
UNIT 1 WATER AND SANITATION

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- 1.3 Water-Sanitation and Development Relationship
- 1.4 Health Effects of Water and Sanitation
- 1.5 Challenges of Water and Sanitation Problems
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1.1 INTRODUCTION

The provision of safe drinking water and basic sanitation are critical to sustainable development of any economy. Improvement in safe drinking water supply and sanitation has been seen to have produced significant impact on decrease in diseases and recurring health problems among urban population. However, the problem of urban sanitation and water supply is particularly evident in urban slums both in developed as well as developing countries. Inadequate access to clean water and safe sanitation places slum dwellers at particular risk of several communicable diseases such as diarrheal diseases and helminthic infections. Government of different countries, particularly government of India has formulated water and sanitation policies for ensuring safe drinking water and sanitation to its people. This unit deals with sanitation and drinking water problem in urban areas and its consequences and the policies formulated by the government of India to deal with these two vital basic issues of development.

After reading this unit, you will be able to:

- Explain meaning and importance of water and sanitation
- Spell out relationship between water-sanitation and development
- Discuss the health effect of water and sanitation
- Analyse challenges of water and sanitation problem
- Describe national water policy and national sanitation policy of government of India

1.2 WATER AND SANITATION: CONCEPT AND IMPORTANCE

For the past few decade, the World as a whole, experiencing a wave of urbanization. Rapid urbanization has given rise to a host of problems, water and sanitation are important among them. The Mar Del Plata Conference in 1977 focused exclusively on the drinking water and sanitation needs of the poor and vulnerable. This resulted in the designation of the period from 1981 to 1990 as the International Drinking Water Supply and Sanitation Decade (IDWSSD). The

Global Water Supply and Sanitation 2000 Assessment shows that 1.1 billion people lack access to improved water supply and 2.4 billion to improved sanitation. The report mentioned that, if improved water supply and basic sanitation were extended to the present day “unserved”, it is estimated that the burden of infectious diarrhea would be reduced by some 17 percent and if universal piped water supply and well-regulated water supply is ensured and full sanitation is achieved, this would reduce the burden by some 70 percent.

Water is the most basic, precious and indispensable resources of life and fundamental to the survival of human being. Worldwide, agriculture use 69 percent of the total water available, 23 percent is used by industries and 8 percent is utilized domestically. Water, which is essential for life, growth and health, can also be a source of spread of diseases and cause of ill-health, if contaminated or improperly handled and stored. Safe drinking water plays a major role in the overall well being of people, with a significant bearing on infant mortality rate, death rate, longevity and productivity. It is warned that in India, millions of people suffer the consequences of drinking contaminated water, thereby, seriously affecting the health of future generations who are growing up with bouts of debilitating diarrhoeal diseases. The General Covenant on the Right to Water adopted by the Covenant on Economic Social and Cultural Rights in November, 2002 recognized water as a fundamental human right and stated that everyone has right to access to safe and secure drinking water, equitably without discrimination.

Like water, sanitation is also important for human health. Sanitation is defined as safe management of human excreta, including its treatment, disposal and associated hygiene related practices. The package of environmental sanitation largely include: (i) Solid waste disposal both human and animal; (ii) Liquid waste disposal; and (iii) drainage. Indiscriminate defecation and throwing of garbage are the most uncivilized types of environmental insanitation.

The problem of urban sanitation and water supply is visibly evident in urban slums. Many studies and reviews have noted that the urban slum dwellers have inadequate access to clean water, good sanitation and waste disposal and are vulnerable to risk of several communicable diseases. A World Health Organization Study estimates that the daily fecal output of the urban population in developing countries is greater than 500,000 tons. A study show that in Mumbai, it is estimated that approximately 73 percent of the slum primarily use community toilets provided through the municipal authorities and approximately 25 percent rely primarily on open defecation. Water supply is likewise inadequate, with many slum dwellers required to carry bucket water some distance, thus both increasing their workload and also decreasing the volume available per household.

Why should cities care about safe water and sanitation?

- Vital to human health
- Generate economic and social benefits
- Contribute to social and cultural values
- Helps the environmental sanitation
- Check morbidity and mortality
- Indicators of a health city

1.3 WATER-SANITATION AND DEVELOPMENT RELATIONSHIP

Water and Sanitation are intrinsically interconnected with the Millennium Development Goals, (MDGs) fixed by United Nations. The halve by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation is one of the numerical and time-bound targets defined for the MDGs. The relationships between water-sanitation and various development goals are described below:

1) **MDG-1: Eradication of Extreme Poverty & Hunger-** Ensuring safe drinking water and sanitation will have positive impact on poverty and hunger by reducing time spend on fetching drinking water and walking a mile for open defecation and expenses on drinking water and sanitation. A reduction of the distance to the nearest water sources will have a positive impact on the energy required for securing the household water needs. Besides, access to sanitary toilet will reduce the sanitation related problems and make human being hearty and healthy and devote considerable time for income earning activities. With the reduced time, burden from improved water services, more time can be spend on productive activities either on food production or in other income generating activities. Further more, reduction of working days lost to water and sanitation related diseases will also have a positive impact on the household’s income situation. The relationship is depicted in Figure 1.

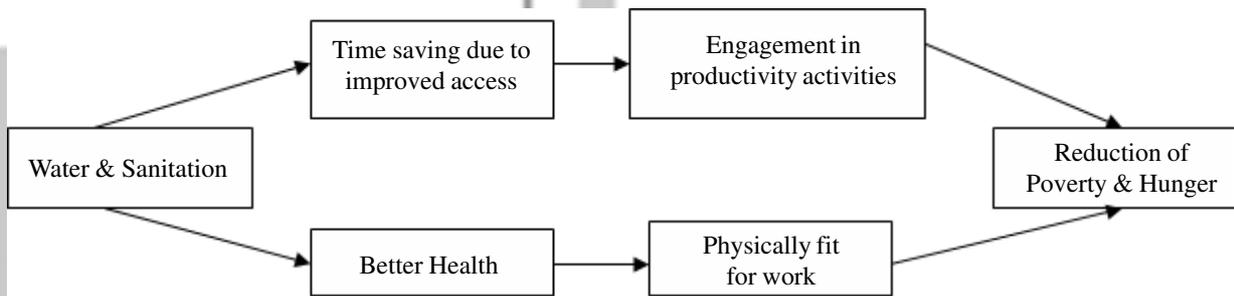


Figure 1: Water and Sanitation vs. Poverty and Hunger

2) **MDG-2: Achieve Universal Primary Education-** The improved water supply and sanitary environment in school will enhance enrolment and retention of boys and girls in the schools. Besides, relieving girls from their water fetching duties, it can improve their school attendance rate. It is observed that the girl child attendance rate is higher in schools having separate toilets for girl children. The better health care of children through the provision of safe drinking water and sanitation in the school will keep children physically and mentally sound and thus will have impact on child’s learning achievements. It will also motivate parents to send their children particularly girls to the schools. The relationship is depicted in Figure-2.

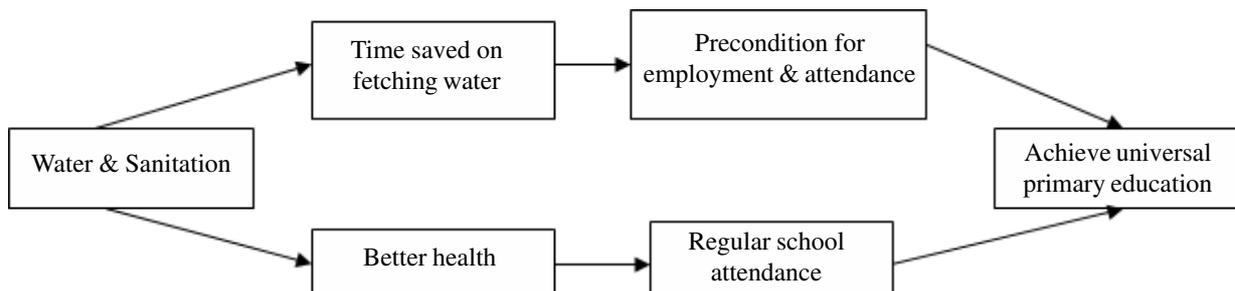


Figure 2: Water and Sanitation vs. Primary Education

3) **MDG-3: Gender Equality-** Fetching water and maintenance of sanitation are under the responsibilities of women in most of the societies, particularly in rural societies and those who are staying in urban slum to remain in queue for fetching a bucket of water. Considerable amount of time of women in rural areas is lost on collecting water and caring for members suffering from water and sanitation related morbidities. Improving water supply and sanitation would produce positive impact on women’s living conditions by giving them more time for productive activities, caring of children, pursuing adult education, empowerment activities and leisure. Ensuring safe drinking water and sanitation make both male and female equally responsible for its maintenance, there by promote gender empowerment. Besides, carrying water pots during the advance stage of pregnancy may cause maternal morbidity and miscarriage. The relationship is depicted in Figure-3.

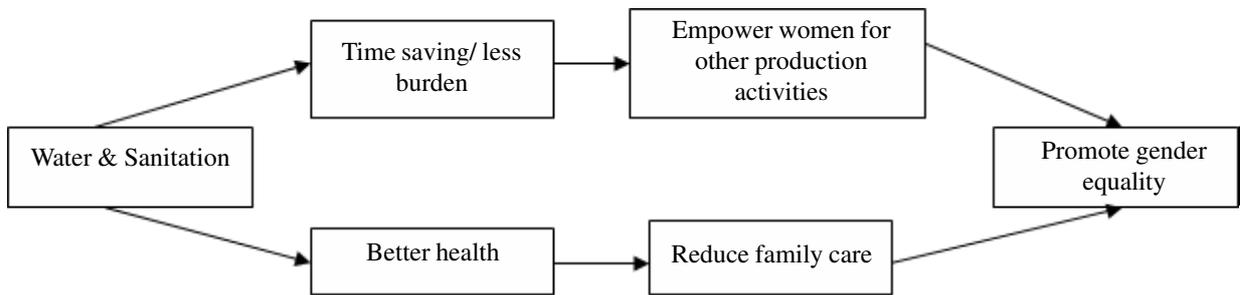


Figure 3: Water and Sanitation vs. Gender Equality

4) **MDG-4: Child Mortality-** Water related diseases are the most common cause of illness and mortality especially among children under-5 in developing countries. Children are more vulnerable to unsafe drinking water and healthy sanitary practices. In India, children of the impoverished families and those are residing either at home or in educational centres in urban slums do not have adequate access to safe drinking water and sanitation. The main causes of child morbidity and mortality are water and sanitation related. The diseases associated with drinking water and sanitation is diahorrea, typhoid, cholera, malaria, warm infection, etc. Provision of safe drinking water and sanitation will reduce the occurrences of these diseases and restrict infant and child mortality. The relationship between water and sanitation and child mortality is given in Figure-4.

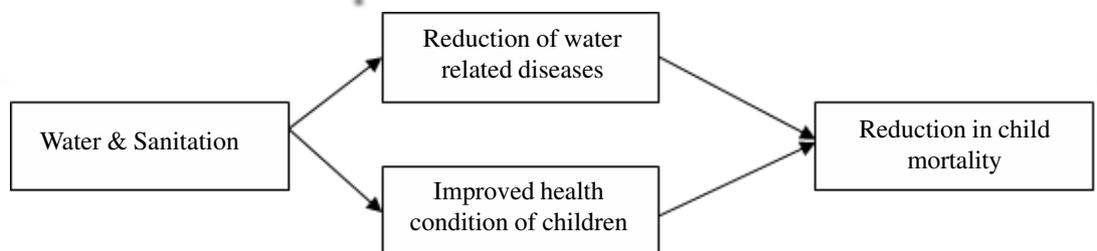


Figure 4: Water and Sanitation vs. Child Mortality

5) **MDG-5 & 6: Maternal Mortality and other Diseases-** Like child mortality, the maternal mortality also depends on safe drinking water and sanitation. Contaminated water and poor hygiene is a contributory factor of poor women health, particularly slow postnatal recovery. Besides, carrying water during

advance stage of pregnancy may lead to miscarriage. Provision of protected water, sanitation and hygiene has substantial relation with antenatal, natal and post-natal care of women. The warm infection and water related diahorrea during pregnancy can cause severe morbidity and even mortality among the pregnant and lactating women. The relationship is shown in Figure-5.

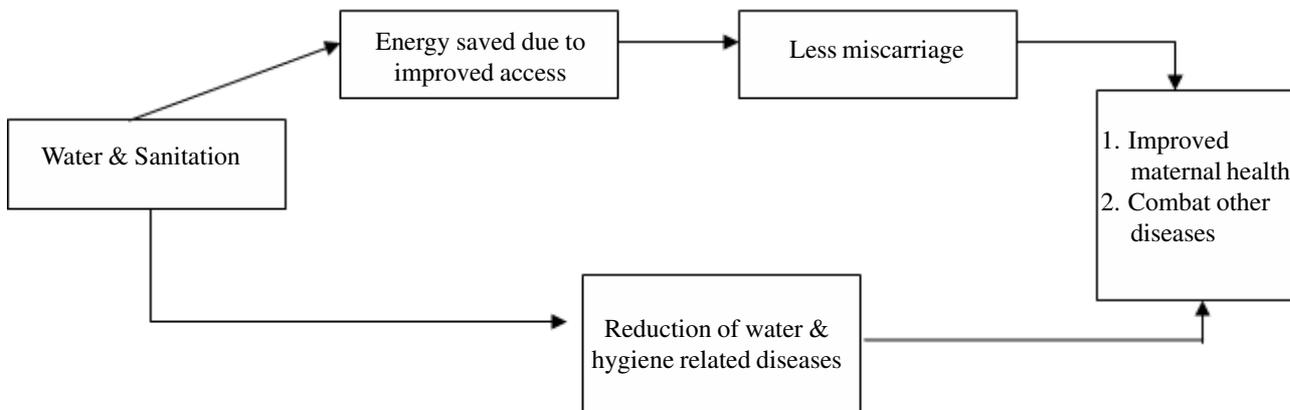


Figure 5: Water and Sanitation vs. Maternal Health and Diseases

6) **MDG-7: Environmental Sustainability-** Insufficient and inadequate water supply and insanitation are intricately related to sustainable environment. Improved sanitation by safe garbage disposal and disposal of human excreta reduces environmental and health risks. People residing in urban slums are generally the victims of contaminated water supply and filthy environment. Besides, improved water management, including industrial pollution control and water conservation is a key factor for maintaining ecosystem integrity. The relationship between water and sanitation and environmental sustainability is shown in Figure-5.

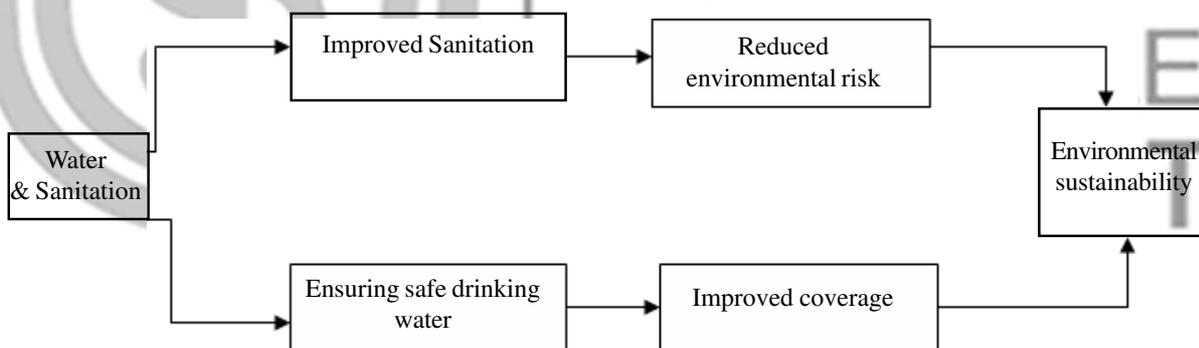


Figure 6: Water and Sanitation vs. Environmental Sustainability

In this session you read about importance of water and sanitation to development. Now answer the questions given in *Check Your Progress 1*.

Check Your Progress 1

Note: a) Write your answer in about 50 words.

b) Check your answer with possible answers given at the end of the unit

1) Briefly describe package of environmental sanitation.

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6) Explain how water and sanitation is crucial for prevention of child mortality.

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1.4 HEALTH EFFECTS OF WATER AND SANITATION

Water and sanitation produces surmountable effect on health in general and health of the children and pregnant women in particular. Some of the health effects of water and sanitation are as follows:

- i) Almost half of the population in the developing world is suffering from one or more infectious diseases associated with contaminated water supply and sanitation. The prominent among them are diarrhea, intestinal helminthes infections, dracunculiasis, schistosomiasis and trachoma.
- ii) More than half of the hospital beds in the world are occupied by people who have water and sanitation related diseases.
- iii) The diarrhea, the second leading cause of infant death is attributed to unsafe drinking water, inadequate sanitation and poor hygiene.
- iv) Intestinal helminthes which affects hundreds of million of people world wide happens largely due to unsafe drinking water and poor sanitation. It is estimated that 133 million have high intensity intenstral helminth infections, which often have severe consequences such as cognitive impairment, massive dysentery or anemia.
- v) Due to lack of availability of basic sanitation, more than 160 million people are infected with schistosomes, causing tens of thousand of deaths every year.
- vi) Improving access to water and better hygiene could reduce the occurrences of trachoma, the leading cause of preventable blindness. More that 150 million people need treatment for these diseases.
- vii) Malaria, typhoid and dengue are largely occurring due to poor sanitation condition in the cities in general and metropolis in particular. The outbreak of dengue in Delhi not only take away several lives but also create a lot of problems for the hospital to accommodate patients suffering from dengue during the outbreak of this epidemic.

See figure 7 for summary on effects of water and sanitation on health.

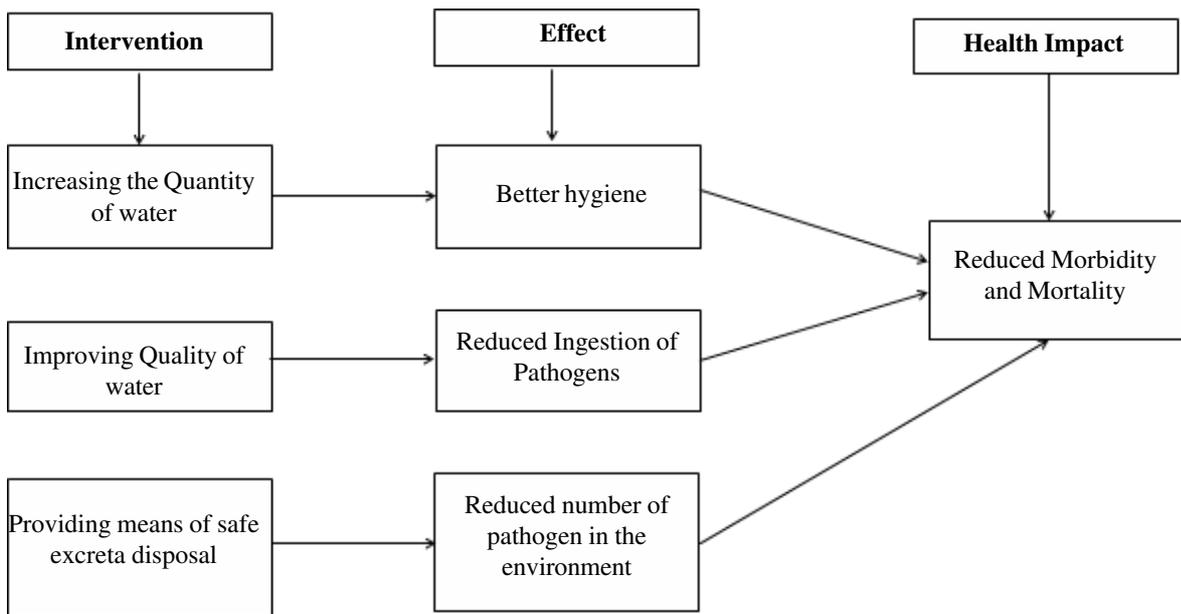


Figure 7: Effect of Water and Sanitation on Health

1.5 CHALLENGES OF WATER AND SANITATION PROBLEMS

Some of challenges associated with water and sanitation problem in urban areas are as follows:

- i) Inadequate investment in water and sanitation infrastructure is a major challenge. Paucity of fund for building of infrastructure by the national and state governments and international investments in water sanitation has been declining.
- ii) There is lack of political will to deal with the problem of water and sanitation. Strong political will is necessary for rebuilding aging water resources and building of garbage disposal tanks and also sewerage system for the safe passage of liquid wastes. Political will necessary to enforce policies which promote water conservation, safe water reuse, safe sanitation and disposal of human excreta, equitable water sharing and sustainable water supply and environmental protection due to insanitation.
- iii) There is a strong requirement of proper solid waste management strategies. Land fill is currently the most preferred alternative for waste disposal by local municipal authorities as it is still the cheapest and easiest method of getting rid of waste away from towns. There is lack of recycling infrastructure with the municipalities which is a cause of concern and it also varies from one municipality to that of the other.
- iv) Operation and maintenance of the urban infrastructure. This is one of the critical areas in almost all municipalities. Because of paucity of funds with municipalities on the one hand and reluctant of beneficiaries to pay for user charges on the other, the operation and maintenance of water and sanitation projects are badly affected. This has also resulted in wastage of investment in these infrastructures.

- v) Public private partnership in urban water and sanitation is another important area to be taken into consideration for the effective handling of water and sanitation problem in urban areas. It has been urged upon developing countries by international lending agencies as an essential component of water sector reform. The Government of India (2002) has urged upon “private sector participation in planning, development and management of water resources projects for diverse uses wherever feasible”.

PPP in Water Supply-A Case Study

The Government of Maharashtra had issued guideline to the Municipal Corporations and Municipal Councils Class ‘A’ for encouraging PPP to increase efficiency and investments in water supply and sewerage projects vide Govt. Circular dated 12th June, 2001. According to the Govt. Circular, the following options for PPP were suggested:

- i) Management agreement/contract
- ii) Tax agreement
- iii) Concession agreement

As the water supply scheme of Municipal Council Chandrapur City was in loss, this case was put in the General Meeting of the Council held on 26/02/2002 to explore PPP.

In the General Body meeting resolution was passed and decided to collect the required information regarding privatization of the scheme. So rules and conditions were prepared/framed to privatize the scheme as per the guidelines of Government.

Through tendering route, the water supply scheme of Chandrapur was privatized on 23/04/2004. The scheme was handed over the M/s Gurukrupa Association & Pvt. Ltd. for 10 years.

As the scheme has been privatized, the council is not required to spend any amount on the scheme. On the contrary, in 10 years, during /period the Council will get income of Rs. 1.59 crore from the private agency.

Key Features and Findings of PPP

- There will be no financial burden on the Council.
- In the next 10 years, the council will get an income of Rs. 1.59 crore from the contractors.
- From the date of privatization in the last 4 years there is no serious complaint received regarding to the water supply except some casual ones.
- During scarcity, the contractor supplies water through tankers without taking any extra charges from the Council.
- It is in the agreement that the contractors should lay at least 1 KM pipe line every year.
- It is also mentioned in the agreement/contract that the number of the public stand posts shall be kept intact.

- The minimum water rate notified by the State Government (Rs. 806/- per year from ½ inch connections) will be continued for 3 year and afterwards 10% additional charges will be levied for 3 years. Finally after 10 years the rate will grow from Rs. 806/- to Rs. 1072/-.
- Municipal workers collect the water samples and sent it for checking to the District Health Centre.
- Rs. 75/- Lakhs bank guarantee is located from private contractor as security.
- The contractor will be responsible to maintain machineries, pipelines, etc. with any additional cost.
- In case of default by contactor, there is a proper penal action prescribed by Municipal Council as per the agreement.
- The contractor is also responsible for repairing all bore wells and hand pumps in the City.
- Regarding to the regular water supply by the contractors, there are some special clauses in agreements.

Source: Compendium on Public Private Partnership in Urban Infrastructure case study, <https://doc-o4-94-docswieer.googleusercontent.co>

- vi) Water pricing is another important and challenging area of urban services management. According to Mathur and Thakur (2003) the main objectives of water pricing are to be: (1) **revenue efficiency**: the revenue from the water users should be sufficient to pay the operation and maintenance cost of water utility's operations, to pay loans undertaken to replace and expand the capital stock and to provide a return to capital at risk ; (2) **economic efficiency**: it requires that prices be set to ensure that consumer face the avoidable costs of their decisions; (3) **equity**: means that water tariff treats similar customer equally and that customers in different situations are not treated the same; and (4) **poverty alleviation**: water services are often seen as a "basic right" and their access as necessary regardless of whether or not people can pay. Effective pricing mechanism needs to be evolved by the municipalities which will not be very taxing.
- vii) Community based management of water supply and sanitation through decentralization is now days proved to be better solution for water and sanitation problems. The urban local bodies can play vital role in the management of water problems and collection and disposal of garbage in their respective municipalities. The community and community based organizations can become indomitable source of sustainable water and environmental development in their respective areas.

1.6 WATER AND SANITATION POLICY OF INDIA

Water supply and sanitation is sole responsibility of state government, however, with the passing of 73rd and 74th constitutional amendments, the state can assign these responsibility and power to Panchayati Raj Institutions (PRIs) and Urban Local Bodies (ULBs). Government of India has formulated National Water Policy and National Sanitation Policy at different points of time to deal with water and sanitation issues effectively. Let us discuss them one by one.

1.6.1 National Water Policy

National Water Policy was adopted in September, 1987. It has enabled the government to gather, a number of issues and challenges emerged in the development and management of the water resources. The National Water Policy (1987) was reviewed and updated in 2002 with the issue of National Water Policy 2002 (NPW 2002). The salient features of the NPW 2002 are:

- **The NWP Defines Water as a Prime Natural Resource:** Water is a basic human need and a precious national asset, to be planned, developed, conserved and managed in an integrated and environmentally sound basis, keeping in view the socio-economic aspects and the needs of the states. It recognizes water as a crucial element in developmental planning, to be managed in a sustainable manner and guided by the national perspective. Water as a resource is one and indivisible: rainfall, river waters, surface ponds and lakes and ground water are all part of one system.
- **Private Sector Participation:** It encourages participation of private sector in planning, development and management of water resources projects with a view to introduce innovative ideas, generate financial resources, and bring in better management practices. All models of private sector participation, viz. build, own, operate and transfer, are acceptable.
- **Emphasis of Asset Utilization:** It stipulates that there is an urgent need for paradigm shift from creation of new projects to improvement of the performance of existing projects.
- **Practices for Water Conservation:** It acknowledges the importance of all types of practices, the traditional practices like rainwater harvesting, preservation of forests; the modern conventional practices like water shed management, soil conservation; and the modern non-conventional methods like inter-basin sharing of water, artificial recharge of ground water and desalination of sea water.
- **Multi-Pronged Approach:** It emphasizes multi-sect- oral, multi-disciplinary planning with participatory approach, for the entire river basin. The water allocation priorities and drinking water, irrigation, hydro-power, ecology, industrial use and navigation, in that order. It specifically stipulates that drinking water requirement shall be first charge on any available water.

The NWP 2002 is aimed at improving existing strategies to improve water quality and reduce ground water and surface water pollution. Use and application of scientific tools and techniques to improve water resources development has also been emphasized. Further the policy encourages those projects development and proposals, which account for the sustainable use of surface and ground water, incorporating quantity and quality as well as environmental considerations.

There are 24 goals of the National Water Policy 2002 among which key areas related to water supply and sanitation being: Water Resource Planning, Project Planning, Groundwater Development, Drinking Water, Private Sector Participation, Water Quality, Water Zoning, Conservation of Water, Project Monitoring.

1.6.2 The National Urban Sanitation Policy 2008

The National Urban Sanitation Policy 2008 aims to achieve 100 per cent sanitation coverage under the 11th plan. The Policy focuses on generating awareness about sanitation and its linkages with public and environmental health among communities, encourages behavioral changes to adopt healthy sanitation practices. The policy hopes to achieve sanitized towns and cities ensuring affordable hygiene and sanitation facilities for urban poor and women.

1.6.2.1 Policy Goals

The overall goal of this policy is to transform Urban India into community-driven, totally sanitized, healthy and livable cities and towns.

The specific goals are:

- a) Awareness Generation and Behaviour Change
- b) Open Defecation Free Cities
- c) Integrated City-wide Sanitation
- d) Sanitary and Safe Disposal
- e) Proper Operation & Maintenance of all Sanitary Installations.

a) Awareness Generation and Behaviour Change

- i) Generating awareness about sanitation and its linkages with public and environmental health amongst communities and institutions.
- ii) Promoting mechanisms to bring about and sustain behavioral changes aimed at adoption of healthy sanitation practices.

b) Open Defecation Free Cities

All urban dwellers will have access to and use safe and hygienic sanitation facilities and arrangements so that no one defecates in the open. In order to achieve this goal, the following activities shall be undertaken:

- i) Promoting access to households with safe sanitation facilities (including proper disposal arrangements).
- ii) Promoting community-planned and managed toilets wherever necessary, of groups, of households who have constraints of space, tenure or economic constraints in gaining access to individual facilities.
- iii) Adequate availability and 100% upkeep and management of public sanitation facilities in all urban areas, to rid them of open defecation and environmental hazards.

c) Integrated City Wide Sanitation

- i) Mainstream thinking, planning and implementing measures related to sanitation in all sectors and departmental domains as a cross cutting issue, especially in all urban management endeavours.
- ii) Strengthening national, state, city and local institutions (public, private and community) to accord priority to sanitation provision, including planning, implementation and O&M(operation and maintenance).
- iii) Extending access to proper sanitation facilities for poor communities and other unserved settlements.

d) Sanitation and Safe Disposal

100% of human excreta and liquid wastes from all sanitation facilities including toilets must be disposed of safely. In order to achieve this goal, the following activities shall be undertaken.

- i) Promoting proper functioning of network based sewerage systems and ensuring connections of household to them wherever possible.
- ii) Promoting recycle and reuse of treated waste water for non potable applications wherever possible will be encouraged.
- iii) Promoting proper disposal and treatment of sludge from on site installations (septic tanks, pit latrines, etc.).
- iv) Ensuring that all the human wastes are collected safely confined and disposed of after treatment so as not to cause any hazard to public health or the environment.

e) Proper Operation & Maintenance of all Sanitary Installations

- i) Promoting proper usage, regular upkeep and maintenance of household, community and public sanitation facilities.
- ii) Strengthening ULBs to provide sustainable sanitation services delivery.

1.6.2.2 Components of National Urban Sanitation Policy

Government of India shall support the following components:

a) Awareness Generation

A country wide Information, Education and Communication (IEC) Strategy will be designed and implemented for raising awareness on the public health and environmental importance and sanitation. The socio cultural basis against sanitation and sanitary work need to be targeted, and dignity and humane approach promoted in the elevation of priority to sanitation in public affairs. Further, the public good nature of urban sanitation necessitating collective action needs to be highlighted in the minds of all stakeholders.

b) Institutional Roles

The Government of India will support clear assignment of roles and responsibilities, resources and capacities and institutional incentives in relation to setting standards, planning and financing, implementation, knowledge development, capacity building and training, Monitoring & Evaluation (M&E), and regulatory arrangements. The government will help states and cities in ensuring sanitation as a core responsibility of Urban Local Bodies as envisaged in the Constitutional (Seventy fourth) Amendment Act, 1993. The special roles of NGOs and Community Based Organizations (CBOs) will be recognized in mobilizing communities, raising awareness and in working with poor communities to assist them in finding affordable, community-managed solutions to sanitation.

c) Reaching the Un-Served and Poor Households

The national policy will help urban areas adopt a city-wide, demand based participatory approach to individual (resolving tenure, space and affordability constraints), and community sanitation where individual sanitation facilities

are not feasible. Towards this, special slum and community sanitation plans will be formulated as a part of the City Sanitation Plan. Provision of public sanitation facilities will also be supported.

d) Knowledge Development

The policy recognizes the importance of developing and disseminating knowledge on institutional development, technology choices and management regimes, planning new developments and up gradation, and sustainability issues.

e) Capacity Building

Government of India will help to formulate and implement a National level strategy on capacity building and training to support states and cities to build their personnel capacities and organizational systems for delivery of sanitation services.

f) Financing

The Govt. of India, wherever possible, will explore possibilities of providing assistance for funding projects proposed as part of city sanitation plans through its schemes like JNNURM, UIDSSMT and 10% lump sum for North Eastern States, Satellite Township Scheme, etc. However, the emphasis will be on improving the efficiency of existing sanitation infrastructure and service delivery.

g) National Monitoring & Evaluation

At the national level, the Govt. of India will support periodic rating of cities by independent agencies. A National Annual Award will be instituted on the basis of this rating.

h) Coordinator at the National Level

National Investments in urban infrastructure and housing shall accord high priority to sanitation. Towards this, sanitation will be mainstreamed into all relevant programmes of all the relevant sectoral ministries.

In this session you read about water and sanitation policy of government of India. Now answer the questions given in *Check Your Progress 2*.

Check Your Progress 2

Note: a) Write your answer in about 50 words.

b) Check your answer with possible answers given at the end of the unit

1) Briefly describe, the multipronged approach as emphasized in National Water Policy.

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2) Explain objectives of National Sanitation Policy.

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1.7 LET US SUM UP

The provision of safe drinking water and basic sanitation are critical to sustainable development of any economy. Improvement in safe drinking water supply and sanitation has been seen to have produced significant impact on diseases and recurring health problems among urban population. This unit has covered the importance of water and sanitation to Millennium Development Goals. Further it also describes the importance of water and sanitation to health. Finally the unit has narrated the National Water and National Sanitation Policy of Government of India.

1.8 REFERENCES AND SELECTED READINGS

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1.9 CHECK YOUR PROGRESS POSSIBLE ANSWERS

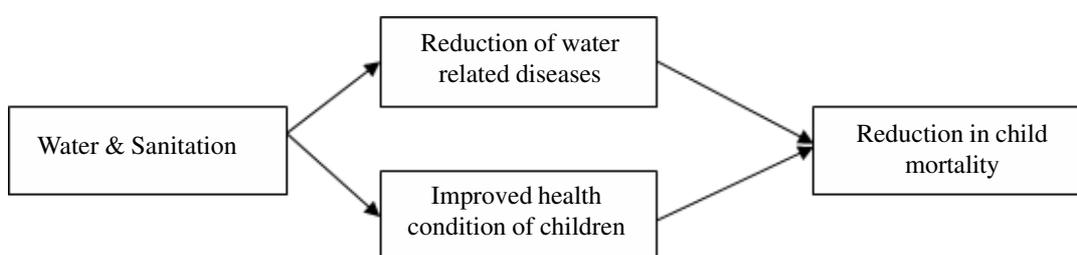
Check Your Progress 1

1) Briefly describe package of environmental sanitation.

The package of environmental sanitation largely include: (i) Solid waste disposal both human and animal; (ii) Liquid waste disposal; and (iii) drainage. Indiscriminate defecation and throwing of garbages are the most uncivilized types of environmental insanitation.

2) Explain how water and sanitation is crucial for prevention of child mortality

Water related diseases are the most common cause of illness and mortality especially among children under-5 in developing countries. Children are more vulnerable to unsafe drinking water and healthy sanitary practices. In India children of the impoverished families and those are residing either at home or in educational centres in urban slums do not have adequate access to safe drinking water and sanitation. The main causes of child morbidity and mortality are water and sanitation related. The diseases associated with drinking water and sanitation are diarrhoea, typhoid, cholera, malaria, worm infection, etc. Provision of safe drinking water and sanitation will reduce the occurrences of these diseases and restrict infant and child mortality.

**Check Your Progress 2**

1) Briefly describe the multipronged approach as emphasized in National Water Policy.

The National Water Policy emphasizes on multi-sect-oral, multi-disciplinary planning with participatory approach, for the entire river basin. The water allocation priority goes like drinking water, irrigation, hydro-power, ecology, industrial use and navigation, in that order. It specifically stipulates that drinking water requirement shall be first charge on any available water.

2) Explain objectives of National Sanitation Policy.

The overall objective of this policy is to transform Urban India into community-driven, totally sanitized, healthy and liveable cities and towns.

The specific objectives are:

- a) Awareness Generation and Behaviour Change
- b) Open Defecation Free Cities
- c) Integrated City-wide Sanitation
- d) Sanitary and Safe Disposal
- e) Proper Operation & Maintenance of all Sanitary Installations.

b. Water and Its Contaminants. i. properties of water, ii. density. iii. symbols, formulas, equations. iv. solutions, v. ionic compounds. c. Solubility, solution concentrations, pH, solubility curves. d. Water purification. Section A: Sources and Uses of Water. Youtube movie on Oxygen. 2. Over the next 3 days (starting today) complete the chart on page 9 documenting your daily water use, use the Unit 1 A2 Water Use Diary (in link above). Link to A2 Water Use. Review and cite WATER AND SANITATION protocol, troubleshooting and other methodology information | Contact experts in WATER AND SANITATION to get answers. I was thinking of doing a cointegration analysis given that the variables are unit-roots, and hereby, investigating the long-run relationship between 6.1, 6.2 and 4.1 where 4.1 would be the dependent variable. I just don't know if this economically speaking makes any sense? - Therefore I wondered whether it is possible to make a standard OLS regression, is that more correct? Ensure availability and sustainable management of water and sanitation for all. One in three people live without sanitation. This is causing unnecessary disease and death. Although huge strides have been made with access to clean drinking water, lack of sanitation is undermining these advances. If we provide affordable equipment and education in hygiene practices, we can stop this senseless suffering and loss of life. Goal 6 in action. To ensure clean water and sanitation for all, we all have to take action. Get inspired here: #Goal6. Food, water and environment are personal and immediate matters. Nutritious food maintains health, promotes growth in children, and prevents blindness. Safe drinking water nurtures and restores; unsafe water, even when it looks clean, is harmful. Puddles and rubbish lying around encourage mosquitos and rats. Clean surroundings, gardens, and properly located latrines can make the neighborhood beautiful and more healthy. Other diseases caused by unclean water and bad sanitation include cholera, typhoid, dysentery and bilharzia. Mosquitos which breed in puddles, borrow pits, open drains, slow moving streams, and ponds cause malaria, dengue fever, and other diseases. But it isn't just dirty water that causes problems.