

Evaluation of NCA WASH program in Iraq 2005 – 2011



Project: Iraq WASH program assessment
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1. INTRODUCTION AND OBJECTIVES

Iraq has been the largest WASH and rehabilitation & construction programs funded by NCA with a total budget of NOK 120 mill invested over the past 7 years. NCA has been in Iraq since 1997 with office in Baghdad and Basra city. After the war in 2003, the security situation got worse, and expats / Norwegian representatives had to leave Basra in 2005. The local Iraqi NCA representative has been running the operations in Basra from 2005 to 2009 with remote NCA management from Kuwait and Jordan.

The WASH program started with rehabilitation of water and sanitation system including trucking services from Kuwait right after the war in 2003, and continued the work with installation and rehabilitation of purification units (PU) and compact units (PU/CU). Over the last years several desalination reverse osmosis (RO) units are also installed, as most of the southern Iraq is dependent on water from RO units for safe drinking water, as the water salinity is too high for drinking. NCA has also conducted extensive rehabilitation programs for water pipelines not covered in this assessment. A change in program strategy led to a focus to supply of WASH services to public schools with hygiene promotion and sanitation after 2008.

The WASH activities needed to be assessed as NCA is now phasing out these activities in Iraq. The period of the assessment program span from water units installed in 2005 and up to date with associated programs. The assessment selected 20 of totally 34 installations in schools, hospitals and in rural villages for Bashra and Babil regions to form a representative picture of the total WASH program performed by NCA in Iraq. The assessment focused on the below listed issues:

- Technical
- Sustainability
- Gender issues

Every site visit has been performed according to a similar procedure including a detailed checklist, interviews and documentation by photos. The detailed check lists can be found as an attachment to this report. The pros and cons from the assessment findings will be used as input to future programs by documenting what results have been achieved, and which aspects needs to be improved.

The present Terms of Reference set the detailed scope for this evaluation.

2. CONCLUSIONS

From the desperate situation of polluted surface / river water, or even no water at all, the situation has improved significantly for the beneficiaries of the Iraq WASH program. NCA installations and rehabilitation work has a direct impact on drinking water for more than 1,000,000 beneficiaries.

In the majority of the assessed installations, clean drinking water is provided with a high degree of sustainability. The best results can be found for all hospital RO installations, and also the majority of CU and PU installations / rehabilitations in the cities and villages. Installations of smaller water units in schools suffer from lack of maintenance and proper follow-up.

A hygiene program has been initiated from 2008 / 2009. The assessment team could not identify any positive impacts from the hygiene campaign in the sites assessed. Hygiene awareness and long term campaigns are generally missing particularly in schools.

The gender issue is generally fulfilled as schools, hospitals or village / city water plants serve the population on an equal basis.



Hospitals

All RO units installed in the hospital can be characterized as successful projects. The implementation and timing of the project has been good to provide clean drinking water to the hospitals in a critical period. The operation and the maintenance of the plant have been satisfying, and the units are providing drinking water at stable rates and without interruption. In all hospitals sustainability is secured, since operation and maintenance of the RO unit is part of the overall hospital budget and funding. A high degree of safe water awareness and ownership is created among all actors.

The hospitals serve a significant number of beneficiaries, and the majority of these people are marginalised people. On the negative side it should be mentioned that all of the hospital RO units from NCA are oversized. Units are running part time only, often based on the understanding that the unit cannot be operated continuously. Some of the units do not have technical documentation or manuals available, and are vulnerable to main component failure.

Schools

The WASH interventions in schools have generally been unsuccessful due to shortage of follow up and fund for maintenance, and also due to poor layout and design that was not very functional or practical. Among the schools assessed, there is only one school that had access to safe drinking water and satisfying hygiene conditions. The hygiene standards of the schools are found to be very bad with, and with latrines that suffer from bad design and limited cleaning and maintenance. Although hygiene campaigns were only introduced in the last years of the WASH program, the general focus on these matters are missing from NCA.

Cities and villages

Installation of compact units (CU) in rural villages has generally been successful and highly appreciated by the beneficiaries. A high degree of sustainability and ownership to the units is registered in the community. The main limitation to water production in the rural villages is the lack of electricity, which requires fuel to drive the booster pumps.

Rehabilitation work of CU plant in cities done in cooperation with other organizations of the Water Directory is also considered to be successful. The plant assessed deliver water at design capacity, and is operated full time during summer. City CU plants have dedicated emergency electricity lines, and are less vulnerable to failure and use of generator back-up. All units are followed up by the Water Department, but suffer from general poor maintenance and follow-up over time.

The significant rehabilitation work done by NCA in the Hilla CU water plant differ from all other WASH activities, as the Hilla plant is very large. The main conclusion is that the Hilla unit operates at capacity rates, and that the most of the NCA rehabilitation work and equipment supply has been a success. On the negative side, many of the pumps supplied by NCA have failed to operate over the last years. This is a combination of poor maintenance, Water Department corruption related to spare part deliveries, but also the selection of pump type by NCA.

Hygiene

Several hygiene awareness programs have been initiated and carried out by NCA after 2009. One male hygiene coordinator was employed in 2009 to coordinate the hygiene activity, and to identify men and women for hygiene training programs. The campaigns have included distribution of posters, brochures and hygiene kits together with training of people for hygiene awareness. Sessions with training of trainers have been conducted in cooperation with youth centers, women organizations and the Ministry of Health. Hygiene sessions have been conducted in Basra, Babil and Wassit region, and especially in the remote and poor areas. NCA also received funds from IOM, MFA and ACT for hygiene intervention

Little effect from the hygiene work can be observed at the sites visited during the assessment. Women in the NCA team working with the hygiene campaign would have been favourable.



3. ASSESSMENT DETAILS

Together with the NCA Amman office for Iraq and the local Iraqi NCA team, a list of water unit installations for the assessment was prepared. The assessment has covered 20 of the 37 units installed after 2005 in the Basra and Babil region.

A checklist including details and selected photos has been developed for all units assessed, and the complete set of check lists for all water units is an attachment to this report. The table below is a summary of the water plants, and the units assessed are marked with the date of assessment.

Years	Projects Name	Location	Type	Beneficiaries	Evaluated
2005	1- Al-Jamhory Hospital	Center of Basrah	RO Unit		
	2- Al-Jazeera Village	Al-Jazeera 4 village.	RO Unit + PU	11 000	03.03.11
2006	1-Al- Zubair Hospital	Al-Zubeer Dist.	RO Unit	200 beds / 600,000	10.03.11
	2-Al-Qurna Hospital	AL-Qurna Dist.	RO Unit		
2008	1-Al-Fayha'a Hospital	Shatt Al-Arab Dist.	RO Unit	400 beds / 500,000	03.03.11
	2- Al-Shafa'a Hospital	Center of Basrah	RO Unit	180 beds / 350,000	03.03.11
	3- Al-Faw Hospital	Al- Faw Dist.	RO Unit	50 beds / 50,000	02.03.11
	4-Abo Al-Khaseeb Schools	Abo Al-Khaseeb Dist.	RO units	Not known	06.03.11
2009	1- Abo Al-khaseeb Hospital	Abo Al-khaseeb Dist.	RO Unit	85 beds / 350,000	06.03.11
	2-Abo Floos Health Clinic	Abo Floos port	RO Unit		
	3- Shatt Al-Arab Clinic	Shatt Al-Arab Dist.	RO Unit		
2010	1-Al Sanadid School	Al-Nashwa sub-district	RO Unit		
	2-Al Nashwa School	Al-Nashwa sub-district	RO Unit		
	3-Al-Meyah Primary school	Al-Nashwa sub-district	RO Unit	600	05.03.11
	4-Al-Rafdain School	Al-Nashwa sub-district	RO Unit		
	5-Al-Jazzera School	Al-Nashwa sub-district	RO Unit	400	03.03.11
	6-Abo Al-khaseeb	Abo Al-khaseeb sub dist	RO Unit		
	7- Shatt Al-Arab	Shatt Al-Arab dist.	RO Unit		
	8-Al-DalR Health clinic	Al-DalR sub dist.	RO Unit		
	9-Al-Qurna/Al-Qurna dist.	Al-Qurna/Al-Qurna dist.	RO Unit		
	10-Al-Dowa village	Al-Nashwa sub-district	CU	3 000	05.03.11
	11-Sayed Ali Noor Clinic	Al-Nashwa sub-district.	PU		

BASRA PROJECTS

Years		Projects Name	Location	Type	Beneficiaries	Evaluated	
BABIL PROJECTS	2005/06	1	1-New Hilla WTP	Hilla City	CU	900 000	09.03.11
	2007/08	2	1-Suwaid Village	Al-Midhatya Sub-district	New PU-20 m3/h	3 000	07.03.11
		3	2-Albu Hadid Village	Al-Midhatya Sub-district	New PU-4 m3/h	3 000	07.03.11
	2008/09	4	1-Jarbu'ya Qrt.	Al-Kasim Sub-district	Rehab.-200 m3/h	10 000	08.03.11
		5	2-Khiza'il/Abu Dirbash Village	Al-Taly'a Sub-district	Pipeline-7000 m	1 450	08.03.11
		6	3-Al-Ameer Qrt. No. 2	Al-Midhatya Sub-district	Rehab.-200 m3/h	75 000	07.03.11
		7	4-Al-Assaf Village	Al-Midhatya Sub-district	New PU-20 m3/h	10 000	07.03.11
		9	5-Al-Hamza Dist	Babel Gov.	PU	600	
		10	6-Al-Azizia Dist	Wasit Gov.	PU	400	
		11	7-Al-Agra'a River village	Babil Gov.	PU	2 000	
	2009/10	12	1-Intilaka School	Al-Midhatya Sub-district	Rehab./Upgrade	3 700	07.03.11
		13	2-Firdous School	Al-Kasim 'Sub-district	Filtration unit	1 400	08.03.11
		14	3-Sab'awy School	Al-Taly'a Sub-district	Filtration unit	1 200	08.03.11
		15	4-Dhamna Village	Al-Kasim Sub-district	New CU-50 m3/h	3 250	

3.1 TECHNICAL

It was difficult for the assessment team to find out whether the water units installed in Iraq have been inspected by NCA Iraqi staff or expats since the handing over to the authorities. The agreement between NCA and the authorities who took over the running responsibility did not call for further follow up by NCA after handover. It has therefore been essential to verify the technical status and operational conditions of the units.

Hospitals

Hospital RO units installed in southern parts of Iraq are container based solutions with additional storage tanks and piping in PVC. All units are designed for brackish water with some salinity, and with membranes operated at 10 bar inlet pressure with typical capacity 2 – 3 m³/h. All hospital installations assessed serve their purpose of providing clean water to hospitals, and the operation of the units is generally satisfying. The RO units are highly appreciated by the hospital, and operations and maintenance is generally well taken care of by engineers or technicians.

Electrical back-up generators are delivered with all hospital RO units. The generators are not in use, as the power supply to the RO units is secured by the overall hospital electrical supply and its back-up generator. Some of the generators have also been supplied with single-phase, while the RO pump motors are three-phase.

Awareness of membrane protection from chlorine content in the source water is not always known, although some of installations will shut down their RO units when detecting chlorine in the water source. As the chlorine content of the water supplied from government net seems to contain little or no chlorine, no damage is registered on any of the membranes inspected. None of the RO installations had replaced their membranes.

Operation manuals for many of the RO units supplied from Turkey are either missing, or they are written in Turkish language only. Only one of the hospital RO units is delivered from a local Iraqi company. This unit was the most successful plant assessed in hospitals.

RO units are found to be generally vulnerable to main equipment failure, as not all installation will be able to provide spare parts. Brackish water leaks in the container had resulted in severe corrosion of the carbon steel container floor in several of the RO installations.

All RO units assessed are oversized and therefore operated only a few hours of the day to meet the hospital water requirement. It is possible to produce 3 – 10 times more water from the units installed in hospitals. It is also a general understanding that the RO units should not be operated full time to 'save' the membranes.

Schools

In the southern part of Iraq where the river water has some salinity, small RO units with 0.1 - 0.25 m³/h capacity are installed in the schools. Installations further north would be UV and filtration. There was only one of the five schools visited where the school has assured sustainability and good maintenance of the RO unit.

In some of the schools, the design and installation of the RO / UV filtration unit and its tap stations was not properly done, as the units needs to be protected from a large number of young and curious student, and the tap stations needs to be routed out to the school yard.

There is generally no technical competence in the school administration to understand, operate or maintain the RO / UV filtration unit. Lack of electricity to the school or failure in the small booster pumps was also registered as a main problem.

Latrines in school did not have elevated squatting plate (Indian type toilets), foot paths were missing. Urinals do not exist in Iraq, this may be a good improvement in NCA designs for future projects. No back-up generator for water pumps have been delivered together with the installation, this may have secured pump power and washing water in schools.

Cities and villages

For the two CU plants of capacity 200 m³/h ref the list above, NCA has been involved in the rehabilitation of the sand media filters with new filter internals, upgrade of nozzles, and filter internal glass flake lining. Pump and motors have also been supplied. NCA has also recently installed a new CU plant of capacity 50 m³/h in cooperation with OCHA. Several smaller PU installations of 4 - 20 m³/h are installed in the rural villages including 20 m³ bladder storage capacity connected to tap stations serving the beneficiaries.

Chemicals are generally injected for flocculation in the inlet chambers, and chlorine is in most of the cases injected on a regular basis before export to the beneficiaries. Back-washing of both sand filter and active coal filter is done on a regular basis.

The river booster pumps are normally horizontal pumps with the intake a few meters below into the river. There is an inlet check valve at the river intake to assure priming of the pump with water for start-up. The check valve is vulnerable to leakage, and additional priming with water supply into the suction line was required for one of the installations.

The export flow of water from the CU plants has been verified in the assessment by the use of a clamp-on ultrasonic meter, as all flow meters seen during the assessment were broken.

3.2 SUSTAINABILITY

An important aspect of the assessment is to verify the sustainability of the water project after the handover of a water installation or plant from NCA to the schools, hospitals and villages. The units visited during the assessment been in operation from 1 to 5 years.

Schools

Majority of the schools does not have the financial means or technical knowledge to ensure the continuity of the water units installed. Spare parts have to be provided privately by head master or teachers. The schools are under the Educational Department, where water issues are not attended. Only one of the RO / UV filtration units is in operation out of the six schools assessed.

Hospitals

For the hospitals, the ownership is taken care of by the hospital structure. There are assigned technicians on fulltime basis, and allocated fund for O&M in hospital overall budget. Clean water is essential for the hospitals, and the water units are therefore very well taken care of to assure continued operation.

Cities and villages

For the cities and villages, the Water Directory has taken over responsibility after hand-over from NCA, and there is a good connection between the water unit operators and the Water Directory. Maintenance and follow-up sometime suffers from challenges with bureaucracy, and also corruption with regard to providing spare parts.

In the rural villages, the main limitation is the lack of electricity with resulting high diesel cost for provision of water. In one village, the water unit was handed over to village leader (Mukhtar) to ensure the operation. The water unit was further handed over to the former NCA employee who lives in the same village, and he possesses a good knowledge of unit. He was selling the water at low cost to beneficiaries and thereby provided sustainable funding for O&M.

3.3 GENDER

The water projects initiated by NCA in Iraq give equal access to water disregarding sex or religion. The units in schools, hospital and villages / cities serve men, women and children equally. The gender issue impact is out of NCA scope and impact for these installations, as the water units supply a common storage bladder, tap station or network pipeline.



In the schools, both boys and girls have equal access to the water from the tap stations. There was one school where the latrines were locked off during girl classes, but this is not the general trend. In the hospitals water is supplied into the hospital network for tap stations, surgery and cooking and thereby serves both men and women equally. In the rural villages, the women do collection of water at the tap stations.

It is observed that technical maintenance and operation of RO units is especially difficult to achieve in girls school where there are only female teachers and administration with no technical competence. It also seems more difficult for a female head master to get support from the local council.

In the rural villages, it would be impossible in Iraq to have women as technicians or operators of a water plant. There is generally lack of personnel in the first place that can operate or maintain the units at all. Speaking with women in the rural villages is not possible in Iraq due to the code of culture, as only women have access to women.

It could be noted that one of the water installations by NCA has been with tap stations just outside a mosque. As women are not allowed to go to the mosque, this location for the water station does not serve men and women equally.

NCA interventions in hospitals are major technical operations where installations were done by external contractors. Hospitals are institutions where it is not possible to practice neither NCA's holistic approach nor IASC guidelines. The hospital serves the need for all communities' regardless gender, ethnic and religious background of the society. Water intervention has had a tremendous impact on hygiene especially when most of these hospitals have maternity and children ward. In the hospitals around the bigger cities, it is observed that the women are represented as doctors or in the hospital administration. In one of the RO units assessed, both the electrician and mechanical engineer were women.

It would be appreciated to have more women as part of the personnel in the NCA project organization, and through the execution of the program.

3.4 OBSERVATIONS AND RECOMMENDATIONS

The overall conclusion after the assessment is positive since most of the water installations are actually producing clean water to a large number of beneficiaries despite the safety situation and the remote operation during the last 5 years. But it could be noted that the assessment has revealed potential for improving technical competence, follow-up and monitoring by NCA through the project planning and design phase.

To perform the assessment effectively, the total overview of all Iraq WASH projects including simplified total budget figures, scope of work and project reports for each implementation should have been available from the start. It has taken some time to obtain the complete overview of the WASH program.

5 years of remote operation caused by the security situation would be a significant challenge to any project, and regular monitoring and project follow-up has therefore not been possible. It also seems to us that personal disputes in the organization has contributed negatively into the project.

An important observation is that water and hygiene is difficult to promote in schools, as the schools are administrated and funded by the Educational Department, where water and hygiene is not a focus. To succeed in school, more effort may be required by NCA in the beginning of the projects to mobilize education department, local councillors, teachers, students and parents to achieve significant results on hygiene and water components.

The situation of overcapacity registered for the hospital RO units could have been solved by installing smaller units, possibly with space allocated for future upgrade of units in parallel. Significant project costs could have been saved, and a potential retrofit of a smaller membrane is considerably lower in price. But it should also be mentioned that several of the hospitals were expanding, so that the RO capacity may be appreciate in the coming years.

The best result during the assessment was found with the hospital RO unit supplied from a local Iraqi supplier. Here the best training was given during the project, and this unit had available operation manuals, check lists and day logs in Arabic language. Spare parts were easier to buy for the Iraqi RO unit, which is an observation that local purchase can be favourable.

For the construction of latrines, NCA should make effort to introduce better culturally appropriate and innovate ideas in building, construction and project designs.

The responsibility of a water unit handed over by NCA is transferred to the local village or the Water Directory when NCA has completed the installation. However, for some of the largest rehabilitations of the interventions, it could be a lesson learned to continue with a yearly follow-up after the hand over from NCA. As spare parts for some installations also seem to be difficult to obtain through the Water Department, a follow-up visit with potential supply of critical spare parts would be beneficial even after the NCA hand over. Closer monitoring by NCA from the project start to identify hurdles and find solutions and direct contact towards suppliers may be a solution.

Observations and recommendations found in this assessment will hopefully be useful input for future long term NCA projects in other countries.