



Islamic Republic of Iran  
Ministry of Health and Medical Education

# National Strategy for Drinking Water Quality Improvement



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Ministry of Health and Medical Education

**In The Name of God**

# **National Strategy for Drinking Water Quality Improvement**

High Council of Health and Food Security

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**Original in Persian (2011)**

**English version (2014)**

## **PREFACE**

Drinking water supply is one of the basic challenges in many parts of the world. Besides its quantitative aspect resulting from global warming and population increase, the quality of distributed drinking water is also of high importance. Access to safe drinking water would prevent water-borne diseases and decrease the rate of related health costs within the societies.

Regarding the necessity for implementation of an integrated management system for drinking water supply in urban and rural regions, and in order to clarify the roles and responsibilities of different governmental entities, this national document was developed by the Ministry of Health and Medical Education (MOHME), and was further ratified by the government in order to prepare the related implementation packages by responsible organizations.

Considering the importance of this document and its positive impacts on the health of drinking water consumers, the English version of this national document has been prepared upon the suggestion of the WHO representative in Iran, by the Center for Water Quality Research (CWQR), Institute of Environmental Research (IER), Tehran University of Medical Sciences, hereby acknowledged.

**Prof. Kazem Nadafi**

**Head of Environmental &  
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**Islamic Republic of Iran**

## **Cabinet Approval**

**In The Name of God**

**Ministry of Energy – Ministry of Agriculture Jihad – Ministry of Industry, Mine and Commerce – Ministry of Health and Medical Education – Department of Environment**

Based on the proposal set forth by the Ministry of Health and Medical Education and according to Article 138 of the Constitution of the Islamic Republic of Iran, the Cabinet approved the following on Oct. 12<sup>th</sup>, 2011:

1-The “National Strategy for Drinking Water Quality Improvement”, which has been approved by the “Office of the Cabinet”, is defined with its objectives and strategies as seen in the attachment.

2-The ministries of Energy, Health and Medical Education, Agriculture Jihad, the Department of Environment and Iran’s National Standard Organization are duty bound to present their executive and operational programs within the framework of the strategies presented in the mentioned document in the form of executive packages with the cooperation of other related ministries and organizations and during the three months after this approval, and implement them according to Item 217 of the Law of the Five-Year Development Program of the Islamic Republic of Iran.

3-The Ministry of Health and Medical Education is duty bound to present a report of the implementation of this approval every three months, to the Office of the Cabinet.

**Mohammad Reza Rahimi**

**First Vice-President**

Copy sent to the Office of the Supreme Leader, Office of the President, Office of the Head of the Judiciary, Office of the First Vice-President, Secretariat of the Expediency Council, Vice-President for Planning and Strategic Supervision, Vice-President for Management Development and Human Capital, Vice-President for Legal Affairs, Vice-President for Parliamentary Affairs, Supreme Audit Court, Court of Administrative Justice, General Inspection Office, General Office of Islamic Consultative Assembly Laws, General Office of Laws and Regulations, General Office of Legal Affairs, all ministries, organizations and government institutions, Islamic Revolution institutions, Secretariat of Governmental Media Council and the Office of the Cabinet.



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## **INTRODUCTION**

Access to safe drinking water is considered as one of the basic needs of the community and as the most important source of life, with a significant role in people's lives. Nowadays, supplying drinking water and meeting people's water demands are considered as fundamental challenges in urban and rural areas; in addition, the control of water-borne diseases is esteemed to be highly essential.

Based on the statistics of the World Health Organization (WHO), more than one billion people in the world do not have access to safe drinking water, and the annual number of deaths in the world resulting from intestinal diseases exceeds 1,500,000 including children under 5 years old, who comprise more than 90% of this figure.

Shortage of water resources, population increase leading to higher water demands, and the disposal of untreated sewage, reveal the necessity for systematic, comprehensive, and optimal thinking and

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planning in the management of water resources and the development of water supply services.

The results of researches conducted in different countries have shown that comprehensive water quality management is the most important method for prevention and control of water-borne diseases in the world; furthermore, planning and investment in the sector of safe drinking water supply can lead to cost reductions in the treatment sectors besides economic growth and productivity and this would be affordable in the long run. In this regard, the Ministry of Health and Medical Education (MOHME), based on its inherent mission, has considered developing the National Initiative for the improvement of Drinking Water Quality with the collaboration of the Ministry of Energy, the Department of Environment (DOE), the Ministry of Agricultural Jihad, and the partnership of distinguished university academics, in order to be used as the basis for intersectoral cooperation for conservation and improvement of drinking water quality within a 15 year period (2011-2025), with the clarification

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and endorsement of the roles and responsibilities of each of the related governmental bodies in the field of drinking water quality.

## **1- VISION**

**Preparation of suitable conditions for providing safe drinking water for the public, with respect to human dignity and the improvement of health.**

## **2- STRATEGIC GOALS**

### **3-1 Protection of drinking water sources against pollution**

One of the important points for the development of public health within communities is the provision of safe drinking water for consumers. In spite of the increasing attempts to supply safe drinking water, water-borne diseases are still considered as a major health concern in the world.

Gastro-intestinal diseases resulting from the consumption of polluted water, and the low level of health services, cause the deaths of more than 2.4 million people per year. In addition to biological

contamination, water safety is also affected by to chemical and radiological parameters.

Considering the decrease in global accessible water resources, one of the most important goals for the drinking water suppliers is to protect and improve the quality of water sources which are used to supply drinking water. To achieve this goal, defining a strategy for the quality management of water resources is very essential in our country, because Iran is located in the arid belt of the Middle East, with an annual average precipitation rate of 250 mm, and it is facing a decrease in water reserves and an increase in population. On the other hand, most of the water sources are exposed to chemical, microbial and even toxic and oil pollution risks, due to agricultural and industrial activities.

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***Strategy 1-1 Identification of hazardous agents (including human and environmental factors) for each of the drinking water sources***

- **Executive:** Department of Environment (DOE)
- **Collaborators:** Ministry of Health and Medical Education (MOHME); Ministry of Energy; Ministry of the Interior; Ministry of Energy; Ministry of Industry, Mine and Trade; Ministry of Agricultural Jihad

***Strategy 1-2 In-country quality zoning of the drinking water sources by application of the Geographic Information System (GIS)***

- **Executive:** Ministry of Energy
- **Collaborators:** Department of Environment (DOE); Ministry of Health and Medical Education (MOHME)

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*Strategy 1-3 Determination of the quality-based limits for drinking water resources*

- **Executive:** Ministry of Energy
- **Collaborators:** Department of Environment (DOE);  
Ministry of Health and Medical Education (MOHME)

*Strategy 1-4 Classification of drinking water sources to critical, semi-critical and non-critical sources based on pollution parameters*

- **Executive:** Ministry of Energy
- **Collaborators:** Department of Environment (DOE);  
Ministry of Health and Medical Education (MOHME)

*Strategy 1-5 Planning for control and elimination of sources of pollution in the vicinity of drinking water sources*

- **Executive:** Department of Environment (DOE)

- **Collaborators:** Ministry of Health and Medical Education (MOHME); Ministry of the Interior; Ministry of Energy; Ministry of Industry, Mine and Trade; Ministry of Petroleum (MoP); Ministry of Agricultural Jihad

*Strategy 1-6 Continuous surveillance and inspection of the quality of drinking water resources*

- **Executive:** Ministry of Health and Medical Education (MOHME)
- **Collaborators:** Ministry of Energy; Department of Environment (DOE)

*Strategy 1-7 Preparation, development and presentation of an inspection model for usage of toxins and pesticides in agricultural lands close to drinking water sources*

- **Executive:** Ministry of Agricultural Jihad



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- **Collaborators:** Department of Environment (DOE); Ministry of Energy; Ministry of Health and Medical Education (MOHME); Institute of Standard and Industrial Research of Iran (ISIRI)

*Strategy 1-8 Development of mechanical and biological alternatives for pesticides and chemicals in agricultural activities*

- **Executive:** Ministry of Agricultural Jihad
- **Collaborators:** Department of Environment (DOE); Ministry of Health and Medical Education (MOHME)

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### **3-2 Safeguarding drinking water sources and facilities against deliberate contamination, sabotage and bio-terrorism**

One of the approaches for spreading biological agents among the population, is the intentional contamination of water and food, which nowadays is called bio-terrorism. This is considered as the second most important method of disease transmission, after respiratory transmission. Biological threats are created by pathogens and biotoxins. Amongst the most important toxins and agents used in bio-terrorism, bacterial agents (such as: *Bacillus anthracis*, *Yersinia pestis*, *Vibrio cholerae*, *Escherichia coli*, *Enterohemorrhagic*), bacterial toxins (such as *Botulinum*, *Staphylococcal Enterotoxin*) and fungal and vegetal toxins (such as: *Terico-Tessin*, *Ricin*) can be mentioned.

Numerous factors may affect the pathogenicity created by biological agents, including the type of agent and its population, its resistance in the environment, its potential for toxin production, the incubation period, and its ability to confront the host immune system. Water

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being polluted in bio-terroristic actions cannot be recognized by organoleptic specifications and in most cases act silently, suddenly and without any apparent changes (in color, taste and odor). Water treatment plants, water wells (used to provide drinking water) and treated water reservoirs are the main points to release these agents bio-terrorism; hence more basic, less industrial and less sanitary-based control mechanisms, would provide a better situation for the possibility of sabotage.

The most important constraints in dealing with these agents are their high resistances to environmental conditions, the lack of rapid and on-time detection measures, the low level of infection dosage, and absence of vaccines against them, which lead us to consider prevention as the best way to fight against this phenomenon.

In some countries, military organizations have worked on fundamental planning to deal with this phenomenon and have considered necessary measures for pre-crisis, critical, and post-crisis conditions. Health education, the observance of sanitation principles

during biological attacks, conduction of water treatment processes and especially water disinfection, surveillance, protection of drinking water facilities and sources, access to methods for rapid detection of the agents, are the most important measures in the prevention and control of biological threats.

*Strategy 2-1 Usage and development of quality monitoring for drinking water supply systems in order to detect pollution and implement corrective measures*

- **Executive:** Ministry of Energy
- **Collaborators:** Ministry of Health and Medical Education (MOHME); Department of Environment (DOE)

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*Strategy 2-2 Prevention of water pollution in waterways, drainage systems and influents to drinking water sources*

- **Executive:** Department of Environment (DOE)
- **Collaborators:** Ministry of Energy; Ministry of the Interior; Ministry of Agricultural Jihad; Ministry of Health and Medical Education (MOHME)

*Strategy 2-3 Development of conservation and protection facilities for drinking water sources, reservoirs, and supply and distribution facilities*

- **Executive:** Ministry of Energy
- **Collaborators:** Ministry of the Interior

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### **3-3 Development, improvement, and application of suitable technologies in drinking water treatment systems**

Drinking water treatment and distribution systems should be designed and constructed in such a way that there would be the capability of removing different types of contaminants based on national standards.

Considering the existing treatment systems in the Country, some of them can only remove limited types of pollutants and this challenge highlights the necessity to plan for the development of the existing water treatment plants according to the types of pollutants in raw waters.

#### ***Strategy 3-1 Application of suitable treatment methods according to climatic and economic conditions and the variety of pollutants***

- **Executive:** Ministry of Energy
- **Collaborators:** Ministry of Health and Medical Education (MOHME)

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### **3-4 Development and revision of drinking water quality standards and requirements based on risk management**

National drinking water standards should be defined and developed in such a way that they would be enforceable, apart from conforming with international standards and local conditions.

National standards have not yet been developed in many fields related to drinking water such as desalination systems, domestic point-of-use (POU) systems, water quality equipments (such as kits for chlorine, and turbidity measurements) and the types of pipes and accessories used in water distribution facilities. In some cases, it is also essential to revise the existing standards based on the conditions in the Country.

Another point which should be regarded in the development of standards is to consider health-related criteria and specifications and also the presence and participation of representatives, from the health sector.

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***Strategy 4-1 National support of applied researches in the field of drinking water quality and its impacts on health***

- **Executive:** Ministry of Health and Medical Education (MOHME)
- **Collaborators:** Ministry of Energy; Ministry of Industry, Mine and Trade; Department of Environment (DOE); Ministry of Agricultural Jihad; Institute of Standard and Industrial Research of Iran (ISIRI)

***Strategy 4-2 Revision of standards, requirements and manuals for public drinking water quality based on the Country's existing conditions***

- **Executive:** Institute of Standard and Industrial Research of Iran (ISIRI)
- **Collaborators:** Ministry of Health and Medical Education (MOHME); Ministry of Energy



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*Strategy 4-3 Development of national standards for domestic water treatment and desalination systems*

- **Executive:** Institute of Standard and Industrial Research of Iran (ISIRI)
- **Collaborators:** Ministry of Health and Medical Education (MOHME); Ministry of Energy

*Strategy 4-4 Development and revision of water examination methods and analysis of the results*

- **Executive:** Ministry of Health and Medical Education (MOHME)
- **Collaborators:** Ministry of Energy; Department of Environment (DOE); Institute of Standard and Industrial Research of Iran (ISIRI)

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*Strategy 4-5 Development of standards for the quality of additives, the types of pipelines and fittings, and internal and external coatings in the public drinking water transportation and distribution network*

- **Executive:** Institute of Standard and Industrial Research of Iran (ISIRI)
- **Collaborators:** Ministry of Health and Medical Education (MOHME); Ministry of Energy

*Strategy 4-6 Development of water quality standards for non-potable water*

- **Executive:** Institute of Standard and Industrial Research of Iran (ISIRI)
- **Collaborators:** Ministry of Health and Medical Education (MOHME); Ministry of Energy

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### **3-5 Effective prevention of health risks related to drinking water system facilities, accessories and chemicals used**

Drinking water systems should be designed in a manner to prevent chemical and microbial pollution. The application of suitable coatings is one of the approaches for the protection of reservoirs and metallic pipelines in drinking water facilities against corrosion, which therefore prevents the destructive effects of environmental agents, by creating a barrier between the metal and the environment. Different chemicals which are used in the preparation of these coatings have the potential to change water quality through leaching. According to many research-based studies, drinking water pollution has been known to occur due to coating applications, and the leached contaminants are in some cases categorized as hazardous and even carcinogenic. Hence, it is essential to develop the necessary standards for pipelines and fittings and to plan for revisions with the entry of new products into the market.

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In order to decrease the potential for Disinfection-By-Products (DPBs), prechlorination should be limited in water treatment, and necessary measures should be taken for the usage of suitable disinfection systems according to the raw water quality. Chemicals which are used in drinking water treatment processes may have adverse effects on drinking water quality if there is no adequate surveillance and control.

*Strategy 5-1 Selection and usage of appropriate water pipelines, and storage reservoirs in the drinking water transportation and distribution network through health considerations and surveillances*

- **Executive:** Ministry of Energy
- **Collaborators:** Ministry of Health and Medical Education (MOHME)

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*Strategy 5-2 Identification of pipeline materials used in the drinking water network and elimination of non-standard and non-appropriate pipelines and fittings*

- **Executive:** Ministry of Energy
- **Collaborators:** Ministry of Health and Medical Education (MOHME)

*Strategy 5-3 Identification and removal of Disinfection-By-Products(DBPs) precursors and other additive chemicals in treatment processes, and establishment of a monitoring system*

- **Executive:** Ministry of Energy
- **Collaborators:** Ministry of Health and Medical Education (MOHME); Institute of Standard and Industrial Research of Iran (ISIRI)

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*Strategy 5-4 Supervision and control of chemicals, additives, and the types of applied facilities used in drinking water treatment*

- **Executive:** Ministry of Energy
- **Collaborators:** Ministry of Health and Medical Education (MOHME); Institute of Standard and Industrial Research of Iran (ISIRI)

*Strategy 5-5 Supervision of the operation of treatment systems, drinking water storage, and transportation and distribution facilities with an emphasis on sediment washing and discharge*

- **Executive:** Ministry of Energy
- **Collaborators:** Ministry of Health and Medical Education (MOHME)

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***Strategy 5-6 Organization and monitoring of the importing, manufacturing, and supplying of domestic water treatment systems based on national standards***

- **Executive:** Ministry of Health and Medical Education (MOHME)
- **Collaborators:** Ministry of Energy; Institute of Standard and Industrial Research of Iran (ISIRI); Ministry of Industry, Mine and Trade

***Strategy 5-7 Organization and supervision of water desalination systems based on national standards***

- **Executive:** Ministry of Energy
- **Collaborators:** Ministry of Health and Medical Education (MOHME); Institute of Standard and Industrial Research of Iran (ISIRI); Ministry of Industry, Mine and Trade

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### **3-6 Promotion of the index of access to safe drinking water in rural and urban areas**

Access to drinking water is one of the rights of the citizens of the Country. Based on health indices, access to drinking water in rural areas is less than in urban areas; also, the percentage of microbial quality appropriateness is lower in rural areas. Hence, it seems that in some parts, there are significant differences between the drinking water access index and chemical and biological quality in rural and urban areas, which cause inequality in access to safe drinking water in the country.

*Strategy 6-1 Improvement of drinking water sources and facilities in regions under the coverage of water and wastewater companies, with an emphasis on rural areas*

- **Executive:** Ministry of Energy
- **Collaborators:** Ministry of Health and Medical Education (MOHME); Department of Environment (DOE)



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***Strategy 6-2 Improvement of drinking water sources and facilities in regions not covered by water and wastewater companies, with an emphasis on rural areas***

- **Executive:** Ministry of Energy
- **Collaborators:** Ministry of Health and Medical Education (MOHME); Ministry of The Interior; Department of Environment (DOE)

***Strategy 6-3 Supplying safe drinking water through non-conventional methods to regions without access to drinking water***

- **Executive:** Ministry of Energy
- **Collaborators:** Ministry of Health and Medical Education (MOHME)

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*Strategy 6-4 Preparation and introduction of regulations and approaches for the establishment of non-governmental systems in supplying rural and urban water, with an emphasis on rural areas*

- **Executive:** Ministry of Energy
- **Collaborators:** Ministry of Health and Medical Education (MOHME); Ministry of Roads and Urban Development

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### **3-7 Implementation of a drinking water safety plan in the Country**

Drinking water safety cannot be ensured unless parameters defining performance accuracy are considered in addition to qualitative monitoring. For this reason, the Drinking Water Safety Plan (WSP) has been presented by the World Health Organization (WHO). The scope of the implementation of this plan includes all parts of the drinking water supply system, from withdrawal catchment to the point of use. The objective of the drinking water safety plan is to ensure the quality of drinking water based on risk management, which includes: prevention of pollution in drinking water resources, water treatment for reduction or removal of pollutants in order to achieve standards, and prevention of water recontamination during the storage, distribution and consumption stages. Regarding these objectives, the active participation of all related and responsible organizations is essential.

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*Strategy 7-1 Development and scale-up of the drinking water safety plan*

- **Executive:** Ministry of Health and Medical Education (MOHME)
- **Collaborators:** Ministry of Energy; Department of Environment (DOE); Ministry of Agricultural Jihad; Ministry of Industry, Mine and Trade; Ministry of Petroleum (MoP)

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### **3-8 Management improvement of drinking water quality in bottled, mineral, and packed water and its distribution**

Water packaging in bottles or any other suitable container provides assurance for the consumers that the product they are consuming is safe.

Meanwhile, some products may not possess sufficient quality because of the lack of observance of the standards by the producers. Hence, due to the expanding variety of bottled and mineral waters which are entering the market daily with new names, it is very necessary to observe the safety principles and compositions of bottled waters.

Use of polymeric compounds in manufacturing non-standard packaging may be hazardous; it should be noted that in higher temperatures, the leakage rate of these compounds into the water increases. A similar phenomenon is probable as time passes after the production date. In order to improve the quality of bottled and

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mineral waters, special supervision should be implemented in all stages of production, packaging, and distribution.

*Strategy 8-1 Improvement of monitoring and supervision of manufacturers of bottled, mineral and packed waters (production, packaging, and distribution)*

- **Executive:** Ministry of Health and Medical Education (MOHME)
- **Collaborators:** Ministry of Energy; Ministry of Industry, Mine and Trade

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### **3-9 Management of the supply of safe drinking water during emergencies**

One of the most important challenges communities and victims are facing during crisis especially in earthquakes and floods, is how to supply safe drinking water; during natural disasters, this challenge threatens the health of the people, and neglect or low attentiveness in the processes of supply and supervision would intensify the crisis.

In normal conditions, drinking water quality should be highly considered with special precision and sensitivity, because any neglect would increase the probability of sewage or pollutants leaking into water sources and networks, providing favorable conditions for water-borne diseases.

However, in critical conditions, the lack of drinking water on one hand, and the pollution of water sources on the other, would doubly intensify the crisis. Destruction of water sources such as springs, wells, qanats and, fractures in drinking water surface and elevated reservoirs, sewage pipelines, facilities and pump stations, along with

power outages, are also among the main reasons for water system failures or water pollution, in these circumstances.

Water shortage would oblige the victims to use any sort of accessible and even contaminated water. Hence, supplying water through mobile tankers, the installation of fixed tankers in damaged areas and/or in temporary settlements, necessitates essential control and supervision from water withdrawal to water usage points.

*Strategy 9-1 Development of drinking water standards in emergencies*

- **Executive:** Institute of Standard and Industrial Research of Iran (ISIRI)
- **Collaborators:** Ministry of Health and Medical Education (MOHME); Ministry of Energy



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*Strategy 9-2 Development of solutions for safe drinking water supply in emergencies for all regions in the Country*

- **Executive:** Ministry of Energy
- **Collaborators:** Ministry of Health and Medical Education (MOHME); Ministry of Energy

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### **3-10 Establishment of a comprehensive and transparent drinking water quality information dissemination system**

Establishing a comprehensive system comprising of all drinking water quality information, from source to point-of-use, plays an important role in water supply management.

In some circumstances, because of a lack of information, rapid actions cannot be taken when problems occur, or parallel actions may simultaneously be planned or conducted in different sectors, which would lead to heavy costs.

*Strategy 10-1 Establishment of a comprehensive and dynamic information system for drinking water quality from source to point-of-use.*

- **Executive:** Ministry of Energy
- **Collaborators:** Ministry of Health and Medical Education (MOHME); Department of Environment (DOE)

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*Strategy 10-2 Preparation of identification for drinking water flow lines in communities pattern in communities including flow charts, the types of treatment processes, the types and amounts of chemicals, and equipments used in the distribution system*

- **Executive:** Ministry of Energy
- **Collaborators:** Ministry of Health and Medical Education (MOHME)

*Strategy 10-3 Establishment of an information system of the population under coverage of all drinking water sources and water-borne diseases related to drinking water quality*

- **Executive:** Ministry of Health and Medical Education (MOHME)
- **Collaborators:** Ministry of Energy; Statistical Center of Iran; Department of Environment (DOE)

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### **3-11 Promoting public awareness, participation and public education**

In order to promote public awareness and participation, and to prevent public misinformation, it is necessary to provide sufficient and on-time information related to the conservation of water resources, water quality, water disinfection in emergencies, essential standards for point-of-use treatment systems, desalination systems, and the type of pipelines used in domestic water networks.

*Strategy 11-1 Providing information and public education regarding water sanitation and protection of drinking water sources*

- **Executive:** Ministry of Health and Medical Education (MOHME)
- **Collaborators:** Ministry of Energy; Department of Environment (DOE); Islamic Republic of Iran

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Broadcasting ( IRIB); Ministry of Culture and Islamic Guidance

*Strategy 11-2 Providing information and public education regarding water sanitation in emergencies*

- **Executive:** Ministry of Health and Medical Education (MOHME)
- **Collaborators:** Ministry of Energy; Islamic Republic of Iran Broadcasting ( IRIB); Ministry of Culture and Islamic Guidance

*Strategy 11-3 Providing information and public education regarding domestic water treatment equipments and their permissible cases of application, and drinking water storage tanks and network fittings*

- **Executive:** Ministry of Health and Medical Education (MOHME)

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- **Collaborators:** Ministry of Energy; Institute of Standard and Industrial Research of Iran (ISIRI); Islamic Republic of Iran Broadcasting ( IRIB); Ministry of Culture and Islamic Guidance

*Strategy 11-4 Design, presentation and ratification of a participation pattern for non-governmental organizations for supplying safe drinking water and promoting water quality in the Country*

- **Executive:** Ministry of Health and Medical Education (MOHME)
- **Collaborators:** Ministry of Energy; Institute of Standard and Industrial Research of Iran (ISIRI); Islamic Republic of Iran Broadcasting ( IRIB); Ministry of Culture and Islamic Guidance

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***Strategy 11-5 Providing information and public education***

***regarding the specifications of bottled, packed, and mineral waters***

- **Executive:** Ministry of Health and Medical Education (MOHME)
- **Collaborators:** Ministry of Energy; Institute of Standard and Industrial Research of Iran (ISIRI); Islamic Republic of Iran Broadcasting ( IRIB); Ministry of Culture and Islamic Guidance; Ministry of Industry, Mind and Trade

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### **3-12 Observance of safety and health considerations in developing domestic non-potable water network**

Regarding the constraints in drinking water supply sources, and high costs of treatment, dual water distribution systems have been used for effective and optimal management in allocating different resources such as fresh water, recycled water, and desalinated water. Dual water distribution systems, provide two separate systems, one for drinking water and another one for non-potable water, which operate separately in a region. Existing water sources (such as surface runoff, rain harvesting, and groundwater) are usually used for supplying non-potable water. In circumstances where there are high water costs, low water quality, or lack of access to water sources, the community may search for other possible water resources. The point to be considered is the necessity for surveillance of non-potable water quality and the development of related regulations and standards.



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*Strategy 12-1 Conducting feasibility studies for applying dual networks for potable and sanitary water*

- **Executive:** Ministry of Energy
- **Collaborators:** Ministry of Health and Medical Education (MOHME)

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### **3-13 Mitigating adverse effects of climate change on drinking water quality**

Climate change may occur with increase in precipitation, resulting in the infiltration of polluted runoffs into water sources, or with droughts leading to a decrease in water resources, salt water intrusion, and an increase in the concentration of pollutants in water sources.

#### ***Strategy 13-1 Determination of the impacts of climate change on drinking water resources and forecasting water quality variations***

- **Executive:** Department of Environment (DOE)
- **Collaborators:** Ministry of Health and Medical Education (MOHME); Ministry of Energy; Iran Meteorological Organization

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*Strategy 13-2 Design of priorities and presenting suitable solutions for dealing with the impacts of climate change on drinking water sources*

- **Executive:** Ministry of Energy
- **Collaborators:** Ministry of Health and Medical Education (MOHME); Department of Environment (DOE)

*Strategy 13-3 Monitoring the impacts of climate change on drinking water quality*

- **Executive:** Ministry of Energy
- **Collaborators:** Ministry of Health and Medical Education (MOHME); Iran Meteorological Organization

**National Strategy for  
Drinking Water Quality Improvement**



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