of development of a major Afghan urban centre through the provision of better water services;

6) Central Statistics Office of the Islamic Republic of Afghanistan. (2012). Data on the census of 2011 and 2012;

7) Ernst and Young. (2012). Audit report of the project;

8) Folder containing memoranda of understanding (MoUs) and letters in the Charikar SBSU office;

9) EU/ACF.(2009). Tender documents for packages 1 and 2 under the project;

10) JICA (2009). The Study for the Development of the Masterplan for the Kabul Metropolitan Area in the Islamic Republic of Afghanistan;

11) Project leaflets and MoUs;

12) Leaflets from the Herat Strategic Business Unit;

13) MEW. (2013). Draft regulations for right of way (protection areas);

14) MRRD. (2013). 2013 activities of the National Rural Water Supply, Sanitation and Irrigation Programme (Ru-Wats-SIP);

15) MRRD. (2015). Draft Water Supply Strategy;

16) MRRD. (2014). description of Water Supply Project, Main Pipe Line for Charikar Centre, Parwan Province;

17) MRRD: http://www.mrrd-ru-watsip.org/, accessed 8 May 2015.