Chapter Fifteen

Drinking Water and Sanitation

15-1 Background

Syria is a semi-arid county with limited water resources. The continued population growth, urban expansion and fast economic development have led to increased pressure on the country's natural resources including the deterioration of water resources, which will have serious long-term repercussions on the sustainability of these resources.

In terms of water, Syria is divided into seven basins and the average supply of surface water is estimated to be around 10 billion m^3, while figures show that the average supply of renewable groundwater is around 6 billion m^3. These figures imply that the speed of groundwater depletion exceeds natural renewability in most Syrian territories, the impact of which is evident in the drop of groundwater levels in many areas.

Available information shows that the agricultural sector consumes around 90% of the country's water resources, while 8% is used for drinking purposes and 2% is consumed by the industrial sector. Reports demonstrate that around 1,160 million m^3 of drinking water were produced in 2004, where the water loss was 16-14% and the number of subscribers was 2.7 million.

The 2004 estimates show that the drinking water was supplied to 92% of the population. Groundwater is the main source of drinking water, and per capita daily consumption is 16-150 liter.

Water analysis results show that both surface and groundwater are polluted with sewage disposal/industrial wastewater, and despite the fact that many sewage networks were built in many cities and towns, there is still shortage in treatment stations. The longest main sewage network is spreading around 18300 km. 95% of the urban population is serviced with sewage networks against 46% of the rural population, while the number of people serviced with sewage-treatment stations is estimated to be around 24%.

15-2 Performance of the drinking water & sanitation sector in the 9th FYP

The total investments dedicated for the drinking water sector in the 9th FYP were around SYL 25 billion. The implementation rate of planned projects was 98%, and the percentage of people serviced with drinking water rose from 84% in 2000 to 90% in 2004. Water production increased from 920 million to 1160 million m^3, while the number of subscribers increased from 2.1 to 2.7 million.

The total investments allocated for the sanitation sector in the 9th FYP amounted to SYL 6 billion. The implementation rate of planned projects was 100%, and the number of people serviced with sewage networks rose from 66% in 2000 to 71% in 2004.

15-3 Problems and challenges facing the drinking water sector

- Rising percentage of physical and administrative water loss.
- Leakage of wastewater into some drinking water sources making them polluted and unsafe to drink.
- Encroachment on water networks as a result of informal settlement and random housing and of failure to issue necessary legislations to control such practices.
- Increased illegal digging of wells, which seriously affected the groundwater storage.
- Lack of feasibility studies for most drinking water projects.
- Imbalance between the high population growth and the limited water resources.
- Old machinery and equipment used in water-related activities.
- Poor technical and implementation studies for most water projects due to the lack of expertise.
- Increased operating costs due to rising electricity and fuel prices, which increase budget deficits in the institutions concerned.
- The low tariff in place since 2000 and the increasing cost of drinking water production have led to imbalance between revenues and expenditure consequently creating budget deficit.
- Inefficiency of meters with numerous malfunctions, in addition to poor collection system.
- Multiple regulatory bodies in the water sector including administrative duplication.
- Centralized decision-making.
- Poor participation of beneficiaries in the planning of drinking water and sanitation projects.
- Lack of a water use specification policy.
- Lack of qualified administrative cadres.

Problems and challenges facing the sanitation sector

- The diverse array of official bodies working in sanitation projects in the field of study, implementation or management, coupled with poor coordination and integration between them which leads to numerous fallacies and squandering.
- Inefficient sewage networks.
- Lack of optimal performance, operating and utilization of existing projects.
- Delays in implementing sanitation projects (study, contracting procedures and implementation), which has a negative impact in terms of economic feasibility upon utilization.
- Poor studies and designs due to lack of technical experience in this field.
- Lack of environmental impact evaluation studies for most projects.
- Lack of qualified cadres working in the sanitation sector.
- Lack of sewage-treatment units at various economic activities (health/agricultural/industrial), which has a negative impact on the performance of sewage-treatment stations.

15-4 Future vision

The drinking water and sanitation sector is planned to be developed to become a service provider via highly efficient public institutions that mange the water resources dedicated for drinking purposes and maintain these resources in a manner to preserve everyone's right to get safe drinking water and treated wastewater.

15-5 long-term objectives

Up to 2020, the drinking water and sanitation sector shall be able to fulfill the following objectives:

- Clean and sustainable drinking water provided.
- Operating and maintenance costs of drinking water and sanitation services recovered.
- Financial autonomy in managing drinking water and sanitation institutions achieved.
- Sustainable management of drinking water resources to ensure safe and clean drinking water for the current and future generations achieved.
- Water consumption rationalized.
- Physical and administrative water loss reduced.
- Wastewater reused in other producing sectors.
- Independence in taking managerial decisions achieved.
- Executive decision-making decentralized on lower management levels.
- Decisions based on socioeconomic feasibility studies and environmental impact evaluation taken.
- Cooperation with the private sector achieved in performing tasks and activities that boost the technical, financial and administrative efficiency of the relevant institutions.
- Utilization of trained personnel capable of performing advanced tasks in suitable working environment achieved.
- Participatory approach and communication with all bodies engaged in drinking water and sanitation projects achieved to ensure optimal service-providing for all social categories.

10^{th} FYP

A- Wider objectives

- Provide potable water and treated wastewater for urban and rural residential areas and their expansions based on the principle of "integrated and sustainable water resources between all water users within the same water basin".
- Reduce the water loss in drinking water institutions.
- Provide good quality services for subscribers financed by gradually recovering operating and maintenance costs based on the principle of "mutual financial support between all social categories in the governorate serviced by one institution".
- Set up an organizational framework that delegates the broadest financial & HR management powers to the relevant institutions in order to enhance decision-making at lower management levels.

- Set up the institutional framework that coordinates between the public bodies in charge of water supply and distribution, water networks, swage-treatment stations, reuse of treated wastewater under the supervision of one administration or body and the governing frameworks for private sector participation in implementing some executory tasks.
- Vocationally develop sector employees to enable the performance of duties effectively and efficiently, train them to carry out advanced tasks and provide the proper working environment that guarantees having qualified personnel continue working in the sector.
- Enhance communication and participatory approach in project planning and financing in the residential areas to be provided with drinking water and sanitation services.

B- Main quantified objectives at sectoral and macro levels

Based on the above wider objectives, the main achievable quantified objectives in the drinking water and sanitation sector may be determined as follows:

1- Provide potable water for 99% of urban population and 93% of rural population.
2- Provide sewage networks for 98% of urban population and 65 of rural population.
3- Provide sewage-treatment stations for 85% of urban population and 15% of rural population.
4- Reduce the water loss in drinking water institutions to 22% for urban population and 15% of rural population.
5- Achieve the following average operating and maintenance drinking water supply services cost recovery rate for 2006-2010:

٢٠١٠	٢٠٠٩	٢٠٠٨	٢٠٠٧	٢٠٠٦
%90	%٧٥	%٦٥	%٦٠	%٥٥

6- Achieve the following cost recovery plan for operating and maintaining sewage networks and treatment stations:

٢٠٠٦	٢٠٠٧	٢٠٠٨	٢٠٠٩	٢٠١٠
%٢٥	%٣٠	%٣٥	%٤٠	%٥٠

7- Train 100% of senior managers.
8- Train 20% of technical staff.
9- Achieve per capita water consumption of 80 liters per day minimum after implementing the rationalization programs are ensuring resources sustainability.

C- Strategy

The drinking water and sanitation sector is a key service sector for all development sectors. It is based on the concept of fulfilling consumer needs at minimum costs. Despite being a non-profit sector, it is supposed to be able to recover costs of services provided to the citizens, in addition to the environmental sustainability of drinking water resources. The following is a host of strategies meant to help fulfill these approaches:

- **Provide potable water and treated wastewater for rural and urban areas (Objective 1)**

1. Estimate the future drinking water needs and determine treated wastewater uses in coordination with the concerned bodies.
2. Formulate plans for drinking water and sanitation programs; study the environmental and socioeconomic impact of scheduled projects; put forward alternative solutions when necessary and identify necessary resources to implement these programs, their sources and methods of providing them in coordination with the concerned bodies.
3. Develop programs for water consumption rationalization through demand management projects coupled with necessary economic incentives.
4. Monitor the water sources in terms of quantity and quality and take the preventive measures to protect them.

- **Reduce the physical and administrative water loss (Objective 2)**

5. Give drinking water and sanitation institutions the necessary powers to take necessary measures to help reduce the administrative water loss.

6. Develop and implement a program to reduce the physical and administrative water loss, study results of measures taken and put forward alternative solutions if these measures have proven ineffective.

- **Provide good quality services for subscribers to be financed by recovering operating and maintenance costs (Objective 3)**

7. Evaluate impressions of beneficiaries about the status of current services and develop these services in order to fulfill beneficiaries' needs with minimum costs.

8. Identify the actual operating and maintenance costs and propose mechanisms to recover these costs gradually taking into consideration mutual financial support between all social categories on the level of a single governorate.

- **Delegate powers in financial and HR management at the concerned institutions and enhance decision-making at lower management levels (Objective 4)**

9. Give drinking water and sanitation institutions broader powers in terms of financial and HR management.

10. The Ministry of Housing and Construction shall develop a bylaw specifying the job descriptions in drinking and sanitation institutions as well as power delegation mechanisms.

- **Set up an institutional framework that organizes the relation between the sector authorities and the private sector (Objective 5)**

11. Introduce an institutional system that defines the relations between the sector bodies in charge of water supply and distribution, water networks, swage-treatment stations and the reuse of treated wastewater.

12. Develop and implement an institutional system that defines the relation and scope of cooperation between the bodies concerned in the drinking water and sanitation sector and the private sector.

- **Vocational development for all employees (Objective 6)**

13. Organize training courses to raise technical and administrative efficiency of employees and on all levels continuously and methodologically.

14. Create a suitable working environment and give incentives to maintain qualified personnel and prevent their drain out of the sector.

- **Enhance communication and participatory approach in project planning and financing (Objective 7)**

15. Present results of environmental and socioeconomic effect evaluation studies of drinking water and sanitation programs to the communities concerned in order to seek their opinions about the measures introduced and get their approval.

16. Encourage citizens, through public-work, to contribute in funding water and sanitation projects.

17. Raise public awareness through communicating with people in issues pertaining to water resources and drinking water and sanitation services.

D- Measures and workplan

- **Evaluate future drinking water needs and determine treated wastewater utilizations (Strategy 1)**
  - Coordinate with the Ministry of Irrigation to dedicate necessary water resources to the drinking water sector.
  - Coordinate with the ministries of agriculture and irrigation to reuse treated wastewater for irrigation purposes and organize the use of fertilizers.
  - Coordinate with the Ministry of Irrigation to study the possibility of transferring drinking water between water basins when necessary.

- Coordinate with the ministries concerned in order to draw a picture of future population growth in urban and rural areas.

- **Execute drinking water and sanitation projects (Strategy 2)**

  - Update the drinking water sources and projects map and establish a database for it.
  - Finalize comprehensive sanitation master plans in different governorates.
  - Draw up a drinking water program that gives priority to areas suffering a shortage of drinking water services.
  - Conduct an assessment of environmental and socioeconomic impact of drinking water projects and adopt final solutions prioritized according to specific standards.
  - Complete the studies and executive dossiers of prioritized projects.
  - Continue preparing a Syrian code to design and execute projects excellently and efficiently.
  - Identify necessary funding for water and sanitation projects and define potential funding sources.
  - Coordinate with the concerned bodies to raise necessary funding.
  - Expand and replace drinking water networks in urban and rural residential areas.
  - Expand and replace sewage networks in residential areas and give priority to communities located within the protected drinking water sources sites.
  - Establish treatment stations in all governorate as well as in most polluted residential areas.
  - Promote the decentralized sanitation systems in rural areas according to feasibility studies.

- **Study and implement demand management projects (Strategy 3)**

  - Gather information in the field of introducing water consumption rationalization techniques to consumers.
  - Determine the expected reduction in water consumption and its impact on the financial revenues of the relevant institutions.
  - Identify the impact of reducing water consumption on the priority of supplying projects and the necessary investments.
  - Study the cost of incorporating consumer demand management technologies.
  - Determine necessary financial resources to execute demand management projects and identify potential funding sources.
  - Coordinate with the concerned bodies to get necessary funding for demand management projects.
  - Coordinate with the concerned bodies to determine the nature of economic incentives that would encourage subscribers to use water rationalization technologies, and also determine implementation mechanism.
  - Set and fulfill priorities for the demand management projects' program.

- Coordinate with the ministries of irrigation and agriculture to apply modern irrigation methods in agricultural areas adjacent to drinking water wells to control random pumping operations and prevent depleting the groundwater storage for irrigation purposes.
- Design a manual to survey drinking water and sewage users (via questionnaires) to determine possible demand, including conducting surveys to verify willingness to pay, level of awareness of the importance of services, attitudes and practices amongst users.

- **Monitor the water resources dedicated to drinking (Strategy 4)**

  - Work with the competent bodies to determine protected sites for all water sources and connect them with a single GIS-based network.
  - Monitor supply and distribution technologies that may enhance water supply efficiency and control water network leakages.
  - Formulate a special system to monitor water quality and quantity.
  - Regularly evaluate the threats on water sources in coordination with the other bodies concerned and take necessary measures to prevent their negative impact.

- **Broader powers in implementing measures intended to reduce the administrative water loss (Strategy 5)**

  - Identify government procedures and legislations that hinder water institutions efforts to reduce the administrative water loss.
  - Propose amendments to current legislations and procedures attached with an economic impact study.
  - Work closely with the competent authorities to approve giving broader powers that allow water institutions to act more effectively to reduce the administrative water loss.

- **A workplan to reduce the water loss and monitor results (Strategy 6)**

  - Estimate the physical loss in water networks and the ensuing financial losses.
  - Estimate the administrative loss in drinking water institutions and the ensuing financial losses.
  - Estimate the resources required to reduce the water loss, including the human and financial resources and methods of providing them.
  - Propose specific projects to reduce the water loss based on feasibility studies specifying actual costs and estimated revenues.
  - Draw up a workplan for projects intended to reduce the physical and administrative water loss, implement these projects and monitor results.
  - Conduct studies clarifying the financial revenues generated by the adopted measures.
  - Take the suitable corrective actions should the adopted ones proven ineffective.

- **Evaluate impressions of beneficiaries about the status of current services (in association withy strategy 7)**

  - Lay out a mechanism to monitor and record impressions of beneficiaries about the services provided by the relevant institutions.
  - Conduct studies about quality of performance in term of services provision and their ensuing costs and compare with other institutions.
  - Develop the work of subscriber affairs directorates to ensure better services for subscribers.
  - Take necessary corrective actions to tackle the areas related to bad performance in service provision or those resulting in heavy costs (in comparison with other institutions).

- **Propose mechanisms to recover operating and maintenance costs (Strategy 8)**

  - Determine the actual operating and maintenance costs taking into consideration the additional costs of fulfilling the subscribers' needs.
  - Conduct a tariff study that takes into consideration the economic status of various social categories and lay out a mechanism to implement this system in order to reach the planned cost recovery rate for operating and maintenance services on governorate level.

- **Broader financial and HR management powers (Strategy 9)**

  - Evaluate the current power delegation practice at the water and sanitation institutions and their impact on fulfilling subscribers' needs, sustainability of water resources and ability to recover costs.
  - Follow up with the government to make it delegate these powers to enable the water and sanitation institutions to work more efficiently and achieve the planned objectives.

- **Decision-making at lower management levels (Strategy 10)**

  - Evaluate the current decision-making powers delegated to lower management levels and their impact on decreasing work effectiveness and efficiency.
  - Propose broader decision-making powers at lower management levels attached with an evaluation of the risks associated with these powers.
  - Transfer the proposed powers to the lower management levels, monitor development of performance and apply the suitable corrective actions should no improvement in work efficiency appeared.

- **Integration of responsibilities between the bodies concerned in managing the sector (Strategy 11)**

  - Evaluate the nature of governing relations and the current coordination mechanisms between the bodies concerned in the sector.

- Propose coordination mechanisms that lead to the integration of responsibilities between the bodies concerned in the sector and follow up their implementation.
- Monitor coordination results and take necessary corrective actions to ensure the effective management of water and sanitation facilities.

- **Coordinate the relation between the water and sanitation institutions and the private sector (Strategy 12)**

  - Determine the nature of activities that may be assumed by the private sector and coordinate the relation with the relevant public departments.
  - Monitor results of coordination and cooperation with the private sector and take necessary corrective actions to ensure effective management of water and sanitation facilities to satisfy subscribers' requirements with minimum costs.

- **Organize training courses to raise the technical and administrative efficiency of employees (Strategy 13)**

  - Allocate necessary resources for methodological and constant training based on a calculated plan.
  - Design special training programs to keep pace with the scientific developments necessary to raise the standard of technical work at the relevant institutions.
  - Train employees on the work of service-providing institutions that seek to satisfy customers.
  - Develop the cadre responsible for financial management and accounting.
  - Monitor the development of trainees' performance and evaluate and improve the training courses to help raise work efficiency and effectiveness.

- **Create a suitable working environment (Strategy 14)**

  - Evaluate the negative impact of the working environment on employees' efficiency.
  - Propose necessary efficiency-raising measures.
  - Allocate necessary resources and implement and evaluate the remedial measures.

- **Familiarize the communities concerned with results of environmental and socioeconomic effect evaluation studies (Strategy 15)**

  - Conduct seminars and workshops to familiarize local people with the results of environmental impact and socioeconomic evaluation of the proposed water and sanitation related projects and give them the opportunity to express their opinions and suggestions.
  - Lay out a mechanism to compensate the people affected by the project.

- **Participation of the public in funding (Strategy 16)**

- Conduct surveys to verify willingness of drinking water and system users to take part in bearing investment costs of relevant projects and lay out a mechanism for that purpose.
- Cooperate and stimulate work with the local committees at neighborhood level.

- **Communication and awareness raising (Strategy 17)**

  - Organize campaigns to encourage adopting demand management methods to reduce water squandering, and familiarize the public with the economic incentives offered in this field.
  - Formulate awareness-raising programs for all social categories to explain that water is a vital resource that should be preserved.

E- Reforms on legal and institutional levels

Based on the above, the reforms required on the legal and institutional levels may be summed up as follows:

- **Reforms required from the government**

  - Amend specific legislations to give the water and sanitation institutions broader powers in financial affairs, personnel, accounting, procurement ..
  - Issue necessary legislations to unify the bodies working in the sanitation sector and treated wastewater utilization.

- **Reforms required from the Ministry of Housing and Construction**

  - Issue a ministerial decision to restructure the drinking water and sanitation institutions in order to achieve the required objectives and policies.
  - Set up the institutional framework governing the relations between the bodies concerned in the sector on the one hand and between these bodies and the private sector on the other.
  - Amend the bylaw of the relevant institutions.

- **Reforms required from the water and sanitation institutions**

  - Delegate decision-making powers in the drinking water and sanitation institutions to lower management levels.

F- Programs and projects

Programs and projects in this sector may be divided into drinking water and sewage disposal (including treatment). The annual and total investments in this sector are as follows:

Priority	Programs and projects	Estimated investments (SYL million)

P1	Drinking water - Rehabilitation of drinkig water projects - Projects to suplly certain residential areas with water - Develop the work of the relevant institutions - Proposed projects to supply certain residential communities with water and rehabilitate some water projects	٥٣٦٥٨
P2	- Rehabilitation of drinking water projects - Projects to suplly certain residential areas with water - Developing the work of the relevant institutions	٥٢١٠٥
P1	Sanitation - Wastewater treatmnent projects (treatment networks and stations) - Sanitation projects that may be proposed in harmony with the objectives set by the 10th FYP	٤٧٩٩٨
P2	- Wastewater treatmnent projects (treatment networks and stations)	٣٧٠٠٠

Projected Achievements and revenues

Achievements and revenues estimated from implementing the above plan may be divided into direct financial revenues and indirect financial revenues that help improve human life and the environment.

Direct financial revenues

- The proposed policies and measures meant to reduce the water loss caused by the leakage of water from networks and some problems related to meters and the ensuing phenomena (figure show that the loss exceeds 50% in most institutions concerned) shall contribute in boosting revenues of institutions concerned to at least SYL 2.5 billion annually, which roughly equals 0.2% of GDP for 2004.

Indirect gains

- The integrated management of water resources, coordination and distribution of responsibilities between the water and sanitation institutions and the bodies in charge of hydrological basins shall contribute in preventing the pollution and depletion of water resources in the water basin.
- Giving the water and sanitation institutions independence in managing their financial and HR affairs shall help raising management efficiency and improving working environment. It shall also help fulfilling subscribers' needs quickly and efficiently given that the relevant institutions control their own financial and HR resources and consequently workers or employees shall be held accountable in case of failure to perform their duties.
- Decision-making at lower management levels shall contribute in raising the sense of responsibility of decision makers, which shall in turn raise their efficiency and willingness to work and reduce bureaucracy.
- The concept of cost recovery will help ease the financial burden on state budget and achieve financial sustainability in the concerned institutions.
- Contacts with citizens in water and sanitation projects shall help give citizens the impression that these projects are meant to achieve their direct

benefit and consequently feel responsible to protect them and the desire to share in their funding.
- Providing drinking water for all social categories shall help raise standard of living of citizens and alleviate poverty and consequently help settle people in their areas and reduce migration to cities with its negative impact on social level.
- Treating wastewater shall reduce the pollution of the groundwater storage caused by the permeation of wastewater into some clean water resources.
- Treating wastewater shall minimize public exposure to illness caused by water pollution and shall consequently cut the medical bill and boost labor productivity.
- Treating wastewater shall help provide extra water resources for irrigation purposes.

Expected obstacles and threats

In order to increase the possibility of success, the following risks should be avoided:

- Poor coordination between the ministries of housing, irrigation and agriculture for the purpose of integrated water resources management, which poses a threat on the sustainability of drinking water resources for the future scheduled projects.
- Poor technical and administrative efficiency of personnel, which may result in inability of decision-making on lower management levels.
- Drinking water resources squandered due to lack of public awareness and failure to preserve this precious resource due to low tariffs.
- Lack of public awareness of the importance of the sanitation sector and its role in protecting natural resources from pollution, protecting the public from diseases and providing extra source for irrigation.

Performance follow-up and revenues indicators

Implementation of the above plan may be followed up via the following indicators:

- % of people serviced with potable water networks.
- % of people serviced with sewage networks.
- % of people serviced with sewage-treatment stations.
- Number of sick cases caused by polluted drinking water (diarrhea, infectious diseases, etc.).
- Rate of migration from city to country serviced by drinking water and sanitation projects.
- Rate of physical loss in water networks.
- Rate of administrative loss in water institutions.
- Rate of cost recovery against operating and maintenance.
- Rate of cost recovery against operating and maintenance and investment.
- % of people satisfied with services.
- Rate of per capita consumption of water per day.

- Demand management projects/supply projects ratio.
- % of trainees from employees in higher management positions.
- % of trainees from technical staff in the sector.
- % of bills collected.
- Per capita investment in drinking water.
- Per capita investment in sewage-treatment.

Drinking water and sanitation sector

Matrix

Strategies	measures	Anticipated gains	Indicators	Body in-charge	Implementation timeframe
Estimate the future drinking water needs and determine treated sewage utilizations in coordination with the concerned bodies	Coordinate with the Ministry of Irrigation to allocate necessary water resources to the drinking water sector	Water resources for drinking purposes provided and protected from pollution	Agreed standards and criteria to calculate future needs for drinking water and sewage disposal utilizations	Ministry of Housing and Construction in coordination with the Ministry of Irrigation	٢٠٠٦
	Coordinate with the ministries of agriculture and irrigation to reuse treated wastewater in irrigation and organize the use of fertilizers			Ministry of Agriculture and Ministry of Irrigation in coordination with the Ministry of Housing and Construction	٢٠٠٩ – ٢٠٠٦
	Coordinate with the Ministry of Irrigation to study the possibility of transferring drinking water between water basins when necessary			Ministry of Housing and Construction in coordination with the concerned bodies	٢٠١٠ – ٢٠٠٦
	Coordinate with the relevant ministries in order to draw a picture of future population growth in urban and rural areas			Ministry of Housing and Construction in coordination with the concerned bodies	٢٠١٠ – ٢٠٠٦
Formulate plans for drinking water and sanitation programs; study the environmental and socioeconomic impact of scheduled projects; develop solution scenarios whenever necessary and identify necessary resources to implement these programs, their sources and methods of	Update the drinking water sources and projects map and establish a database for it	Integrated plans for implementing drinking water and sanitation projects that ensure sustainable solutions which include the environmental, socioeconomic, financial and	- Drinking water and sanitation projects studied and executed according to the water resources map and the comprehensive regional sanitation plan. - Utilization distribution indicators by area. - Social and environmental impact	Ministry of Housing and Construction	٢٠٠٨ – ٢٠٠٦
	Implement the comprehensive regional sanitation plan in all the country's governorates			Ministry of Housing and Construction	٢٠٠٨ – ٢٠٠٦
	Draw up a drinking water program that gives priority to areas suffering a shortage of drinking water services			Ministry of Housing and Construction	٢٠٠٧ – ٢٠٠٦
	Conduct an evaluation of the environmental and socioeconomic impact of drinking water projects and adopt and prioritize final solutions according to specific standards			Ministry of Housing and Construction	٢٠١٠ – ٢٠٠٦

Strategies	measures	Anticipated gains	Indicators	Body in-charge	Implementation timeframe
providing them in coordination with the concerned bodies	Complete the studies and executive dossiers of prioritized projects	administrative aspects elaborated	measurement indicators.	Ministry of Housing and Construction in coordination with the concerned bodies	٢٠٠٦ – ٢٠٠٩
	Continue preparing a Syrian code to design and execute projects excellently and efficiently			Ministry of Housing and Construction in coordination with the concerned bodies	٢٠٠٧
	Identify the financial resources for executing drinking water and sanitation projects and the potential funding sources			Ministry of Housing and Construction in coordination with the concerned bodies	٢٠٠٦ – ٢٠٠٩
	Coordinate with the concerned bodies to obtain necessary funding for projects			Ministry of Housing and Construction in coordination with the concerned bodies	٢٠٠٦ – ٢٠٠٩
	Expand and replace drinking water networks in urban and rural residential areas			Ministry of Housing and Construction	٢٠٠٦ – ٢٠١٠
	Expand and replace sewage networks in residential areas and give priority to communities located within the protected drinking water sources areas			Ministry of Housing and Construction	٢٠٠٦ – ٢٠١٠
	Establish sewage-treatment stations in all governorate centers and in most polluted residential areas			Ministry of Housing and Construction	٢٠٠٦ – ٢٠١٠
	Develop the decentralized sanitation systems in rural areas according to economic feasibility studies			Ministry of Housing and Construction	٢٠٠٧ – ٢٠١٠
Develop programs for water consumption rationalization through demand management projects coupled with necessary economic incentives. Determine necessary financial resources to execute the demand management projects and identify potential funding sources and methods of	Gather information in the field of introducing water consumption rationalization technologies for consumers	Water consumption rationalized and depletion of water resources reduced	- Studied and executed water rationalization projects. - Indicators of economic incentives adopted to rationalize water utilization.	Ministry of Housing and Construction	٢٠٠٧
	Determine the expected reduction in water consumption and its impact on the financial revenues of the relevant institutions			Ministry of Housing and Construction	٢٠٠٧
	Identify the impact of reducing water consumption on the priority of supply projects and the necessary investments			Ministry of Housing and Construction	٢٠٠٧
	Study the cost of incorporating consumer demand management technologies			Ministry of Housing and Construction	٢٠٠٧

Strategies	measures	Anticipated gains	Indicators	Body in-charge	Implementation timeframe
providing them in coordination with the concerned bodies.	Determine necessary financial resources to execute demand management projects and identify potential funding sources			Ministry of Housing and Construction	٢٠٠٧ – ٢٠١٠
	Coordinate with the concerned bodies to raise necessary funding for the demand management projects			Ministry of Housing and Construction	٢٠٠٨ – ٢٠٠٩
	Coordinate with the concerned bodies to determine the nature of economic incentives that would encourage subscribers to use water rationalization technologies, and also determine implementation mechanism			Ministry of Housing and Construction in coordination with the concerned bodies	٢٠٠٨ – ٢٠٠٩
	Set and fulfill priorities for the demand management projects' program			Ministry of Housing and Construction	٢٠٠٨ – ٢٠١٠
	Coordinate with the ministries of irrigation and agriculture to apply modern irrigation methods in agricultural areas adjacent to drinking water wells to control random pumping operations and prevent depleting the groundwater storage for irrigation purposes			Ministry of Housing and Construction in coordination with the Ministry of Irrigation and the Ministry of Agriculture	٢٠٠٧
	Design a manual to survey drinking water and sewage users (via questionnaires) to determine possible demand, including conducting surveys to verify willingness to pay, level of awareness of the importance of services, attitudes and practices amongst users			Ministry of Housing and Construction	٢٠٠٨
Monitor the water sources in terms of quantity and quality and take the preventive measures to protect them	Take part with the concerned bodies to determine the protected limits of all water sources and connect them with a single GIS-based network	Water resources protected from depletion and pollution	- Water quality and quantity control system and data. - Studies for evaluating the dangers besetting the drinking water sources.	Ministry of Housing and Construction in coordination with the Ministry of Irrigation	٢٠٠٦ – ٢٠٠٧
	Monitor supply and distribution technologies that may enhance water supply efficiency and control water network leakages			Ministry of Housing and Construction	٢٠٠٨ – ٢٠٠٩
	Formulate a special system to monitor water quality and quantity (the health map)			Ministry of Housing and Construction	٢٠٠٨ – 2007
	Evaluate the dangers besetting the water sources regularly in coordination with the other bodies concerned and take necessary measures to prevent			Ministry of Housing and Construction in coordination with the	٢٠٠٨ – ٢٠١٠

Strategies	measures	Anticipated gains	Indicators	Body in-charge	Implementation timeframe
	their negative impact			concerned bodies	
Give drinking water and sanitation institutions necessary powers to take necessary measures to help reduce the administrative water loss	Identify government procedures and legislations that hinder water institutions efforts to reduce the administrative water loss	Administrative water loss reduced	- Broader powers within government procedures and legislations. - Economic impact resulting from broader power delegation in government procedures and legislations.	Ministry of Housing and Construction	٢٠٠٦
	Propose amendments to current legislations and procedures attached with an economic impact study			Ministry of Housing and Construction	٢٠٠٦
	Work closely with the competent authorities to approve delegating broader powers that allow water institutions to act more effectively to reduce the administrative water loss			Ministry of Housing and Construction in coordination with the concerned bodies	٢٠٠٧ – ٢٠٠٦
Develop and implement a program to reduce the physical and administrative water loss, study results of measures taken and put forward alternative solutions if these measures proven ineffective	Estimate the physical loss in water networks and the ensuing financial losses	Physical water loss reduced	- Projects studied and executed to reduce leakages in drinking water networks	Ministry of Housing and Construction	٢٠٠٨ – ٢٠٠٧
	Estimate the administrative loss in drinking water institutions and the ensuing financial losses			Ministry of Housing and Construction	٢٠٠٨ – ٢٠٠٧
	Estimate the resources required to reduce the water loss, including the human and financial resources and methods of providing them			Ministry of Housing and Construction	٢٠٠٨
	Propose specific projects to reduce the water loss attached with an economic feasibility in terms of actual costs and estimated financial revenues			Ministry of Housing and Construction	٢٠٠٨
	Draw up a workplan for projects intended to reduce the physical and administrative water loss, implement these projects and monitor results			Ministry of Housing and Construction	٢٠٠٨
	Conduct studies clarifying the financial revenues generated by the adopted measures			Ministry of Housing and Construction	٢٠١٠ – ٢٠٠٨
	Take the suitable corrective actions should the adopted ones proven ineffective			Ministry of Housing and Construction	٢٠١٠ – ٢٠٠٩
Evaluate impressions of beneficiaries about the status of current services and develop these services in order to fulfill beneficiaries' needs with minimum costs	Lay out a mechanism to monitor and record impressions of beneficiaries about the services provided by the relevant institutions	Quality of performance in drinking water and sanitation services provision developed	- Subscribers' impressions recording and evaluation reports. - Development measures adopted.	Ministry of Housing and Construction	٢٠٠٧
	Conduct studies about quality of performance in term of services provision and their ensuing costs and compare with other institutions			Ministry of Housing and Construction	٢٠٠٨
	Develop the work of subscriber affairs directorates to ensure better services for subscribers			Ministry of Housing and Construction	٢٠٠٧
	Take necessary corrective actions to tackle the			Ministry of Housing	٢٠٠٩ – ٢٠٠٨

Strategies	measures	Anticipated gains	Indicators	Body in-charge	Implementation timeframe
	areas related to bad performance in service provision or those resulting in heavy costs (in comparison with other institutions)			and Construction	
Identify the actual operating and maintenance costs and propose mechanisms to recover these costs gradually taking into consideration mutual financial support between all social categories on the level of a single governorate	Determine the actual operating and maintenance costs taking into consideration the additional costs resulting from fulfilling subscribers' needs	Costs recovered	- Cost analysis. - Tariff system studies.	Ministry of Housing and Construction	٢٠٠٦
	Conduct a tariff study that takes into consideration the economic status of various social categories and lay out a mechanism to implement this system in order to reach the planned cost recovery rate for operating and maintenance services on governorate level			Ministry of Housing and Construction	٢٠٠٦
Give drinking water and sanitation institutions broader financial and HR management powers	Evaluate the current power delegation practices at the water and sanitation institutions and their impact on fulfilling subscribers' needs, sustainability of water resources and ability to recover costs	Costs recovered	- Studies evaluating the current power delegation and development procedures. - Stipulates broader powers in the current government procedures and regulations.	Ministry of Housing and Construction	٢٠٠٦
	Propose broader financial and HR management powers based on an economic impact assessment			Ministry of Housing and Construction	٢٠٠٦
	Follow up with the government to make it provide these powers to enable the water and sanitation institutions to work more efficiently to achieve the planned objectives			Ministry of Housing and Construction	٢٠٠٦
The Ministry of Housing and Construction shall formulate and adopt a bylaw that defines duties of employees of drinking water and sanitation institutions and transfers decision-making powers to lower management levels	Evaluate the current decision-making powers delegated to lower management levels and their impact on decreasing work effectiveness and efficiency	Work efficiency and income increased	- Studies evaluating the current power delegation and development procedures. - Stipulates broader powers in the bylaw of concerned institutions.	Ministry of Housing and Construction	٢٠٠٦
	Propose broader decision-making powers to lower management levels attached with an evaluation of the risks associated with these powers.			Ministry of Housing and Construction	٢٠٠٦
	Transfer the proposed powers to the lower management levels, monitor development of performance and apply the suitable corrective actions should no improvement in work efficiency appeared			Ministry of Housing and Construction	٢٠٠٧ – ٢٠٠٨
Adopt an institutional system that defines the relation between different bodies in	Evaluate the nature of governing relations and the current coordination mechanisms between the bodies concerned in the sector	Work efficiency increased	- Studies pertaining to evaluating nature of governing relations	Ministry of Housing and Construction	٢٠٠٦

Strategies	measures	Anticipated gains	Indicators	Body in-charge	Implementation timeframe
charge of water supply and distribution, water networks, treatment stations and the reuse of treated wastewater	Propose coordination mechanisms that lead to the integration of responsibilities between the bodies concerned in the sector and follow up their implementation		between the bodies concerned in the sector. - Coordination mechanisms adopted.	Ministry of Housing and Construction	٢٠٠٦
	Monitor coordination results and take necessary corrective actions to ensure the effective management of water and sanitation facilities			Ministry of Housing and Construction	٢٠٠٧ – ٢٠٠٩
Set up and implement an institutional system that defines the relation and scope of cooperation between public water and sanitation bodies and the private sector	Determine the nature of activities that may be assumed by the private sector and coordinate the relation with the relevant public departments	Work efficiency and income increased	- Studies pertaining to evaluating current relations with the private sector. - Cooperation mechanisms adopted.	Ministry of Housing and Construction	٢٠٠٦
	Monitor results of coordination and cooperation with the private sector and take necessary corrective actions to ensure the effective management of the water and sanitation facilities which achieves better requirements for subscribers with minimum costs			Ministry of Housing and Construction	٢٠٠٧ – ٢٠٠٩
Organize training courses to raise technical and administrative efficiency of employees and on all levels continuously and methodologically	Allocate necessary resources for methodological and constant training based on a calculated plan	Work efficiency increased via raising standard of personnel	Technical and administrative training courses on all levels	Ministry of Housing and Construction	٢٠٠٦ – ٢٠١٠
	Design special training programs to keep pace with the scientific developments necessary to raise the standard of technical work at the relevant institutions			Ministry of Housing and Construction	٢٠٠٧ – ٢٠٠٩
	Train employees on the work of service-providing institutions that seek to satisfy customers			Ministry of Housing and Construction	٢٠٠٧ – ٢٠٠٩
	Develop the cadre responsible for financial management and accounting			Ministry of Housing and Construction	٢٠٠٧ – ٢٠٠٩
	Monitor the development of trainees' performance and evaluate and improve the training courses to help raise work efficiency and effectiveness			Ministry of Housing and Construction	٢٠٠٧ – ٢٠٠٩
Create a suitable working environment and give incentives to preserve qualified personnel in the sector and prevent their drain	Evaluate the negative impact of the working environment on employees' efficiency	Working environment improved	- Work physical environment improvement indicators. - Indicators of incentives granted to employee.	Ministry of Housing and Construction	٢٠٠٦
	Propose necessary efficiency-raising measures			Ministry of Housing and Construction	٢٠٠٦
	Allocate necessary resources and implement and evaluate the remedial measures			Ministry of Housing and Construction	٢٠٠٧ – ٢٠٠٩
Present results of environmental and socioeconomic effect evaluation studies of drinking	Conduct seminars and workshops to familiarize local people with the results of environmental impact and socioeconomic evaluation of the proposed water and sanitation related projects and give them the	Public backing and support for water and sanitation projects received	- Number of seminars and workshops organized for the communities concerned.	Ministry of Housing and Construction	٢٠٠٧ – ٢٠٠٩

Strategies	measures	Anticipated gains	Indicators	Body in-charge	Implementation timeframe
water and sanitation programs to the communities concerned in order to seek their opinions about the measures introduced and get their approval	opportunity to express their opinions and suggestions		- A mechanism for compensating affected people adopted.		
	Lay out a mechanism to compensate the people affected by the project			Ministry of Housing and Construction	٢٠٠٧ – ٢٠٠٦
Encourage citizens, through public-work, to contribute in funding water and sanitation projects	Conduct surveys to verify willingness of drinking water and sewage disposal users to take part in bearing investment costs of relevant projects and lay out a mechanism for that purpose	Public contribution in funding water and sanitation projects attained	Size and rate of payment sharing by the people concerned	Ministry of Housing and Construction	٢٠٠٩ – ٢٠٠٨
	Cooperate and stimulate work with the local committees at neighborhood level			Ministry of Housing and Construction in coordination with the concerned bodies	٢٠١٠ – ٢٠٠٧
Raise public awareness through communicating with people in issues pertaining to water resources and drinking water and sanitation services	Organize campaigns to encourage adopting demand management methods to reduce water squandering, and familiarize the public with the economic incentives offered in this field	Public cooperation in adopting demand management and water resources protection projects attained	Size and rate of adopting demand management methods by the people concerned	Ministry of Housing and Construction	٢٠١٠ – ٢٠٠٧
	Formulate awareness-raising programs for all social categories to explain that water is a vital resource that should be preserved			Ministry of Housing and Construction in coordination with the concerned bodies	٢٠١٠ – ٢٠٠٦