Urban Utilities Planning: Water Supply, Sanitation and Drainage

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Module - 01

Urban Utilities Planning: Introduction

Lecture - 04

Urban Utilities

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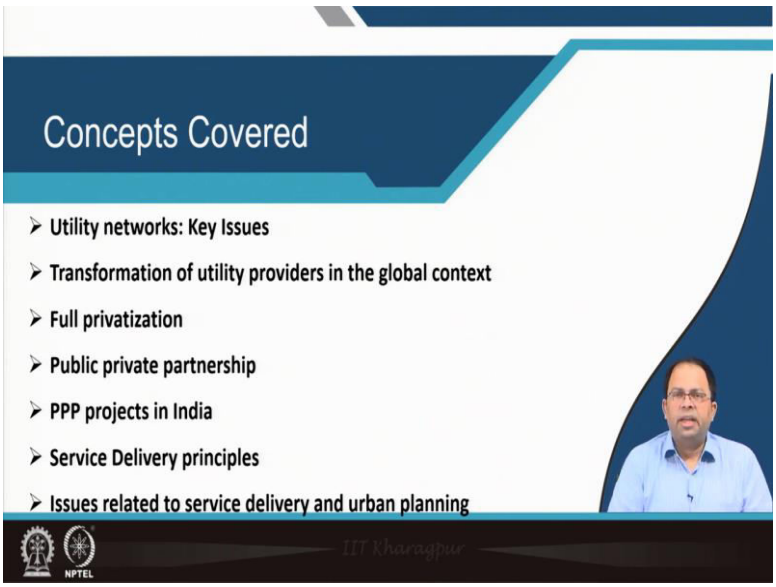

Lecture 4 covers:

- Utility networks and the different issues.
- Transformation of utility providers in the global context
- Full privatisation of utility providers
- Public private partnerships
- Issues related to service delivery and urban planning

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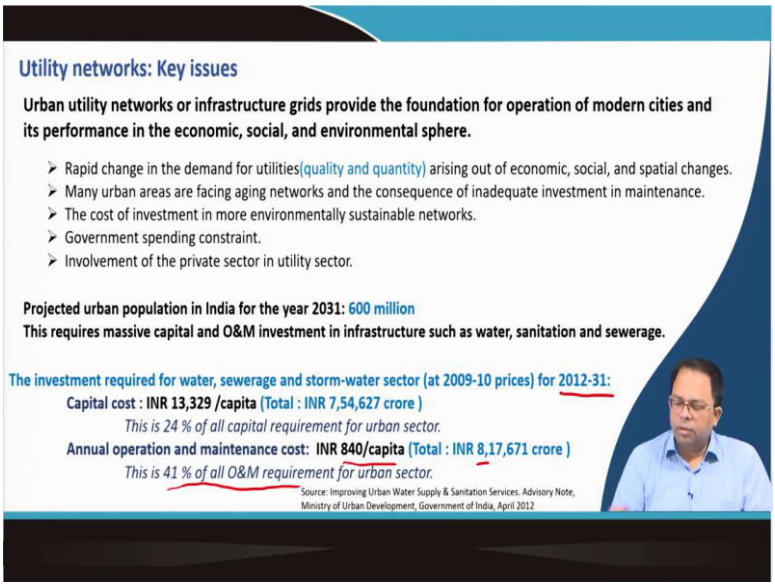

Utility Networks – Key Issues

In today's context, the performance of a modern city in the social, environmental and economic sphere can be linked to the efficiency and performance of the cities' infrastructure grids or the utility networks. For example, an efficient drainage network can avoid waterlogging, and eliminate substantial economic losses.

- The rapid change in the demand for utilities (quality and quantity) arising out of economic, social, and spatial changes:
- Many urban areas face ageing networks and the consequence of inadequate investment in maintenance: There is a need for upgradation. It is also observed that people become increasingly willing to pay for such infrastructure provision and upgradation.
- The cost of investment in more environmentally sustainable networks: is very high, and governments may not involve in such gross spending
- Government spending constraint: especially attributed to the huge investment needed in the beginning.
- Involvement of the private sector in the utility sector is increasing, and it is important to have more private sector involvement.

India's urban population is projected to grow to around 600 million by the year 2031. This requires massive capital and O&M investment in infrastructure such as water, sanitation and sewerage. The investment needed for the water, sewerage and storm-water sector (at 2009-10 prices) for 2012-31 is 754627 crores (INR 13,329 /capita), which is 24 % of all capital requirements for the urban sector. This only accounts for the capital investment,

but, meeting the monetary requirement for the annual operation and maintaining cost is another concern. It comes to around rupees Rs. 840 per capita, amounting to approximately 8 lakh crores, which sums up to 41 percent of all operation maintenance requirements for the urban sector.

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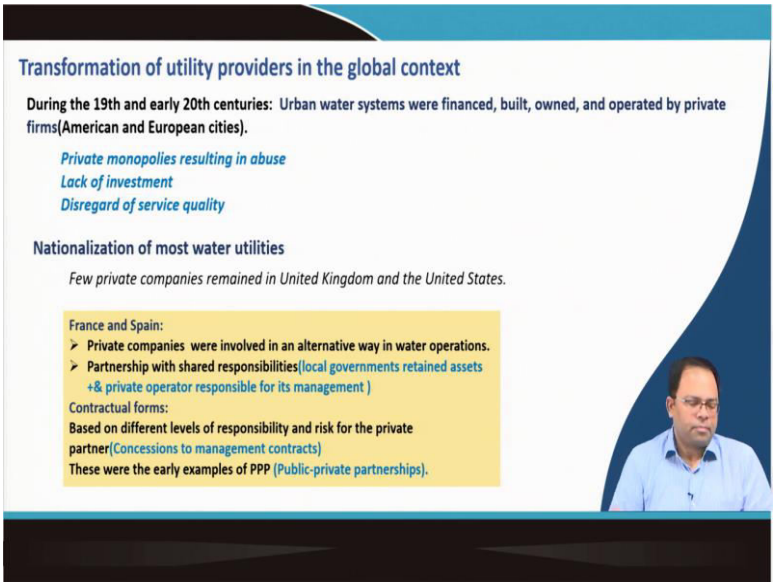

Transformation of utility providers in the global context

Apart from designing a service and implementing it, it is also required to run this service. This task is done by the Utility service providers, which could be either government-run companies, organisations etc. or private companies. A huge transformation in the utility providers can be observed both in India and the global context. During the 19th and the early

20th centuries, every utility provider was a private company; Urban water systems were financed, built, owned, and operated by private firms in American and European cities. This resulted in undesired outcomes such as:

- Private monopolies resulting in abuse: Smaller companies operating in smaller areas eventually resulted in monopoly. For instance, if there is only one company providing a service and there is no other company to compete with it, the company can provide poor service at a higher level and make a profit without meeting the user's expectations or need.
- Lack of investment: Utility sector infrastructure provision or upgradation costs a lot of money and the private sector was unable to make such huge investments for the sector to expand.
- Disregard of service quality: The providers were keener in making a profit rather than providing better service.

These factors eventually led to the nationalisation of most water utilities; however, few private companies continued their operation in UK and US.

Nationalisation of most water utilities

The government outright took entire companies, and the ownership of the assets. The responsibility of maintenance etc. became the government's responsibility. A different model was explored in countries like France and Spain.

In France and Spain, Pp**rivate** companies were **involved in an alternative way in water operations**, i.e., as a partner with shared responsibilities;. The local governments retained the assets whereas, the private operator was responsible for management. This was achieved

through different kinds of contracts. B based on different levels of responsibility and risk of the private partner,.

thereDifferent kinds of contracts such as,

- Concession: the private entity also has to invest some amount of money; they were also responsible for the services
- Management contracts: the private entity is not involved in investing any money, and are responsible for the operations. So, the capital investment needed for setting up a new water treatment unit or laying up distribution lines comes under the government's responsibility.
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These can be identified as the first examples of public private partnerships.

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1980: State Utilities

The service provided by the government also started having a lot of issues

- Growing urban populations resulted in water rationing (Lack of finances to expand): Lack of finance to meet the needs of increasing population resulted in water rationing issues i.e., people were provided less quantity of water than they required.

- Political interference, excessive staffing resulted in inefficiency and poor service quality: There were multiple such concerns, such as a sudden increase in water price leading to an undesired political outcome.
- Tariff was not a priority due to government grants, and customers were neglected: State entities usually depended on the central government for various grants to meet any deficits and timely service provision was not an important concern.
- Utility providers are more interested in building large projects instead of operating them
- Maintenance suffered, thus reducing water quality, and customers willingly defaulted and resisted tariff revision.

Early 1990s: State Utilities

During this time, a need for tariff revision was recognized. People also started to lose their trust in such government-managed utilities. This eventually led to the thought that private management should replace public management. This is achieved by different kinds of contracts or levels of privatization.

Contracts: These mentioned the *service obligations* and *financial incentives* such as the service quality to be achieved for a certain kind of financial incentive. Objectives and the level of service to be achieved was also stated.

Private operators were more efficient in handling these services due to the profit motive.

Policy and regulations: for bBoth the service provision and service expansion was the government's responsibility i.e., the government took decisions on the kind of service to be provided, the amount of tariff etc.

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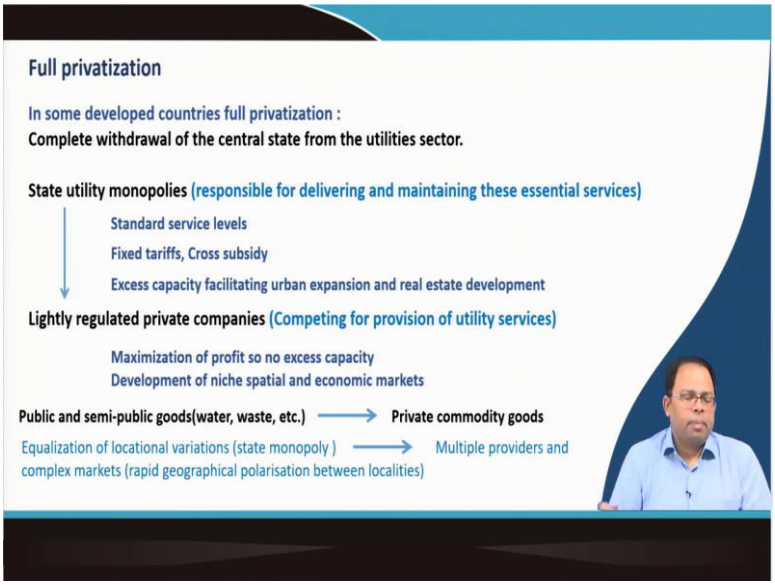

Full Privatization:

During the beginning of public-private partnerships, there was government control even when the private companies were involved. So, Full Privatisation started when the government was willing to transform the ownership or the capital infrastructure to private entities. Thus, the private company is responsible for

the expansion of such service entities as well as their operation and maintenance. In

many developed countries, full privatization meant that the government ultimately withdrew from the utility sector. Thus, there was a huge transformation from the state utility monopolies to

Llightly regulated private companies, which are private companies operating on their own for profit motive but are lightly regulated. This ensured a lot of competition among utility service providers, both for getting contracts or owning particular entities in a particular area leading

to better services to be delivered for the consumer.

State Utility Monopolies: In the initial PPP models, tThe government set standard service fixed tariff (low tariff); the government also subsidized a lot of costs to keep the tariff low. Big companies with an excess capacity preferred to facilitate urban expansion and extended the utility provision for newly developed satellite towns.

Lightly regulated private companies: However, After full privatization started, lightly regulated

private companies that did not have an excess capacity were sceptical about investing for utility provision of a newly developed satellite town because they were unsure about people's occupancy in that city; thus the profit. Profit maximisation was the primary motive and hence, was not interested in expanding their reach. This was negatively affecting urban expansion.

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n addition to that, these smaller companies operated in very niche spatial and economic markets, creating heterogeneous markets at multiple locations instead of having an overall uniform market. This ensured that different kinds of services were available in different parts of the country.

Utility service provision started with private companies followed by government management where the government fixed service level standard and tariff. As the government failed to manage these service provisions effectively, private companies eventually took the role. So, again it gives back control to the private companies. Water, waste, liquid waste,

solid waste, etc. are all public and semi-public goods,. Since there is a transformation from state utilities to private companies, these may be called private commodity or goods. To access these services, one will have to pay money according to market forces. In the case of state monopolies, locational variations were equalized, but with the smaller companies, multiple providers lead to a numerous heterogeneous market.

This actually resulted in *geographical polarization* between the localities.

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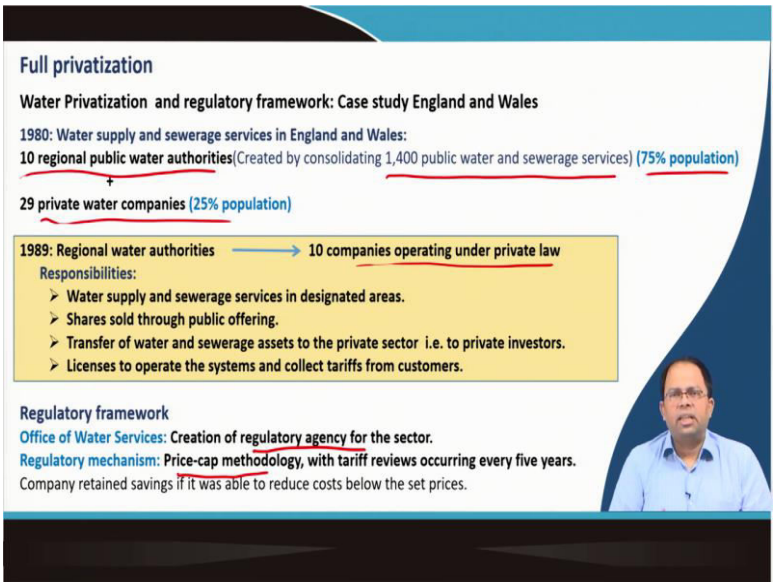

Water Privatization and regulatory framework: Case study England and Wales:

During the 1980s, water supply and sewerage services in England and Wales were provided by around 1,400 public water and sewerage services and 29 private water companies that covered 75% and 25% of the population, respectively. Later, these

1400 public water and sewerage services were consolidated into 10 regional public water authorities which are government companies operating under private law. For example, in India, certain particularspecial purpose vehicles are created used in this manner. There are multiple stakeholders in that company operating under private law. It is also referred to as

Ring-fencing i.e., handling accounts or the company's operation is done by the private company; the company's staff is referred to as being ring-fenced indicating that are separate from the government. This company could be prosecuted under law. Such companies owe the responsibility for service provision, setting tariffs, etc., and are not regulated by the government. Responsibilities of these companies involve

- Water supply and sewerage services in designated areas
- Shares were sold through public offerings
- Transfer of water and sewerage assets to the private sector i.e. to private investors.
- Licenses to operate the systems and collect tariffs from customers

Regulatory framework: Government's role is as a regulator and is responsible for devisesing the regulatory framework based on which such companies will be managed. This was done by the

Office of water services, which involved creating a regulatory agency for the sector. The

regulatory mechanism involved a price cap methodology with tariff reviews occurring every 5 years. The company retained the savings it it was able to reduce costs below the government-set prices.

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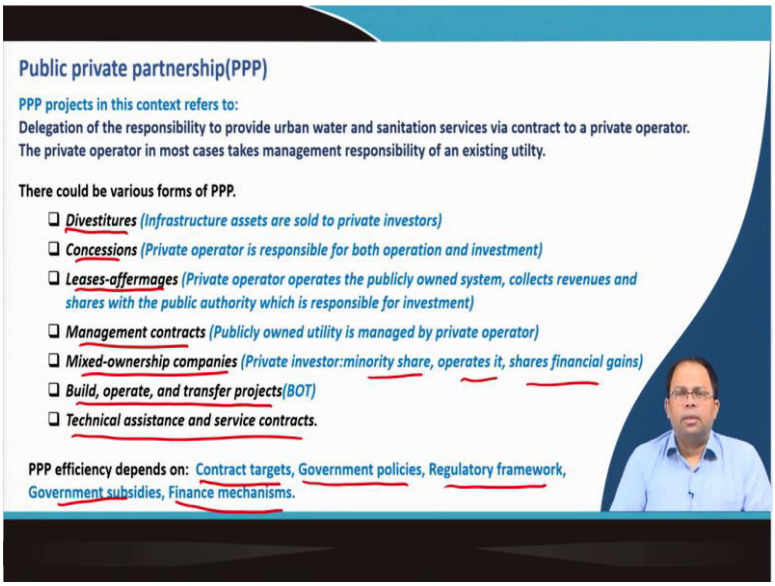

Public Private Partnerships

PPP refers to the delegation of responsibility to provide urban water and sanitation services via contract to a private operator. The private operator was is mostly involved in the management of a particular utility.

There are different forms of PPPs:

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– Divestitures: infrastructure assets are sold to the private investor. ie, full transformation or full ownership transfer.
– Concession: private operator is responsible for both operation and some amount of investment or maybe the entire investment.
– Lease affermages: private operator operates the publicly owned system, collects revenues and shares some of the profit with the public authority. The ownership is retained with the public agency or the government.
– Management contracts: Publicly owned utility managed by the private operator who are responsible for tariff collection, provision of services, day to day operation and maintenance.
– Mixed ownership companies: similar to concessions, where private investors hold the minority share, operate it, and share the government's financial gains. Also, contracts are

given for certain components such as of some or whole maintenance and operation; different components of operation or maintenance can be divided and given as contracts for smaller companies.

- Built, operate and transfer projects
- Technical assistance and service contracts.

There are a lot of challenges involved with PPP as multiple bodies are involved. The efficiency depends on

the contract targets, governments policies, regulatory framework, government subsidies, and the finance mechanisms

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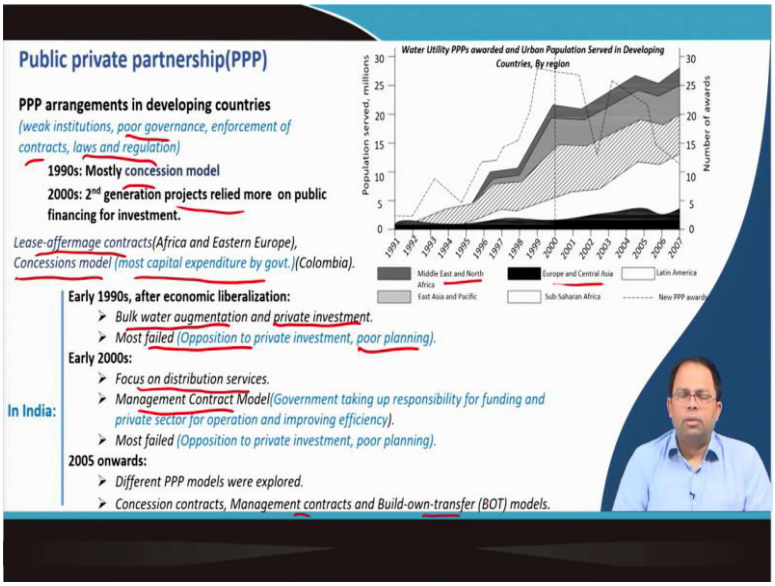

PPP arrangement in developing countries:

The graph given in the above figure shows the increase in the number of PPP projects from 1991,. Iit can be noted that the maximum number of projects under PPP was in 2000 and after that, it started declining. Except for the

initial PPP models during the 1990s such as the concession model, PPP models are it is observed to be successful to an extent.

During 2000s, second-generation projects started, where the public authority was responsible for financing the investment whereas, the private operator was only responsible for management.

Lease affermage contracts - were prevalent in Africa and Eastern Europe

Concession models – most or all of the capital expenditure was by the government. PPP arrangements have a lot of positives; however, there are inherent weaknesses associated with weak institutions involved in the implementation. Also,

Eenforcement of contracts was not proper such as penalizing for non-provision of services.

PPP in India:

- *During the 1990s - after the economic liberalisation, the projects were related to the augmentation of the bulk water; There was a* lot of private investment in this domain. These failed

- because of the opposition for private investment mainly because of peoples' expectation of high prices which were considerably lower and also because of poor planning.

- *Early 2000s* - distribution was the main responsibility underfor the private companies. Management contracts was also prevalent. These failed because of the opposition against private investment.

- *2005 onwards* - Advanced PPP models were explored such as certain kinds of concession contracts, management contracts, and build own transfer models.

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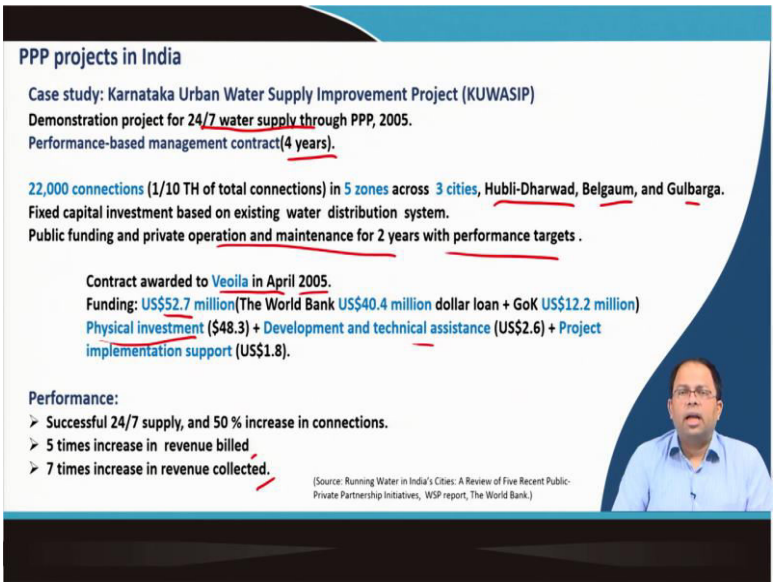

Case study: Karnataka Urban Water Supply Improvement Project (KUWASIP):

It was a demonstration project for 24 x 7 water supply, through PPP in 2005. It was a performance based management contract for 4 years. So, based on the performance of the system, the new targets would be set and the services will be improved. It was

for implementing 22,000 new connections, in 5 zones across 3 cities in this Hubli, Dharwad, Belgaum and Gulbarga. The contract constituted public funding and private operation and maintenance for 2 years with performance targets. The contract was awarded to Veolia (French company) in 2005.

Total funding was around for 52.7 million US dollars, most of it was provided by World Bank like (40 million). 12 million was by the Government of Karnataka. Most of the funding was invested in the physical investment (48 million dollars) i.e., physical infrastructure while the rest of the sum was utilised for implementation support and development and technical assistance.

The project showed good performance involving the successful implementation of 24/7 supply, 50 percent increase in connections, 5 times increase in revenue billed, 7 times increase in revenue collected. Also, the difference between billed and collected also reduced.

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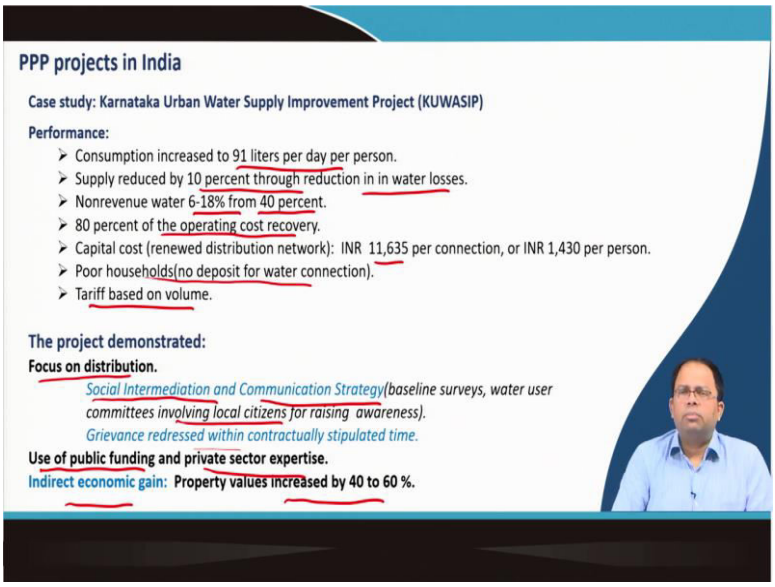

Also,The consumption also increased because of 24/7 services to 91 litres per day per person, and supply reduced by 10 percentand the with reduction in the water losses. Non-revenue water (losses and illegal connections) reached 6 to 18 percent from 40 percent.

80 percent of operating cost was recovered. Capital cost was around INR 11,000 per connection. Also, poor households did not have to deposit money for water connection and tariff was based on volume.

The project demonstrated that PPP works in Indian context, if it is designed well. The two primary highlights involve *Grievance redressal*, that involves addressing complaints on time and then the

Involvement of this local water use committees. This enabled successful conduct of the social intermediation and communication strategy. It used public sector funding and private sector expertise resulting

in a more successful project. Also, another indirect economic gain was the increase in property values by 20%.

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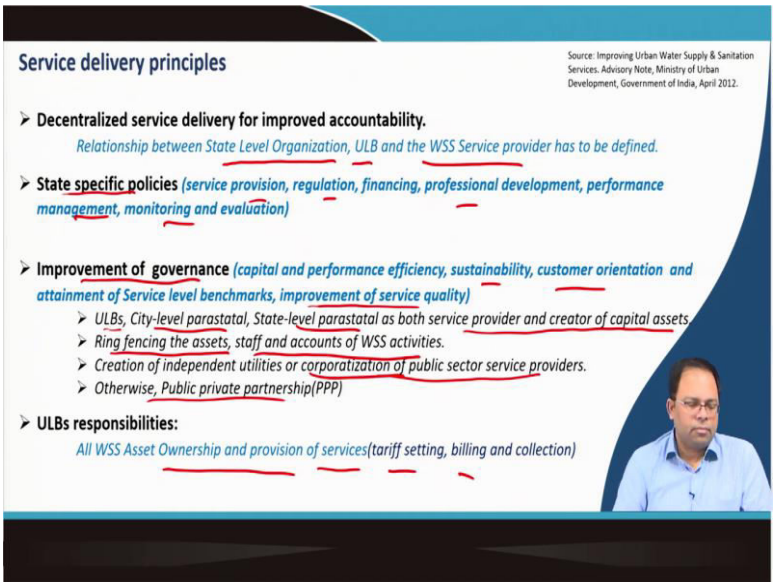

Service delivery Principles

Decentralized service delivery for improved accountability requires coordination between the state-level organization, urban local body, and the WSS provider. A framework defining roles about service delivery is required.

State-specific policies - refer to policies suitable to a state in terms of service provision, regulation, financing, professional development, performance management, monitoring and evaluation.

Improvement of the government

- ULB, City-level parastatal, State-level parastatal as both service provider and creator of capital assets
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- Ring-fencing of the assets staff and accounts of WSS activities - WSS service provider can function and operated based on the rules (tariff, expansion plans) set by themselves, however under the broad control of the government. There is a need to ring-fence their assets or staff and the accounts to notshould not be integrated with other government agencies.
- Creation of independent utilities or corporatization of public sector service providers

These are the different ways in which capital and performance efficiency, sustainability, customer orientation and attainment of service level benchmarks, and improvement of service quality can be achieved.

ULB Responsibilities - ULB has to take responsibility

for setting the tariffs and billing and collection to some extent.

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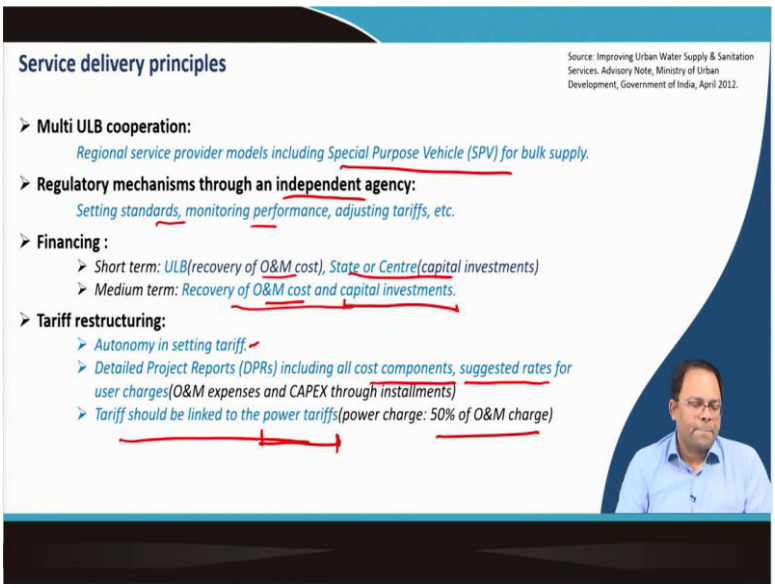

Multi ULB cooperation – Where drainage issues spread across two jurisdictions, it may be needed for bothrequire involvements of managing bodies in both the places. For example, Integrated drainage plan for two areas may be required because drainage water from one area can move to the next area. In such instances, multi ULB cooperation is required. Regional

service provider models including Special Purpose Vehicle (SPV) forcan be adopted. for *bulk supply*. For example, an SPV may be involved in bulk water supply for both the ULB.

Regulatory mechanisms through an independent agency - which can set the standards, and monitor performance and also involve in adjusting the tariffs.

Financing – Both short term and medium-term financing has to be considered. ULB can be responsible for operation and maintenance and the recovery of the costs while the state can be responsible for the capital investment in the short-term projects. In the medium term, recovery of operation and maintenance cost and capital investment has to be covered.

Tariff Restructuring –

Detailed project reports have to be made that considers various cost components and the suggested rates for user charges. Tariff s

hould be linked to power tariff because 50 percent of operation and maintenance cost attributes to the power charge and any fluctuation in power may affect the WSS service cost.

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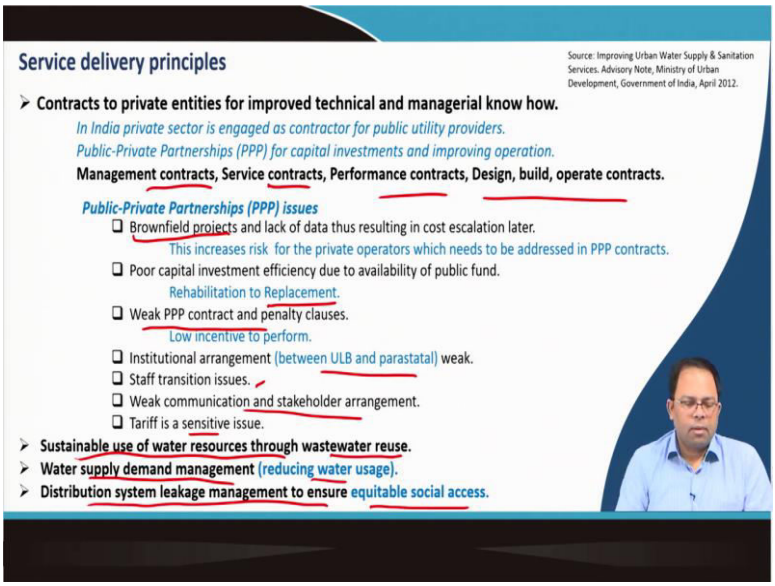

Contracts to private entities for improved technical and managerial know-how - Private sector has to be involved in different capacities such as in management contracts, service contracts, performance contracts, design-build and operate contracts etc. However, there are several concerns to be addressed involving private companies:

- Brownfield projects and lack of data, thus resulting in cost escalation later: This increases the risk for the private operators, which needs to be addressed in PPP contracts - This increases the risk for the private operators, which needs to be addressed in PPP contracts..
- Poor capital investment efficiency due to availability of public fund – Rehabilitation of sewer networks can be adopted instead of replacement we can talk about rehabilitation; that means rehabilitation of sewer networks.
- Weak PPP contract and penalty clauses – which are usually missing
- Weak institutional arrangement between the ULBs and the parastatals
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- Staff transition issues - whenever a government company is converted to a private company, the staff also needs to be transitioned.
- Weak communication and stakeholder engagement
- Tariff is a sensitive issue.

Sustainable use of water resources through wastewater reuse

Water supply-demand management reducing, water usages

Distribution system leakage management to ensure equitable social access.

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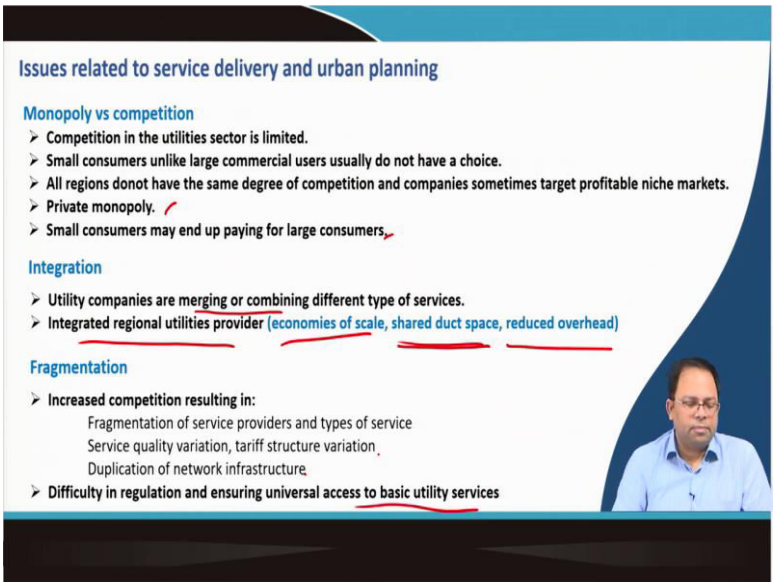

Issues related to service delivery and urban planning

Monopoly

vs competition – even after privatisation, it can be observed that private companies monopolise act as monopolies in specific geographic areas.

- Competition in the utilities sector is limited
- Unlike large commercial users, small consumers usually do not have a choice – while it is flexible for large consumers.
- All regions do not have the same degree of competition and companies sometimes target profitable niche markets - private companies sometimes provide services only at locations where it is profitable.
- Private Monopoly
- Small consumers may end up paying for large consumers

Integration

- Utility companies are merging or combining different type of services to combine different kind of service packages together.

- Integrated regional utility providers are beneficial because they provide economies of scale, shared ducts space and reduced overhead

Fragmentation

Increased competition resulting in

- Fragmentation of service providers and types of services
- Service quality variation, tariff structure revision,
- Duplication of network infrastructure.

Difficulty in regulation and ensuring universal access to basic utility services

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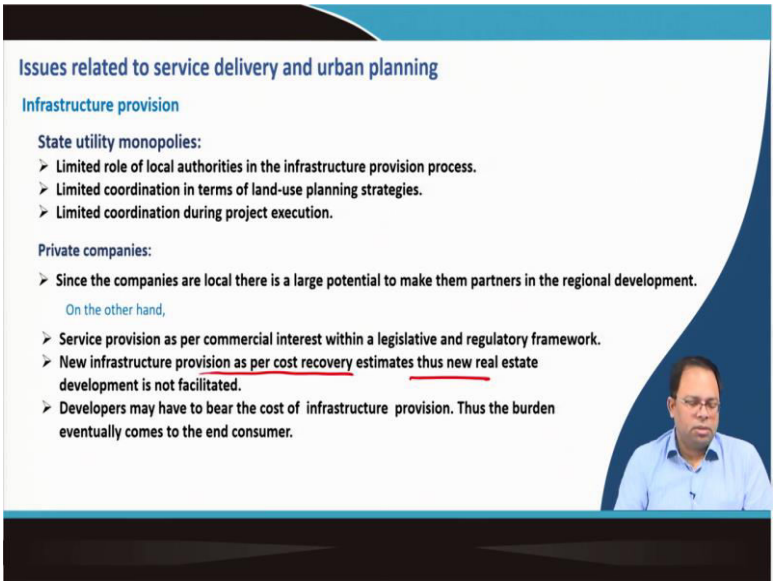

Infrastructure provision

State utility monopolies

- Limited role of local authorities in the infrastructure provision process.
- Limited coordination in terms of land-use planning strategies.
- Limited coordination during project execution.

This is because the state companies were run based on their own rules and policies and did not engage with the smaller ULBs or municipalities. Custom services were also not provided because of the need to provide uniform policies for all areas. Also, feedback from ULB was also not considered.

Private Companies were able to engage in partnership with the ULBs to provide custom or more effective services.

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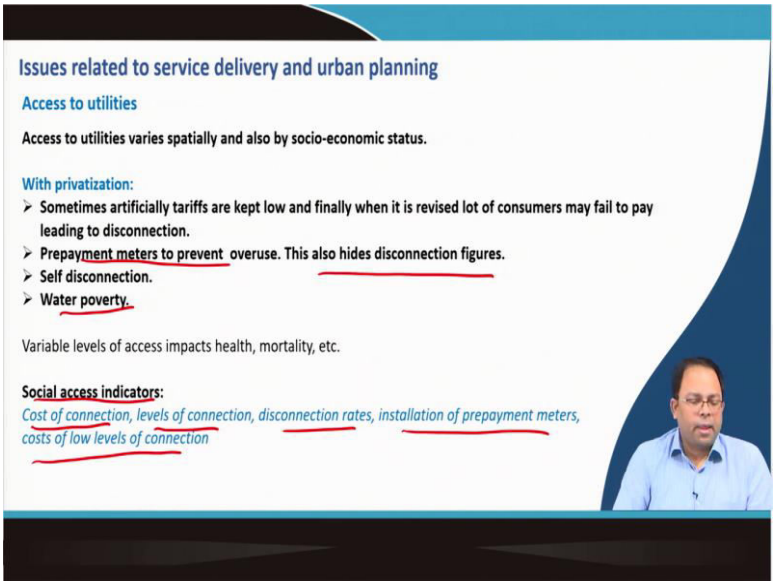

Access to utilities varies spatially and also by socio-economic status.

Privatization

- Sometimes artificially, tariffs are kept low, and finally, when it is revised, many consumers may fail to pay, leading to disconnection.
- Prepayment meters to prevent overuse. This also hides disconnection figures.
- Self-disconnection.
- Water poverty.

This enhances efficiency for the operator, but in actuality, it hides the amount of disconnection.

Social access indicators should also be considered, such as the cost of connection, the levels of connection, disconnection rates for that area, installation of prepayment meters, and cost of low levels of connection

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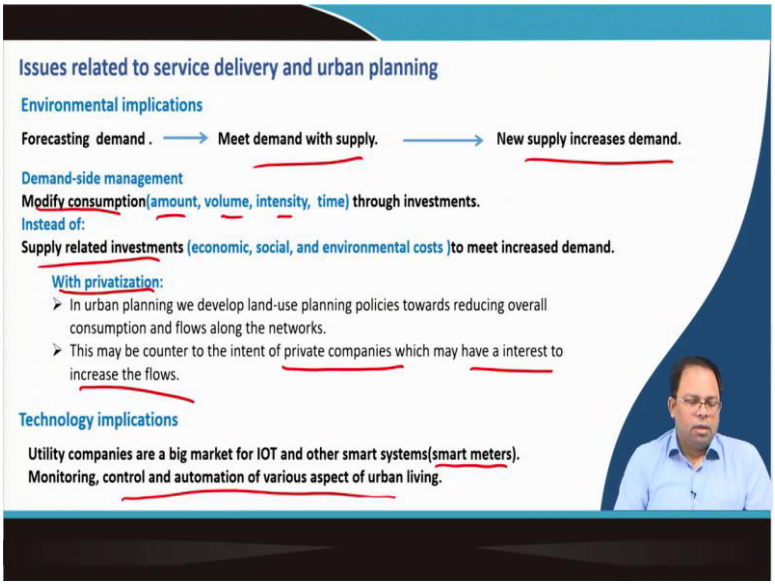

Environmental implications

Demand forecast and meeting the demand is necessary. However, new supply may increase demand. This affirms the need for demand-side management. Thus, it is necessary to modify consumption to reduce demand (amount, volume, intensity, time) through investments

instead of supply related investments (economic, social, and environmental costs) to meet increased demand.

With Privatization:

- In urban planning, we develop land-use planning policies towards reducing overall consumption and flows along the networks.
- This may counter the intent of private companies that may be interested in increasing the flows to enhance profit. Thus, it may turnsbecome unsustainable.

Technology implications - Utility companies are big market for IOT and other smart systems (smart meters)

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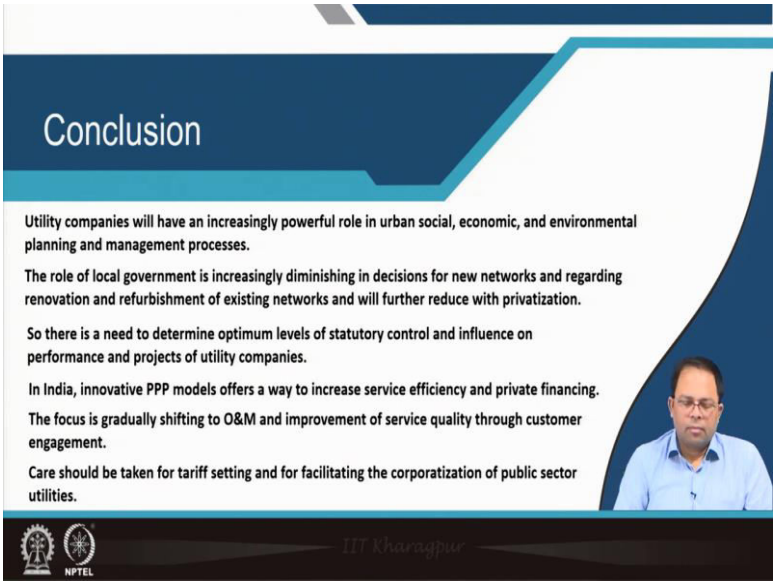

Conclusion

- Utility companies will have an increasingly powerful role in urban social, economic, and environmental planning and management processes.

- The role of local government is increasingly diminishing in decisions for new networks and regarding renovation and refurbishment of existing networks and will further reduce with privatization.

- There is a need to determine optimum levels of statutory control and influence on performance and projects of utility companies.

- In India, innovative PPP models offers a way to increase service efficiency and private financing.

- The focus is gradually shifting to O&M and improvement of service quality through customer engagement.

- Care should be taken for tariff setting and for facilitating the corporatization of public sector utilities.

References

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