

# Waste Water



## Overview of the sector

Until early nineties, wastewater facilities were limited to disparate networks between one region and another. Although main cities are equipped with incomplete wastewater networks, they are still lacking treatment plants. As to small demographic communities, they aren't equipped nor with networks neither with plants. As a result, the issue of water pollution was exacerbating day after day (random sea estuaries polluting the sea and beaches, random sanitation facilities, ground effluents, and streams polluting underground water layers...) therefore threatening the sanitary environment of citizens.

The insufficiency of wastewater services in regions is due to many reasons, most importantly:

1. The insufficient spending in the sector, in other terms the lack of investments required to improve, construct and develop facilities up to an appropriate service and environmental level.
2. The absence of a convenient administrative and executive structure in the sector to accompany the increasing urgent need for wastewater services, implement new methods followed by the administration and in the field of modern sewage disposal techniques.

In order to face such difficult reality, the CDR has been working since 1992 on different axes:

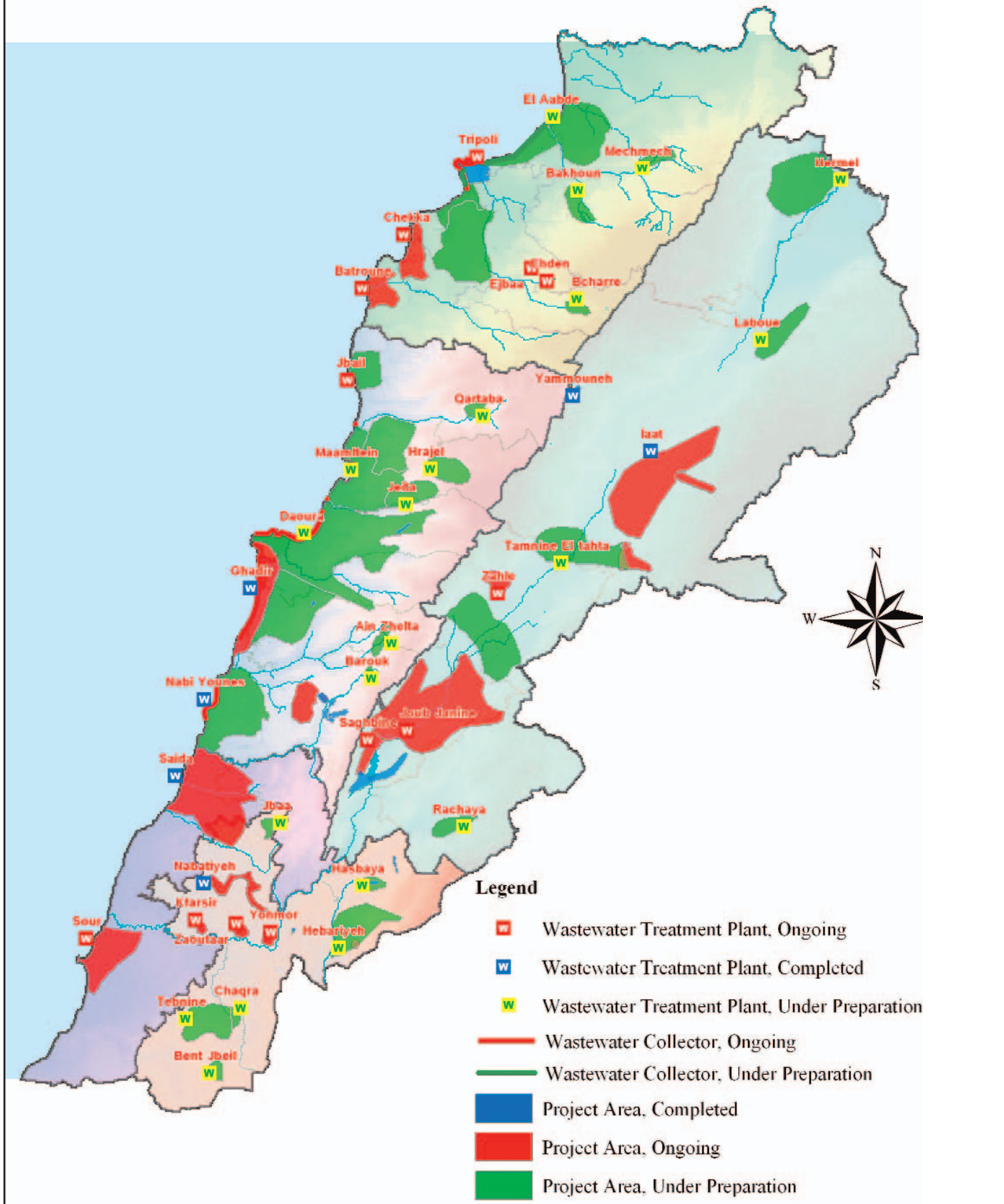
1. Execution of the emergency rehabilitation works of existing wastewater networks and pumping stations, and resolution of all the recent issues.
2. Completion of projects stopped involuntarily and network extension and rehabilitation according to the needs.
3. Launching two programs for protecting the Lebanese coasts and water resources from pollution.

In other terms, the objective of this strategy is to address the problem of pollution and wastewater disposal in a radical manner throughout the country, as the Lebanese government worked and is still working on completing and organizing the public service in the wastewater sector.

However, completing the work on the third axe remains the main goal of CDR for the upcoming stage after works have progressed along the two other axes.

At the institutional level, the promulgation of law 221/2000 constituted a primordial step toward the restructuring and modernization of the sectors of water and wastewater, since public water properties were defined (ground and underground), and an integrated water management (potable, irrigation, and wastewater) was entrusted to four public

## Wastewater Completed, Ongoing & Under Preparation Projects







Waste water network - Tripoli

independent investment institutions (except for the Litani River which remained under the administration of the Litani National Authority to invest its water in irrigation in South of Lebanon, and West Bekaa). Moreover, all water departments have been included in these institutions and subject to the custody of the ministry of Energy and Water.

In 2001, boards of administration for water institutions were formed. In 2005, organizational decrees and new structures thereof were elaborated and enforced in order to achieve many goals, mainly rehabilitating and improving facility services, extending their coverage zone, and maintain the administrative stability and financial balance of institutions.

**Achievements during 1992-2009**

The value of projects implemented to date in the wastewater sector reached US\$ 402 million; the main projects are the following:

**\*Emergency rehabilitation of wastewater networks (NERP1-first year):** This project covered the emergency repair and rehabilitation of wastewater networks in all regions of Lebanon, in addition to the rehabilitation of two wastewater pumping stations in Al Mina-Tripoli and Jounieh, and the construction of about 1000 kilometers of sewage networks.

**\*Completion of Al Ghadir wastewater pre-treatment plant:** The construction and equipping of the wastewater pre-treatment plant were completed and the relevant sea outfall rehabilitated. Such plant will serve the southern part of districts of Baabda and Aley and the west-southern part of Greater Beirut. The plant was put into service in November 1997.

**\*Beirut master wastewater coastal collector project:** This project aims to protect the coast extending from Metn to the Shouf district. The project aims to eliminate all existing sea outfalls along the mentioned coastal area by collecting and conveying wastewater to the Dora and Ghadir pre-treatment plants. The conveyor line comprises two sections, a northern and a southern section. The northern section, covering about 17 kms of collection pipe, includes Dbayeh-Dora - Ras Beirut-Dora coastal areas, in addition to 5 pumping and lifting stations. All works were completed in year 2000 (costing about US\$ 45 million). This section has been designed to serve 1.5 million inhabitants of Dora area by year 2015. The southern section covers the Carlton-Al Ghadir sewer collector line, which is nearly completed (costing about US\$ 14.5 million), designed to serve the south western part of Beirut city and part of its southern suburb well as part of Baabda district and the

Damour-Al Ghadir line, still under construction (about US\$ 9 million), which is designed to serve a major part of Aley district and part of Shouf district.

**\*Execution of the first phase of rehabilitation of Beirut infrastructure**, including the wastewater network (sections 1 and 2) at a cost of US\$ 25 million. The project in all its phases aims to construct a new storm water network independent of the wastewater network.

**\*Completion of the pretreatment plant and execution of the first phase of rehabilitation of wastewater networks in Saida** and suburbs by rehabilitating the existing network and constructing a new network for wastewater transmission to the new treatment plant.

**\*Completion of a waste water treatment plant and a kiln for sludge** in the coastal area of the Shouf (Ras an Nabi Younes) at a cost of US\$ 9.5 million to serve a large number of villages in the Iqlim al Kharroub region, and a waste water treatment plant in Nabatiyeh area (Sharqiyeh) at a cost of US\$ 5.7 million funded by the Lebanese-French Protocol to serve the town of Nabatiyeh and the neighboring villages.

**\*Completion of a waste water treatment plant** in Baalback (Iaat) at a cost of US\$ 6.35 million funded by the IBRD to serve the city of Baalback and several neighboring villages.

**\*Maintenance and upgrading of wastewater and storm water networks in the main cities:** Starting in 1997 pursuant to the decision of the cabinet, works covered periodical maintenance, repair of wastewater and storm water piping utilities in the main cities, in addition to limiting the overflows and preventing problems emanating from breakdowns in the existing drainage networks. The works included cleaning wastewater and storm water piping networks, in addition to installing piping and other civil works required for improving the efficiency of these systems. The project covered Greater Beirut with its southern and northern suburbs, Tripoli, Zahle, Jounieh, Saida, Sour, Nabatieh and their suburbs and was implemented in coordination with the Ministry of Interior and Municipalities.

**Progress of ongoing projects:**

- **Beirut coastal area- southern section of the main wastewater collector, Carlton-Al Ghadir section:** This project covers the construction of two wastewater pumping stations and the installation of 9 kilometers of wastewater sewer lines serving a population of 750,000 (US\$ 12.7 million). The Islamic Development Bank (IDB) financed the Carlton-Al Ghadir collector. Installation of the collector lines is complete and works on the pumping and lifting stations are progressing. The Damour-Al Ghadir section: This section, financed by IDB, (about US\$ 10 million), is still

under execution and it covers about 30 kms of collector lines and 3 pumping stations. It is designed to serve more than 100,000 inhabitants.

- **Protection of the Lebanese coast against pollution:** Lebanon signed several conventions to protect the Mediterranean against pollution, including the Barcelona Convention. The agreements stress on the necessity of treating wastewater before discharged to the sea in cities and towns with populations exceeding 100 000. Several projects have been prepared for the construction of wastewater collector networks and treatment plants in the coastal areas. In the following, the major achievements to date are outlined:

- Saida wastewater pre-treatment plant and main collector line project that started during the second half of the year 2001 at a cost of US\$ 11 million, funded by the Japanese Bank for International Cooperation (JBIC). In addition, the sea outfall relevant to this plant was completed at a cost of US\$ 9.7 million, and was also financed by JBIC. The phase II of the project related to completing the wastewater networks in coastal Saida district is currently under construction at a cost of US\$ 19.7 million.

- The construction of wastewater treatment plants in Chekka, Batroun, Jbeil, Shouf coastal area and Nabatieh was launched. These projects were funded by the financial Lebanese-French Protocol works were achieved in





Waste water treatment plant - Tripoli

Chekka, Batroun, Ras-Annabi Youness in Jiyeh and Nabatiyeh.

- Works to construct a wastewater treatment plant in Tripoli were achieved at a cost of 91 million euros, funded by the European Investment Bank (EIB). The construction of the sea outfall related to the wastewater treatment plant at a cost of 6 million euros funded also by the EIB has started.

- Beirut infrastructure project including the sewer network – Phase II is progressing, financed by IDB (US\$ 38.5 million), and so is the first lot of phase III, In Achrafieh and Rmeil at a cost of US\$ 12 million, financed by the Arab Fund for Economic and Social Development (AFESD).

• **Protection of water sources against pollution:** A study was prepared in 1994 to update the instructional plan of the wastewater sector elaborated in 1982. This study defined water basins and priority areas for construction of new wastewater treatment plants to protect water

resources against pollution. For such purpose, appropriate financing was secured to construct collector lines and treatment plants in main inland cities (Zahleh, Baalbeck, Nabatieh, and others); and also in villages/towns close to water sources and springs (Labweh, Qaraoun Lake, Anjar, Hermel, Mechmech, Becharre, Bakhoun, Chabaa, Jbaa, Hasbaya, Chakra, Hrajel and Kartaba).

The Construction of the Baalback wastewater treatment plant, financed by the World Bank, was completed in the summer of the year 2000. Zahle wastewater treatment plant, funded through the Italian Protocol, was initiated in the first half of the year 2006 (US\$ 21 million). Similarly, the wastewater collection and treatment project in Jeb Jannine, Soghbine and neighboring villages (US\$ 32 million), financed by IDB have been initiated along with the wastewater collection and treatment project in Labweh, Baalbeck district (US\$ 4.5 million) funded through the Iranian protocol.

### Main contracts awarded in 2009

- The implementation of a wastewater collection and treatment projects in Yohmor, Zawtar and Kfarsir villages in Nabatieh District funded by a grant of 7 million euro from the EU
- The implementation of the works to construct sewer networks and a waste water treatment plant in Sour coastal area at a cost of 36 million euro financed by the EIB designed to serve 300.000 persons.
- The construction of additional sewer and potable water networks in Baalback and neighboring villages of Al Khodr, Nabi Sheet, Al Khraybeh at a cost of US\$ 3.5 million financed by the IBRD.

### Main Projects under Preparation (2010-2012)

Protection of the coastline against pollution: The Ministry of Energy and Water prepared a comprehensive study for the district of Akkar recommending the elaboration of a general

instructional plan for wastewater collection and treatment, including the construction of networks and plants for such purpose along the Abdeh coast. In implementation of such project, CDR obtained a loan from the Arab Fund. Moreover, the CDR secured the financing for the construction of the Keserwan wastewater treatment plant from the EIB. Moreover, CDR is currently updating the relevant detailed studies and tender documents.

CDR is currently preparing launch the bid to award the construction of the Dora Wastewater Treatment Plant (north Beirut) and the associated networks, after securing the necessary financing from EIB (60 million euro).

- The feasibility study for the extension of Al Ghadir wastewater pre-treatment plant (south Beirut) is complete. CDR is contacting several funding sources in order to secure funding for the works.

- The CDR has also secured the funding to implement the Greater Beirut wastewater treatment project from the German development agency (KfW) (16 million euro) and the required detailed studies are being prepared. This project involves the construction of wastewater collection and transmission networks from district of Aley and the South western part of Beirut city and south Beirut to the Al Ghadir wastewater pre-treatment plant.

- On the other hand, CDR recently secured financing from AFESD amounting to US\$ 85 million to finance wastewater systems in a number of Lebanese regions, including Akkar coastal area, where the cost of the project and wastewater collection and treatment is estimated around US\$ 25 million, at present the related studies are being updated, and the Chouf coastal area, where the cost of installation of wastewater networks is estimated around US\$ 12 million, preparations are underway to launch the works.

- Funding was secured for the wastewater collector project (Barid – Beddawi section) in the northern coastal section of Tripoli, including the main collector line, lifting stations and main and secondary related networks. This project, financed through the 12 million euro grant provided by Germany, will serve 100,000 inhabitants and its implementation is expected to start at the end of 2010.

**Protection of water sources against pollution:** The Ministry of Energy and Water along with CDR have identified approximately 20 wastewater projects near to water sources (springs, rivers, lakes, etc.) in inland Lebanese areas. Detailed studies are complete for many of these projects that mostly fall within the framework of existing financing agreements (Italian Protocol and IDB). Special importance is given to the western Bekaa area, Qaraoun Lake and the Litani River, where the high level

of water pollution requires urgent intervention to install wastewater collection and treatment facilities.

The CDR secured funding for the study and implementation of the wastewater project in the upper basin of the Litani River (about US\$ 10 million) through a loan agreement with the Arab Fund for Economic and Social Development (AFESD), the necessary detailed studies are being prepared. Moreover, bids for works were launched for similar projects, namely in Bcharre (US\$ 8 million), Shebaa and neighboring areas (US\$ 6 million), and as Safa and al Barouk areas (US\$ 13 million).

Finally, as part of the Baalback water supply and wastewater treatment project, the construction of 160 additional kilometers of water and wastewater networks in Baalback and the surrounding areas is underway. The cost is estimated to be around US\$ 11 million financed by the IBRD.

CDR also received a grant of 6 million euro and signed a loan agreement of 7 million euro with the German agency KfW to implement the project of protection of Jeita grotto against pollution. Currently, work is underway to start the required studies. The project is in two phases aiming at collecting and treating wastewater from the villages in the water basin of Jeita grotto (Darayya, Qleyaat, Beqaata, Bqaatouta, Kfarzebiane and the neighboring villages).

### Schedule of main contracts signed in the wastewater sector during 2009

Project	Estimated value US\$	Source of Funding	Starting	Expected completion
Surveying and study works for the present sea outfall related to the future waste water treatment plant in Dora	1,366,474	EIB	01/11/2009	31/05/2010
Construction of a treatment plant in the coastal area of Sour	40,162,781	EIB	01/08/2009	31/07/2011
Construction of collector networks in the coastal area of Sour	6,368,664	EIB	01/08/2009	31/07/2011
Construction of additional potable and waste water networks in baalback and the villages of al Khodr, an Nabi Sheet and al Khraybeh	3,552,500	IBRD	01/12/2009	30/11/2011
Construction of 3 treatment plants and wastewater networks in Yohmor, Zawtar, and Kfarsir	9,584,175	European Union	01/10/2009	30/09/2010
Construction of sewer networks in the village of the Federation of municipalities of as Swijani in the Chouf area	3,996,857	local	01/12/2009	30/11/2009

**Schedule of main projects under preparation in the wastewater sector (2010-2012)**

<b>Project</b>	<b>Estimated value million US\$</b>	<b>Source of Funding</b>	<b>Date expected to initiate work</b>	<b>Expected completion</b>
Program of Protection of the Lebanese Coast against pollution				
Construction of Nahr El Bared-Tripoli main coastal collector line	16	German Agency (KFW)	March 2010	December 2012
Construction of Akkar coast collector networks and pre-treatment plants	26	AFESD	December 2010	July 2013
Construction of collector networks and pre-treatment plants in the coastal area of Keserwan	90	EIB	March 2011	March 2014
Construction of collector networks and pre-treatment plants in the coastal area of Metn (Dora)	78	EIB	November 2010	January 2013
Program of Protection of water sources against pollution				
Construction of collector networks and treatment plant in Mechmech-Akkar	10.50	Italian Protocol	November 2010	November 2013
Construction of collector networks and treatment plant in Bakhun-Denniyeh	19	Italian Protocol	December 2011	December 2014
Construction of collector networks and treatment plant in Bcharre	7.50	AFESD	December 2010	January 2013
Construction of collector networks and treatment plant in Qartaba-Jbeil	6	Italian Protocol	August 2010	March 2012



Construction of wastewater networks in the coastal area of Jbeil	16	Italian Protocol	August 2010	March 2013
Construction of collector networks and treatment plant in Hrajel-Keserwan	11.50	Italian Protocol	November 2010	November 2013
Construction of collector networks and treatment plant in Jeita-Keserwan	7.50	German Agency KFW	December 2011	December 2013
Construction of collector networks in the area of the Al Ghadir river basin in districts of Baabda and Aley	23.50	German Agency (KFW)	May 2011	May 2013
Construction of treatment plant and wastewater networks in both areas Baruk and Safa	13	AFESD	July 2010	August 2013
Construction of wastewater networks in the coastal area of Chouf	14	AFESD	July 2010	December 2012
Construction of treatment plant and wastewater networks in Chakra and its neighboring areas in Bint Jbeil	4.50	Kuwait Fund	(Implementation and management entrusted to the donor)	
Construction of treatment plant and wastewater networks in Bint Jbeil and neighboring areas	11	Italian Protocol	December 2011	December 2013
Construction of treatment plant and wastewater networks in Tibnine and its neighboring areas in Bint Jbeil	10	Kuwait Fund	(Implementation and management entrusted to the donor)	
Construction of treatment plant and wastewater networks in Hasbaya and neighboring areas	8	Italian Protocol	December 2011	December 2013

Construction of treatment plant and wastewater networks in Arqub	6.50	AFESD	March 2011	January 2013
Construction of treatment plant and wastewater networks in Jbaa and neighboring areas in Nbatiyeh	7	Italian Protocol	November 2010	December 2012
Construction of treatment plant and collector networks in Hermel and neighboring areas	20	Italian Protocol	December 2011	June 2014
Construction of treatment plant and wastewater networks in Labweh and neighboring areas	4.50	Iranian Protocol	August 2010	August 2012
Construction of treatment plant and wastewater networks in central and northern Bekaa in the Litani basin	10.50	AFESD	March 2011	May 2013
Construction of treatment plant and wastewater networks in Anjar, Majdal Anjar, Bar Elias, Mraijet, Marj, Chtoura and neighboring areas	41	Italian Protocol	December 2011	September 2014
Construction of treatment plant and wastewater networks in Rachayya and neighboring areas	8	Kuwait Fund	January 2012	December 2013