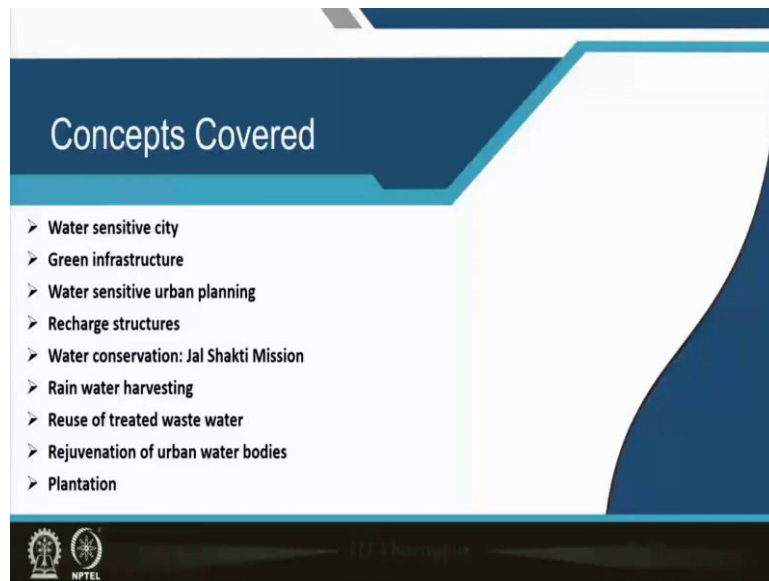


Urban Utilities Planning: Water Supply, Sanitation and Drainage
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Module - 01
Urban Utilities Planning: Introduction
Lecture - 05
Water Sensitive Urban Planning

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Welcome back! In lecture-5, the Water Sensitive Urban Planning will be discussed. The different concepts that will be covered are water sensitive city, green infrastructure, water sensitive urban planning, recharge structures, water conservation (Jal Shakti Mission), rainwater harvesting, reuse of treated wastewater, rejuvenation of urban water bodies, and plantation under Jal Shakti Mission.

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Water sensitive city

Conventional urban water management approach:
Unsuitable for current and future sustainability issues

Water sensitive city

*" i) Access to a diversity of water sources underpinned by diversity of centralized and decentralized infrastructure.
ii) Provision of ecosystem services for the built and natural environment.
iii) Socio-political capital for sustainability and water sensitive behaviors."*

Wong & Brown (2008)

Water sensitive communities
Socio-institutional dimension

Source: Urban Water Management Transitions Framework, Brown et al. 2009

Water sensitive city

In this Lecture, another dimension of utilities planning will be discussed that deals with sustainability that and involves conservation of water will be discussed.

The term water sensitive city has been defined by Wong and Brown using three pertinent points. The first point deals with access to diversity of water sources underpinned by diversity of centralized and decentralized infrastructure. In other words,

there is a need to have a different kind of water sources based on centralized infrastructure and decentralized infrastructure. Centralized infrastructure is like a water treatment plant or water supply system at the urban level whereas decentralized infrastructure is like a water treatment plant at a local area that gathers waters from that particular area as well as provide water supply in the local region. For instance, rain water harvesting in a building that can be reused at local level.

The second point deals with provision of ecosystem services for the built and the natural environment. The third point deals with

the socio-political capital for sustainability and water sensitive behaviours. The socio-political capital involves people and their behaviour on water use and water reuse.

Similarly, water sensitive communities involves socio-institutional dimension. There exist various communities that are willing to save water or use it in a more sustainable or eco-friendly way.

The current approach to conventional urban water management is not sustainable. There is a need to improve sustainability, increase reuse of water, and reduce wastage, and reduce pollution.

The utilities and services for a particular urban area should be designed keeping these things in mind.

The evolution of urban water management framework involves

water supply city, sewerage city, drainage city, waterway city, water cycle city, and water sensitive city.

The water supply city is only concerned about supplying water and are not concerned about drainage or sewerage. Some onsite treatment alternatives like septic tanks and some amount of drainage can be present.

Sewerage city is concerned about public health. There is a focus on laying down sewers, conveyance of wastewater for treatment and final disposal. To deal with the system efficiently, there can be various types of sewerage schemes along with water supply schemes. Drainage city is concerned about effective drainage of storm water so that the floods can be avoided. It involves the designing of and channelization of drains to carry storm water.

Waterway cities are concerned with use of water for social amenities and along with environmental protection measures.

This involves point and diffuse source pollution management, for instance creating retarding basins, detention basins, etc.

Water cycle city deals with water reuse, reduction of the amount of water that goes into the drain to the final disposal point by performing infiltration, and recharging the groundwater.

The diverse, fit for purpose sources and conservation promotes waterway protection.

Water sensitive city is concerned about climate change, intergenerational equity, and sustainability. The service delivery functions involve

adaptive multifunctional infrastructure and urban design reinforcing water sensitive behaviour. Thus, the concern should be designing a city in such a way where a lot of water can be reused instead of generating it. In addition, the consumption should also be reduced and groundwater recharge should be promoted.

Thus, can these aspects can be introduced in the city to make it more sustainable. However, the development of a water sensitive city is gradual as city transforms over time from focus on water supply to water sensitive behaviour. and

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Water sensitive city

City as water supply catchments
Groundwater, urban stormwater, rainwater (roof runoff), recycled wastewater and desalinated water.

- Centralised and decentralised water supply schemes
- Secondary supply pipeline for nonpotable water (third pipe system or dual supply).

Cities providing ecosystem services
'Ecological functioning' of the urban landscapes (sustainable water management, micro-climate influences, facilitation of carbon sinks and use for food production) in addition to provision of spatial amenities.

Green infrastructure in urban design

Protection from stormwater pollution
Treatment technologies: Constructed wetlands and bioretention systems
Scale: Building, Regional public open space etc.

Rehabilitation of degraded urban waterways
Catchment-wide initiatives and on-site channel stabilisation works etc.
Catchment management (waterway health and improving water quality)

A city could be used as a water supply catchment for considering sources such as

groundwater, urban storm water, rainwater from roof, recycled wastewater and desalinated water in case of a seafront. These water sources are used to fulfill water demands in a city using

Centralized and decentralized water supply schemes. To ensure that the recycled wastewater, rainwater or urban storm water can be reused, secondary supply (dual supply) pipeline for non-potable water should be designed. Non-potable purposes involve

cleaning of streets, watering of lawns, etc. In a dual system, one supply is for treated water from water treatment plant, and other supply is for recycled wastewater/urban storm water/rainwater from roofs.

Green infrastructure

Cities also provide ecosystem services that means in addition to provision of spatial amenities, ecological functioning of urban landscapes can be actually planned. Ecological functions include sustainable water management, influencing microclimate influencing, facilitation of carbon sinks and using it for food production. These functions correspond to the development of green infrastructure in the city. It can be achieved by various methods. For instance,

- **Protection from storm water pollution:** Wetlands and bio-retention systems (water treatment systems) can be designed at the building level or regional public open space. In case of decentralised system, storm water can be detained to enable infiltration. This water can be then conveyed to the water bodies. Thus, stormwater pollution is reduced.

- **Rehabilitation of degraded urban waterways that has been widened and depth has reduced:** The degradation of urban waterways deter the drainage of that particular area, thus storm water cannot be drained properly. To achieve this, catchment wide initiatives and on site channel stabilization (stabilization of banks of the channel) could be employed. This will reduce the chances of erosion and help in catchment management where the entire waterway's health and water quality in that waterway could be monitored as well as improved upon.

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Community Level

Green Infrastructure

Retarding basin/Detention basin and structures

Excavated area adjacent to water bodies/streams or storm water for storing water to prevent flooding and ensuring steady discharge either to water bodies or treatment plants.

Vegetated infiltration basins:

Shallow landscaped depressions used to collect and hold storm water runoff, allowing pollutants to settle and filter out as the water infiltrates into ground. It is designed adjacent to an exiting river/ stream/ lake/ bay.

Retention basins

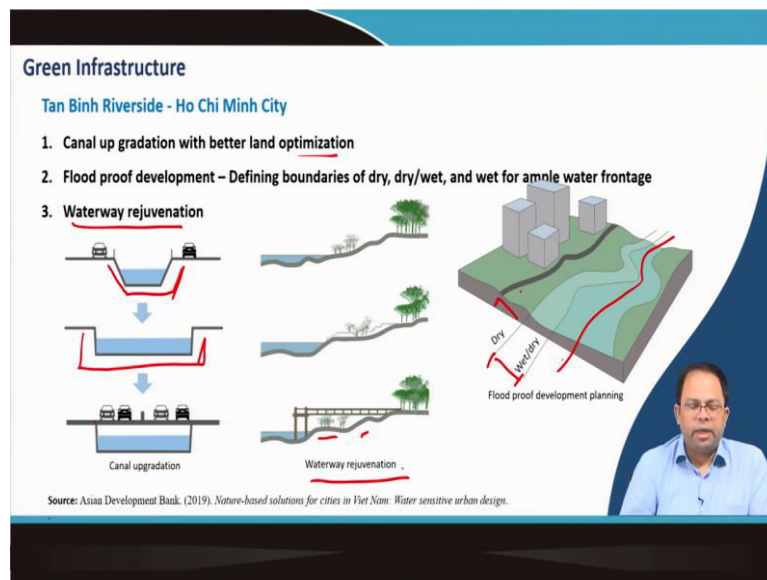
Detention ponds that are designed to permanently retain some volume of water at all times. (Vegetation may be present)

Source: Retention pond in Silkeborg, Istenić et. al. (2012)

- **Retarding or detention basin:** The detention basin or retarding basin detain or retard water to go to the drainage channel directly. In case of a rainfall event, when the water flows over the land surface,
 - the entire pollution from this particular urban area is also carried along with it from the surface which then goes into into the water body through the drains. This direct flow into the water bodies and can be prevented by designing retarding/ basins at the local level, city level, and regional level. In thiese structures, the water can be held for some time then can be gradually released as per the capacity of treatment plants or water bodies. These are excavated areas that are designed adjacent to water bodies to prevent flooding and ensure steady discharge either to water bodies or treatment plants. plants. Detention basins, on the other hand, retain some amount of water permanently.

- **Vegetated infiltration basins:** These are shallow landscaped depressions in the urban landscape used to collect and hold stormwater runoff that allows pollutants to settle and filter out as water infiltrates into the ground. These are designed adjacent to the existing rivers, streams, lakes and bays as similar to the detention basin.
- **Retention basins:** These are a type of detention ponds where infiltration of the storm water happens and that are designed to permanently retain some volume of water is permanently retained at all times for future use. Vegetation can also be provided in these structures.

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Tanh Binh Riverside – Ho Chi Minh City

- **Canal upgradation:** The profile of the canal is made wider to ensure more catchment of the prevent water withoutto spilling along the banks. Eventually, it can be covered so that

the space could be utilised for some purpose with better land optimization. **This is an effective strategy to rejuvenate or refurbish the water channels in urban areas.**

- **Waterway rejuvenation Flood proof development:** It involves defining proper boundaries of dry, dry/wet, and wet for the water bodies so that access of people can be controlled by designing suitable structures. It also ensures flood protection, as well as a site for recreation and other activities.
- **Waterway rejuvenation:** It involves redevelopment of waterfront in a way that provides protection from floods as well as a site for recreation and other activities.

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Water sensitive urban planning

The key principles are:

- To reduce the demand for potable water by using harvested rainwater, treated wastewater and water efficient appliances.
- To minimize wastewater and to treat wastewater for re-use and recharge of water bodies/facilities
- To treat urban storm water towards reuse or discharge to water bodies.
- To use storm water in the urban landscape for recreation and aesthetics.

These measures can be applied at all scales in an urban area.

- Individual scale (Plot level)
- Street scale
- Neighbourhood scale
- City scale

Water sensitive urban design and planning

- Water demand and supply – Water conservation
- Rainfall runoff Rain water harvesting
- Localised water resource management
- Flood mitigation storm water mgt. Green infrastructure
- Wastewater reuse and recycle – Pollution reduction

Source: Centre for Science and Environment, (2017)

Water sensitive urban planning

The key principles of water sensitive urban planning involves

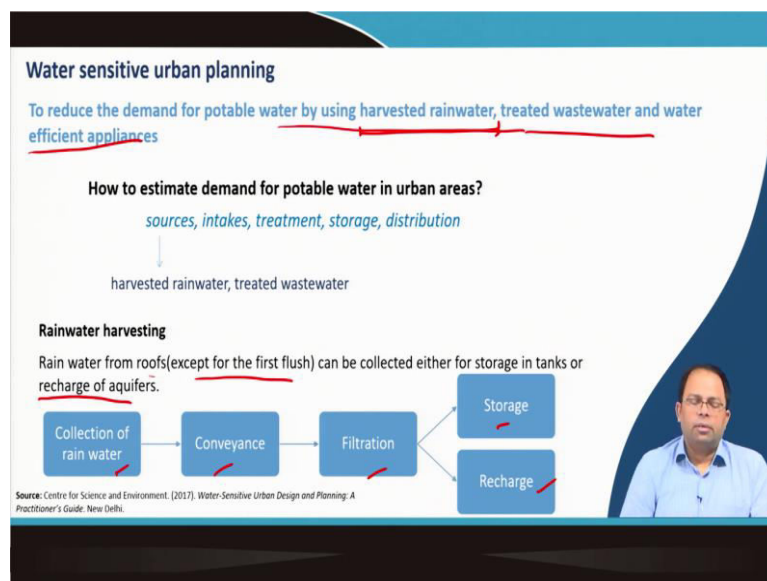
- Reduction of the demand for potable water by using harvested rainwater or localised water resource management, treated wastewater and water efficient appliances.

- Minimization of wastewater and treatment of wastewater for reuse and recharge of water bodies.
- Treatment of urban storm water towards reuse or discharge to water bodies through provision of green infrastructure and flood mitigation.
- Usage of storm water in the urban landscape for recreation and aesthetics.

To implement these principles, there is a need to understand the basics of volume of water generated from a rainfall, volume of runoff and the volume of water for recharge, and management strategies.

These measures can be applied at all scales in an urban area such as individual scale (plot scale), street scale, neighbourhood scale and city scale.

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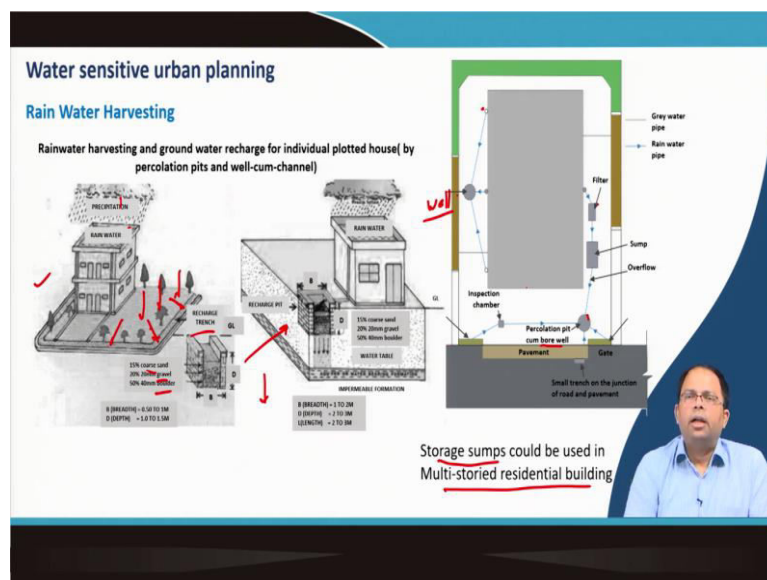


Regarding water sensitive urban planning, demand for potable water can be reduced by using harvested rainwater, treated wastewater and water efficient appliances.

Harvested rainwater is rainwater collected from the roofs. The first flush can not be collected because it might contain different pollutants/impurities that are collected from the roof with the first rainfall of the season.

Rainfalls after that can be collected and stored either in tanks or it can be used to recharge the aquifers in that particular area. The collected rainwater is then conveyed using pipes, filtered if required and then stored it for reuse/groundwater recharge.

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Rainwater harvesting

When precipitation happens, rainwater from roof and lawn is conveyed using rainwater pipes to a recharge trench in the ground where it is stored and then gradually goes into the Earth. Water can be conveyed into recharge pit also. In this system, layers of sand, boulders and gravel are put so that the water can gradually filter and go into the ground. Apart from groundwater recharge, this water can be reused for various non-potable purposes.

In case of multi-storied residential building, if there are not enough open lawns, storage sumps can be created where the water can be stored (after filtration) in future. The excess water from the sumps can go to percolation pit/borehole or reused for non-potable purposes such as cleaning, fire-fighting, etc.

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Water sensitive urban planning


How to reduce demand for potable water in urban areas?

Incentives to promote efficient and equitable use of water.
Change in attitude and behavior.

Water efficient appliances in urban areas.

Fixture	Water use in standard fixtures	Water-efficient fixtures	Estimated water savings
Toilet	Single flush toilet users 10-13 litres/flush	Dual flush toilet in 3/6 and 2/4 litres models	4-11 litres/flush
Urinals	4 litres; 10-13 litres/flush	Sensor operated adjustable flush	2.2-10 litres/flush
Taps	10-18 litres/minute, depending on pressure	Sensor taps	5.5-15.5 litres/minute

Source: Rohilla, S. Daigupta, S. (2011). Roadmap for Rating System for Water Efficient Fixtures. New Delhi: CSE

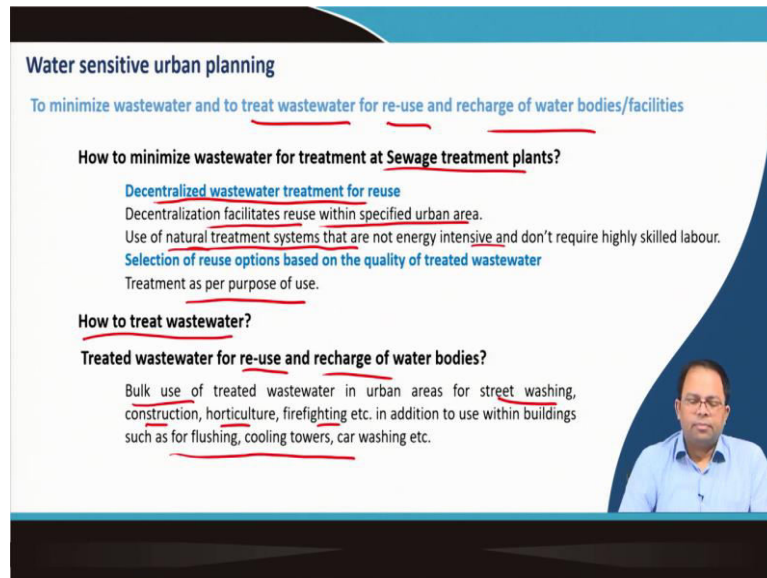


To reduce demand for potable water in urban areas, water efficient appliances should be used and incentives should be provided to promote the usage of water efficient appliances. In addition, there is a need to changes attitude and behaviour. Urban planners are responsible for creation of awareness as well as changing the attitude and behaviour towards sustainable practices.

Water efficient appliances, toilets that use water efficient fixtures(reduce the use the amount of water per flush to 4-11 litres from 10- 13 litres for standard fixtures.), Wwater-efficient urinals (help to save 2.2-10 litre/flush instead of 10-13 litre/flushes) help to save water. Similarly,

Similarly, the taps with sensors help to save 5.5-15.5 litres per minute instead of 10-18 litres per minute.

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Water sensitive urban planning

To minimize wastewater and to treat wastewater for re-use and recharge of water bodies/facilities

How to minimize wastewater for treatment at Sewage treatment plants?

- Decentralized wastewater treatment for reuse**
Decentralization facilitates reuse within specified urban area.
- Use of natural treatment systems that are not energy intensive and don't require highly skilled labour.
- Selection of reuse options based on the quality of treated wastewater**
Treatment as per purpose of use.

How to treat wastewater?

Treated wastewater for re-use and recharge of water bodies?

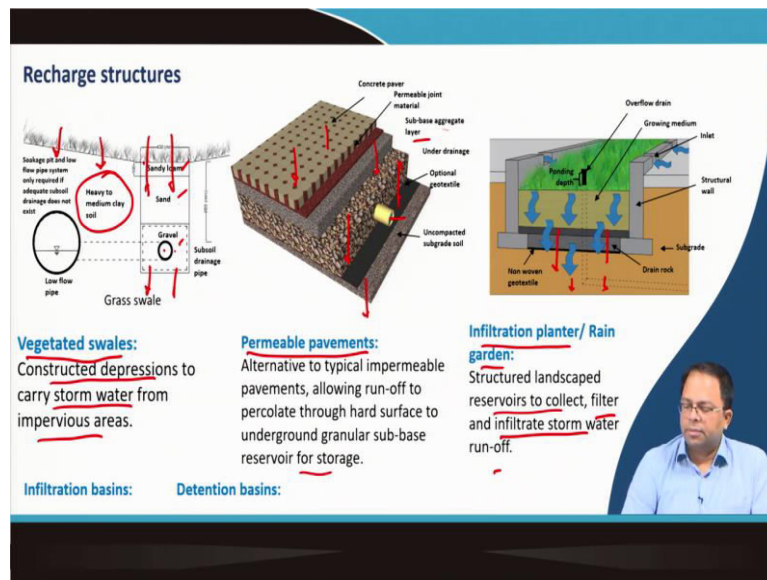
Bulk use of treated wastewater in urban areas for street washing, construction, horticulture, firefighting etc. in addition to use within buildings such as for flushing, cooling towers, car washing etc.

(A video inset of a speaker is visible in the bottom right corner of the slide.)

Another objective of water sensitive planning is to minimize wastewater and treat it for reuse and recharge of water bodies. The minimization of wastewater at sewage treatment plant can be done in a decentralized way using decentralization facilities within specified urban area, and use of natural treatment systems that are not energy intensive and do not require highly skilled labour. In addition, the reuse options can be selected based on the quality of treated water. Shallow filtration beds can be created for stormwater storage that ensures natural filtration.

Treated wastewater can be used for recharge of water bodies and in urban areas for street washing, construction, horticulture, and fire-fighting in urban areas. It can be also used for flushing, cooling towers, car washing, etc.

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Recharge structures

Recharge structures include vegetated swales, permeable pavements and infiltration planter/rain gardens.

Vegetated swale is a constructed depression or permeable green area to carry storm water from impervious areas/areas with heavy to medium clayey soil.

A pit is constructed where sandy loamy soil, sand, and gravel is put that allows water to infiltrate into the ground .. Under drainage pipes can also be laid so that the excess water can be drained properly.

Permeable pavement, an alternative to a typical impermeable pavement,

allows runoff to percolate through the hard surface to underground granular sub base reservoir for storage. Over the uncompacted subgrade soil, a layer of geotextile is laid which filters the percolating water.. Over the geotextile,

sub base aggregate layer is laid through which the water passes via pores. Under drainage pipe is also provided so that the excess water can be drained out. The permeable concrete pavers are laid over the sub base aggregate layer.

Infiltration planters or rain gardens are structured landscape reservoirs to collect, filter and infiltrate storm water runoff. A geotextile layer is also provided to ensure the filtration of percolating water.



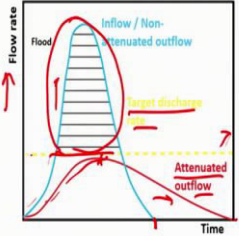
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Detention structures

Metropolitan Area Outer Underground Discharge Channel at the outskirts of the city of Tokyo.

Largest underground flood water diversion facility.

- 5 silos (65 mt deep and 32 mt diameter) connected via 6.5 km long tunnel to a storage tank.
- Storage tank: 25.4m high and 177m long. Supported by 59 pillars.
- 14,000hp turbines and 78 pumps: 200t of water per second to Edogawa River.



(Source: https://www.water-technology.net/projects/g-cans-project-tokyo-japan/#***text=G%20Cans%20Project%2C%20or%20the%20Greater%20Tokyo%20Area%2C%20Japan)

Detention structures

When rainwater is sent to treatment plants, it can exceed the rate up to which treatment plant is able to treat the water. Drains are also not designed to capture the huge inflow. This is non-attenuated flow. Thus, floods happen.

Thus, instead of all the water being released in a short period of time, it needs to be released gradually in a longer period of time. This is called attenuated flow. The excess water can be stored in detention structures if natural basins like retention basins or detention basins cannot fulfil the purpose.

This picture shows the metropolitan area outer underground discharge channel at the outskirts of the city of Tokyo. This is a very famous discharge

structure. It is the largest underground flood water diversion facility that stores the floodwater and gradually releases it so that neither the water supply nor the treatment plants and the water channel is overwhelmed.

There are five silos or chambers which are 65 meter deep and 32 meter in diameter. These are connected via 6.5 kilometres of long tunnel. These are all connected to a storage tank which is around 25.4 meter high and 177 meter long and supported by 59 pillars. This is drained once filled by using 78 pumps and 14000 horsepower turbines. 200 tons of water is released per second in the Edogawa River.

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Water Conservation: Jal Shakti Abhiyan

Campaign for water conservation and water security launched in 2019.
Launched in most water-stressed districts (255 Districts and 1,597 Blocks)
(critical or over-exploited groundwater levels as per Central Ground Water Board 2017)

The important measures are:

- Water conservation and rainwater harvesting,
- Renovation of traditional and other water bodies/tanks,
- Reuse of water and recharge structures,
- Watershed development and
- Intensive afforestation.

A collaborative effort (Ministry of Jal Shakti, Ministry of Housing and Urban Affairs Ministries of State governments/UTs/Urban Local Bodies).
75 lakh water bodies renovated
1 crore (approx.) water conservation & rainwater harvesting structures

- Block and District Water Conservation Plan
- Krishi Vigyan Kendra Melas to increase irrigation efficiency and better choice of crops
- Urban Waste Water Reuse for industries and agriculture (By-laws for the separation of grey water and blackwater)
- 3D Village Contour Mapping

(Source: Jal Shakti Abhiyan (ejalshakti.gov.in))

Water conservation: Jal Shakti Abhiyan

Jal Shakti Abhiyan is the program which has been launched by the government for water conservation and water security. This campaign has been launched in 2019 in the most water stressed districts of India (255 districts and around 1597 blocks) as per the Central Groundwater Board, 2017 report. The important measures in this campaign are include

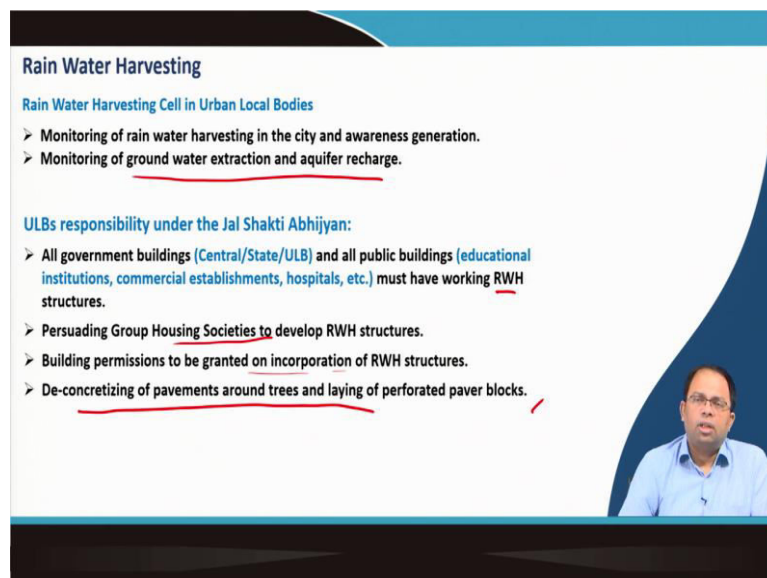
water conservation and rainwater harvesting, renovation of traditional and other water bodies and tanks, reuse of water and recharge structures, watershed development, and intensive afforestation.

A collaborative effort by the Ministry of Jal Shakti, Ministry of Housing and Urban Affairs, ieMinistries of State Governments, urban territories, urban local bodies have renovated around 75 lakh water bodies and introduced 1 crore water conservation and rainwater harvesting structures.

In this project, block and district water conservation plans are prepared. Krishi Vigyan Kendra Melas are organized to increase efficiency of irrigation, and help to choose better crops for that particular area. It also implementedconsiders

urban waste water reuse for industries and agriculture. By-laws are introduced for separation of grey water and black water in an urban area. Then, 3D village contour mapping is also done to understand the flood possibilities and other drainage requirements for different rural areas.

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Rain Water Harvesting

Rain Water Harvesting Cell in Urban Local Bodies

- Monitoring of rain water harvesting in the city and awareness generation.
- Monitoring of ground water extraction and aquifer recharge.

ULBs responsibility under the Jal Shakti Abhijyan:

- All government buildings (Central/State/ULB) and all public buildings (educational institutions, commercial establishments, hospitals, etc.) must have working RWH structures.
- Persuading Group Housing Societies to develop RWH structures.
- Building permissions to be granted on incorporation of RWH structures.
- De-concretizing of pavements around trees and laying of perforated paver blocks.

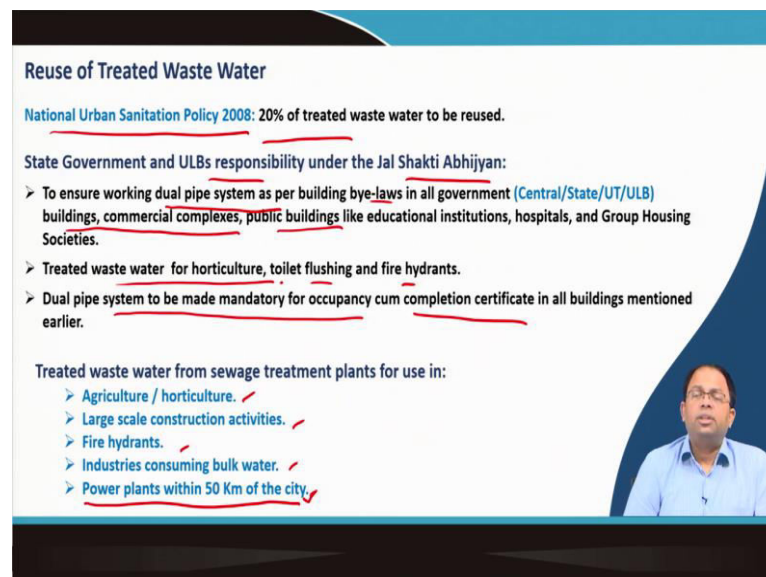
Video inset of a speaker in a blue shirt.

Rainwater harvesting

Rainwater harvesting cell has been created in urban local bodies, where not only monitoring of rainwater harvesting in the city is done but also monitoring of groundwater extraction and aquifer recharge is also undertaken. Regarding this, the responsibilities of ULBs under Jal Shakti Abhiyan to improve the water sensitivity of that or the water reuse include:

- Making mandatory the working rainwater harvesting structures in all government buildings and public buildings
- Persuading group housing societies to develop rain water harvesting structures
- Building permissions to be granted only with incorporation of rainwater harvesting structures
- De-concretizing of pavements around trees and laying of perforated paver blocks

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Reuse of Treated Waste Water

National Urban Sanitation Policy 2008: 20% of treated waste water to be reused.

State Government and ULBs responsibility under the Jal Shakti Abhiyan:

- To ensure working dual pipe system as per building bye-laws in all government (Central/State/UT/ULB) buildings, commercial complexes, public buildings like educational institutions, hospitals, and Group Housing Societies.
- Treated waste water for horticulture, toilet flushing and fire hydrants.
- Dual pipe system to be made mandatory for occupancy cum completion certificate in all buildings mentioned earlier.

Treated waste water from sewage treatment plants for use in:

- Agriculture / horticulture. ✓
- Large scale construction activities. ✓
- Fire hydrants. ✓
- Industries consuming bulk water. ✓
- Power plants within 50 Km of the city. ✓

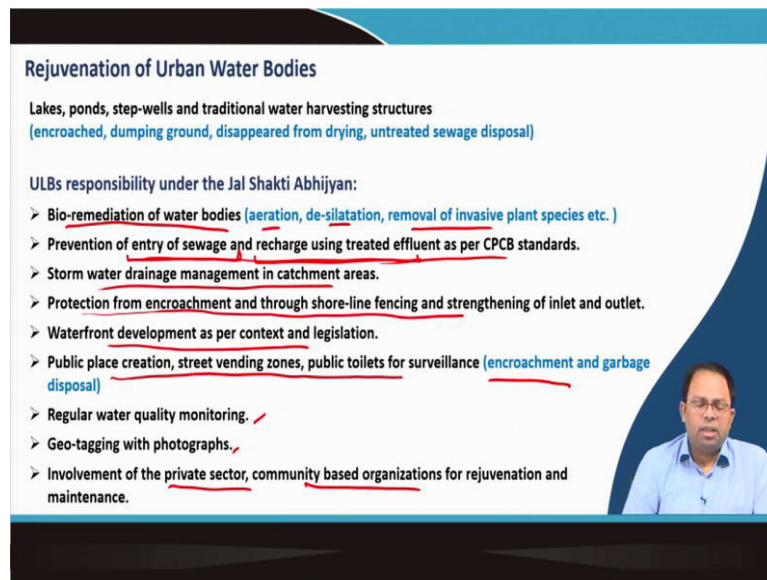
Reuse of treated waste water

According to National Urban Sanitation Policy, 2008; 20 percent of wastewater should be reused. Thus, state governments and ULBs have been made responsible under Jal Shakti Abhiyan to achieve this. The responsibilities are:

- Ensuring working dual pipe systems as per building bye-laws in all government buildings, commercial complexes, public buildings like educational institutions, hospitals and Group Housing Societies. Dual pipe systems are for not only for the standard water supply pipes, but also for water supply through secondary sources like harvested rain waters or treated water. This water may not used for portable purpose,purpose; they could be used for other purposes.
- Usage of treated water for horticultureal, toilet flushing, fire hydrants, etc.
- Dual pipe system is to be made mandatory for occupancy cum completion certificate in all necessary buildings. Whenever the completion certificate is given for a building, it is checked that dual pipes are led for that particular building.

The treated wastewater could be used in agriculture/ horticulture, construction activities, fire hydrants, industries consuming bulk water, and power plants within 50 kilometer of the city. The usage of treated water in appropriate way can reduce the water requirement for urban areas.

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Rejuvenation of Urban Water Bodies

Lakes, ponds, step-wells and traditional water harvesting structures
(encroached, dumping ground, disappeared from drying, untreated sewage disposal)

ULBs responsibility under the Jal Shakti Abhiyan:

- Bio-remediation of water bodies (aeration, de-siltation, removal of invasive plant species etc.)
- Prevention of entry of sewage and recharge using treated effluent as per CPCB standards.
- Storm water drainage management in catchment areas.
- Protection from encroachment and through shore-line fencing and strengthening of inlet and outlet.
- Waterfront development as per context and legislation.
- Public place creation, street vending zones, public toilets for surveillance (encroachment and garbage disposal)
- Regular water quality monitoring. ✓
- Geo-tagging with photographs. ✓
- Involvement of the private sector, community based organizations for rejuvenation and maintenance.

Rejuvenation of urban water bodies

The existing lakes, ponds, step-wells and traditional water harvesting structures which have been encroached upon, converted into a dumping ground, or disappeared from due to drying or from untreated sewage disposal should be rehabilitated or put to reuse. Under Jal Shakti Abhiyan, ULBs have been made responsible for the following tasks:

- Bioremediation of water bodies which include aeration, de-siltation, and removal of invasive plant species
- Prevention of entry of sewage and recharge using treated effluent as per CPCB standards
- Storm water drainage management in catchment areas
- Protection from encroachment and through shore line fencing and strengthening of inlet and outlet
- Waterfront development as per context and legislation
- Public place creation, street vending zones, public toilets for surveillance
- Regular water quality monitoring

- Geo-tagging with photographs
- Involvement of private sector and community based organizations for rejuvenation and maintenance of water bodies

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Plantation

Prevents erosion, reduces run-off, helps in absorption of storm and rainwater, increases recharge of ground water, and encourages development of natural habitat for flora and fauna.

ULBs responsibility under the Jal Shakti Abhiyan:

- To undertake plantation of water hardy indigenous trees (preferably tall) near water bodies, public spaces, parks and on roadside.
- Protective measures to ensure survival and growth of these trees.
- Motivate planting of trees at the resident colonies, schools, public buildings by resident welfare association, NCC, NSS etc.

Awareness Campaign, Funding, Monitoring

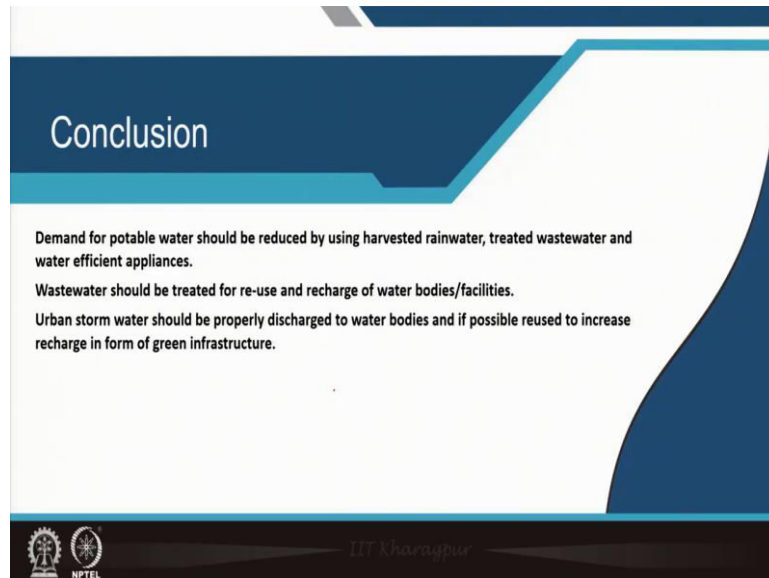
Plantation

Plantation is also a part of Jal Shakti Abhiyan because these prevents erosion, reduces runoff, helps in the absorption of storm and rain water, increases recharge of ground water, and also encourages development of natural habitat for flora and fauna.

ULBs have been made responsible to undertake plantation of water hardy indigenous trees (preferably tall) near water bodies, public spaces, parks and roadside. They are also responsible to undertake protective measures to ensure the survival of these trees. In addition, they motivate planting of trees at residential colonies, schools, public buildings and so on. This program is making various changes to water-stressed districts. This also requires

awareness campaign, funding, and monitoring that needs to be considered while designing these kinds of programs for an urban area.

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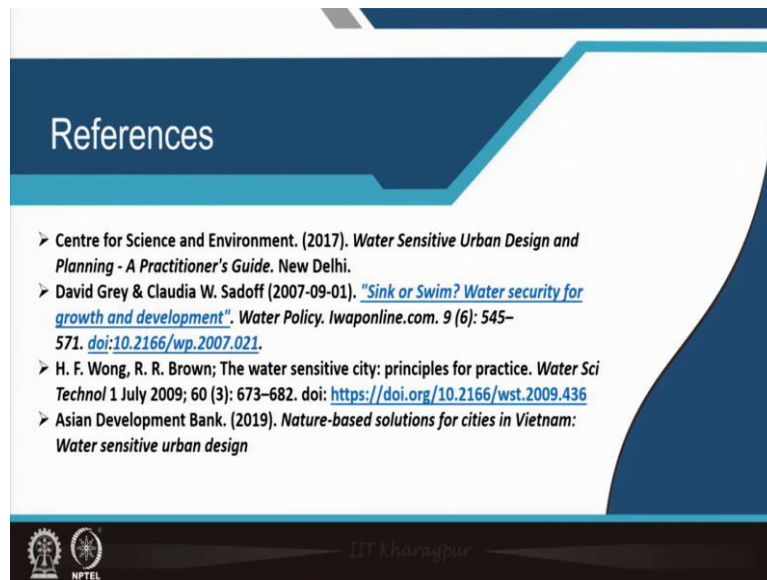
Conclusion

This lecture provides an overview of water sensitive urban planning.

Demand for potable water should be reduced by using harvested rain water, treated wastewater and water efficient appliances for all urban areas. Wastewater should be treated for re-use and recharge of water bodies and facilities.


Urban storm water should be properly discharged to water bodies and if possible reused to increase recharge in form of green infrastructure. These concepts provides an understanding about how we should look into utilities planning for urban areas in Indian urban areas for future.

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