

BUILDING FLOOD RESILIENCE THROUGH INTERLINKING OF LAKES

- THE CASE OF AHMEDABAD

CASE STUDY: COMPLEMENTARY REFERENCE MATERIAL | FOLDER - B

A Case Study conceptualized as part of the GIZ Sustainable Urban Development - Smart Cities (SUD-SC) initiative

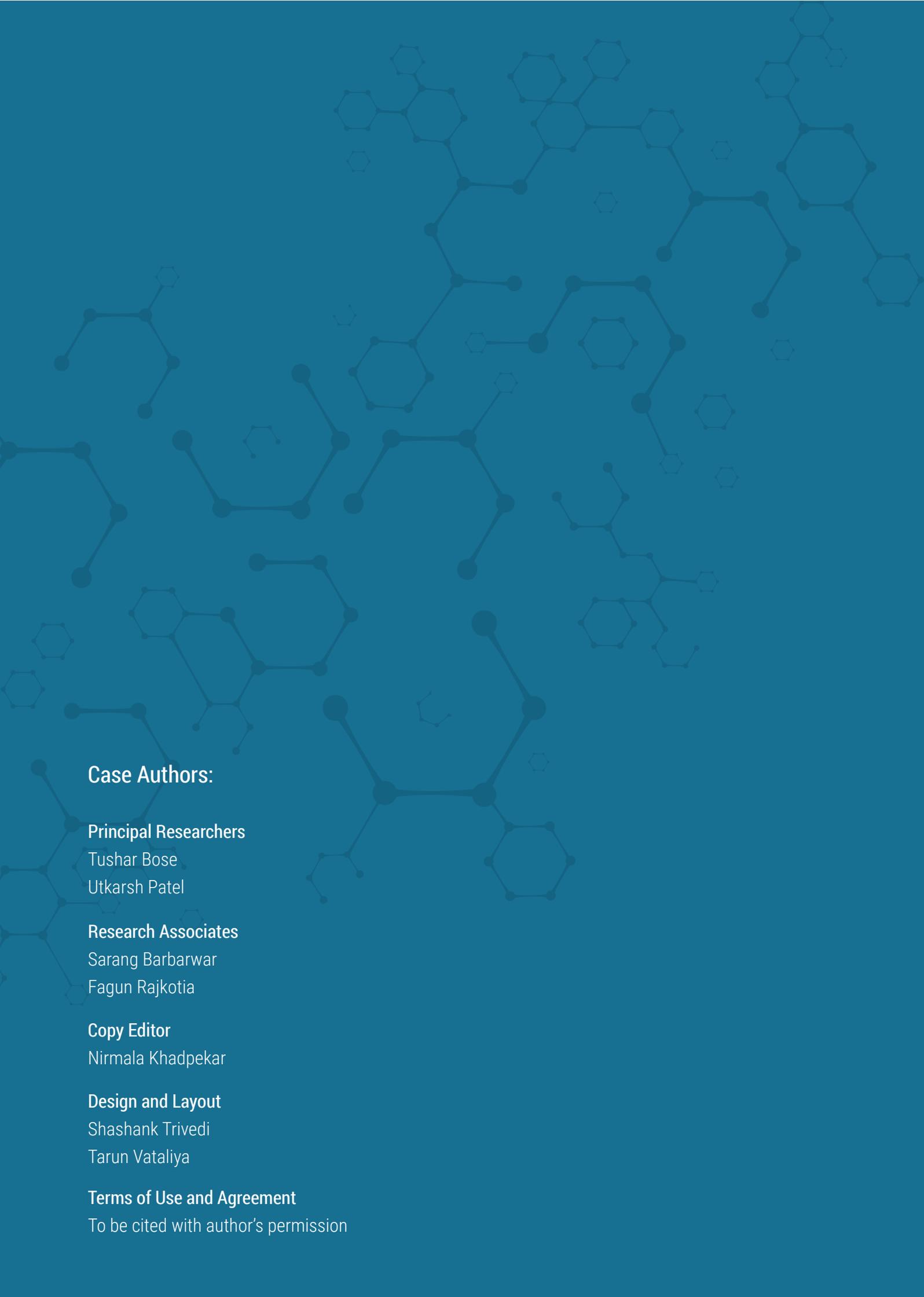


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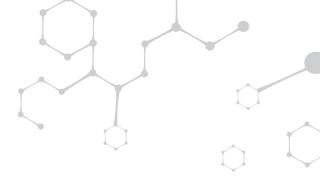
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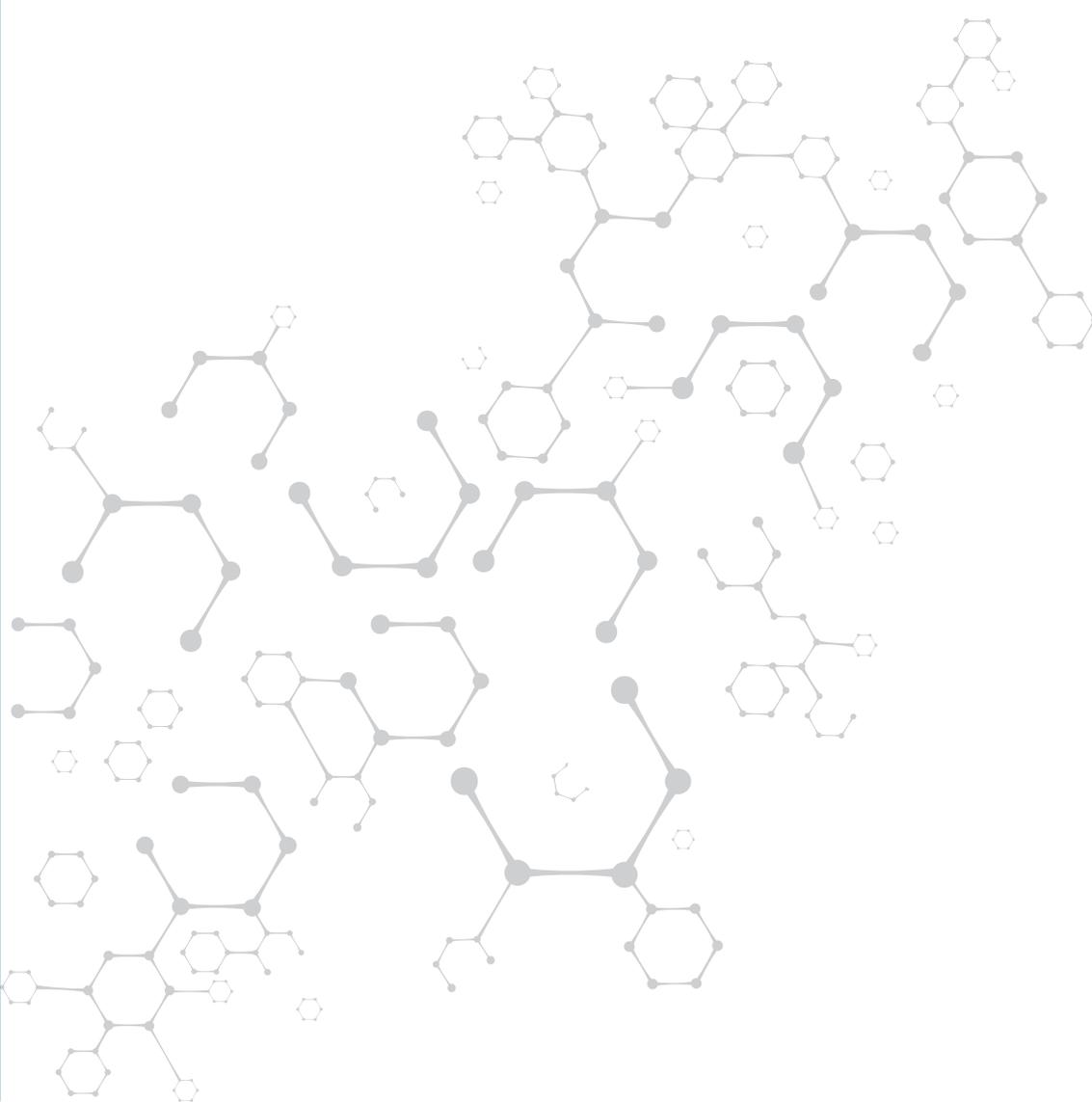


FOLDER-B

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LEGAL PROVISIONS FOR WATER RESOURCE MANAGEMENT

Central Level Legal Provision for Managing Water Resources

Since the early seventies, the Indian Government has felt the need for inclusive and integrated actions for environmental protection and improvement while emphasizing upon the sustainable use of natural resources for development (Induction Material for MoEF&CC, 2007). Since then, the central government has established several Acts to preserve, conserve and safeguard the natural water resources. The purpose of passing these Acts is to empower the central and state governments to take needed action to prevent degradation and improve the human environment, manage water resource consistently, and minimize adverse developmental impacts. Supported by recent legislative, administrative, and judicial initiatives, India's environmental regulations are becoming more comprehensive (IDFC, 2011). Refer to Figure 1 for the timeline of legal provision and schemes for protecting and conserving water bodies. Refer to Table 1 for the details on the statutory actions and the central government sponsor programs, and schemes to protect and conserve water bodies.

Institutional Provision for Water Resource Management in India

Currently, four different ministries, namely Ministry of Environment Forest & Climate Change- MoEF&CC (erstwhile Ministry of Environment & Forest - MoEF), Ministry of Water Resource (presently known as Department of Water Resource, River Development and Ganga Rejuvenation under Ministry of Jal Shakti), Ministry of Housing and Urban Affairs- MoHUA and Ministry of Rural Development- MoRD are involved in developing and implementing schemes and programs for conservation and rejuvenation of water resources. Typically, these programs are implemented in collaboration with the state governments. Under the Environment (Protection) Act, these ministries are empowered to protect and improve the environment by introducing policies, rules and regulations. Ministries are also entitled to develop a set of guidelines as an assisting tool for state governments and local governing bodies to achieve the long-term goal of safeguarding water resources, reducing the adverse impact of proposed development activities on the environment and contributing to achieving sustainable development. Refer to Table 1 for more details on the rules and programs designed and published by the ministries.

Statutory and Institutional Framework of Gujarat State for Managing Water Resources

Gujarat State has taken a multi-pronged approach to protect and safeguarding natural resources and the environment while mitigating climate change impacts. As described in table 2 & 3, Gujarat has evolved/introduced a multi-level statutory and institutional mechanism to tackle water resource management challenges and simultaneously promote sustainable development. Additionally, Gujarat has a well-evolved institutional and legal framework to tackle climate change and its impacts. Table 2 & 3 also presents the legislative and institutional arrangements supporting the development and implementation of the LRIL project. Refer Part-II for details on the institutional framework for Ahmedabad City and its agglomeration area.



Table 2: Sustainable Water Management in Cities- Experiences

Year	Name of ACT	Purpose	Features Related to Water Bodies
1927	Indian Forest Act	The Act was enacted primarily to protect and preserve the forest land and to levy charges on the forest produce (Ministry of Environment & Forests of India, 1927). The Act also aims to protect water bodies situated within the forest area. It empowers the state government to regulate forest within their jurisdiction through the State Forest Officer (SFO). Under the provision of the Act, SFO is entitled to regulate and maintain the water bodies. However, the Act only covers the water bodies that are situated within the forest area. Hence, SFOs are not authorized to take actions against the water bodies located outside the forests.	
1974 (Amended in 1988)	Water (Prevention and Control of Pollution) Act	By formulating the Water (Prevention and Control of Pollution) Act, the Indian Government took a step towards managing the quality of the water resources and preventing them from polluting by controlling and abating water pollution. The Act is aimed at controlling the discharge of sewage, industrial and trade effluents into water bodies (Government of India, 1974). Central and state pollution control boards were constituted according to the subject of this Act to manage water bodies' water quality and abate water pollution (Government of India, 1974). CPCB (Central Pollution Control Board) is a statutory organization under MoEF & CC that is responsible for planning and executing a nationwide program managing water quality of the water resources and abatement of water pollution (CPCB, 2014). In association with State Boards, CPCB conducts National Water Quality Monitoring Program-Quality according to Guidelines for Water Quality Monitoring, 2017 issued by MoEF&CC.	
1977 (Amended in 1991)	Water Cess Act	The Act provides for the levy and collection of a cess on water consumed by persons carrying on specific industries and local authorities and to augment the resources of the Central Board and the State Boards for the prevention and control of water pollution (Government of India, 1977). Anyone consuming water has to pay a certain amount in cess depending on the purpose of water usages (such as industry, domestic, etc.).	
1986	Environment (Protection) Act	This is an umbrella legislation that empowers the central government to protect and improve the environment (Government of India, 1986). Under the provision of the Act, the central government can take actions (such as making rules) to prevent, control and abate environmental pollution (Government of India, 1986).	
2005	Disaster Management Act	The Act's primary purpose is to provide for effective management of disasters and matters connected (Government of India, 2005). Effective disaster management means a continuous and integrated process of planning, organizing, coordinating and implementing measures for the prevention, mitigation and preparedness against the danger from the disasters (Government of India, 2005). The Act directs the constitutions of the Disaster Management Authority at the national, state and district levels. National Disaster Management Authority (NDMA) is the apex body for Disaster Management in India, and is responsible to lay down the policies, plans and guidelines for disaster management countrywide (NDMA, 2020). NDMA addresses the urban flood as a separate disaster and delinks them from the riverine floods. The authority has also prepared the National Guidelines for Urban Flooding, incorporating strategies to deal with them.	
	National Disaster Management Authority (NDMA)	Under the Disaster Management Act, National Disaster Management Authority was set up as the apex body for Disaster Management in India. NDMA is mandated to lay down the policies, plans and guidelines for disaster management countrywide. NDMA addresses the urban flood as separate disaster and delinks them from the riverine floods. This authority has also prepared the National Guidelines for Urban Flooding, incorporating strategies to deal with them.	

Year	Name Rules, Policy & Guidelines / Standards	Purpose	Features Related to Water Bodies
1987 (Review and updated in 2002 & 2012)	National Water Policy	The Ministry of Water Resource has formulated the National Water Policy to govern the planning and development of water resources and their optimum utilization (Ministry of Water Resources, 2011). While addressing the climate change aspect, the policy emphasizes: <ul style="list-style-type: none"> • Manage the flooding in an integrated manner • Provide an ecological buffer protecting environmentally sensitive areas • Encroachments and diversion of water bodies and drainage channels must not be allowed • Rehabilitation of natural drainage system. • Establish institutional framework for monitoring the water quality of each river basin. 	
1992	National Conservation Strategy and Policy Statement on Environment and Development	Ministry Environment & Forests Government of India has prepared the National Conservation and Policy Statement on Environment and Development to weave environmental considerations into the development process (Ministry Environment & Forests, 1992). The document contains suggestion and recommendation that should be adopted by the government for the conservation of natural resources while pursuing development. The strategy emphasizes on (Ministry Environment & Forests, 1992): <ul style="list-style-type: none"> • To carry out an environmental impact assessment (EIA) for specific projects and development • Research, development and adoption of environmentally compatible technologies • Protection of land surrounding water bodies • Conservation of wetlands for sustainable ecological and economic benefits • Classification, zoning and regulations for maintaining the quality of the water bodies to protect and enhance their capabilities to support the various designated uses (Ministry Environment & Forests, 1992). 	
2006	National Environment Policy	MoEF&CC has developed policy and EIA guidelines both to minimize the adverse impacts of rapid industrialization and development on the environment (Ministry of Environment & Forests, 2006; MoEF, 2006) (Ministry of Environment & Forests, 2006). The policy and guidelines are also aimed to achieve sustainable development through timely, adequate, corrective and protective mitigation measures (Ministry of Environment & Forests, 2006; MoEF, 2006). The policy identifies the projects requiring prior Environmental Clearance (EC) respectively from MoEF&CC or the concerned State Environmental Impact Assessment Authorities (SEIAAs) (MoEF, 2006).	
2010 Revise 2017	Wetland Conservation and Management Rules	MoEF&CC has notified Wetlands (Conservation and Management) Rules, 2017 as a regulatory framework for conservation and management of wetlands in India (MoEF&CC, 2017). The rules stipulate to constitute State Wetland Authority in every state and union territory (MoEF&CC, 2017). Under the Wetland Conservation Rules, all wetlands, irrespective of their location, size, ownership, biodiversity, or ecosystem services values, can be declared as Notified Wetlands. The rules have listed out the activities that are not allowed within the notified wetlands, and prohibit the conversion of wetlands for any other uses. However, the rules do not cover the management strategies for the urban small lakes/ tanks.	
2013	CPHEEO- Advisory of Conservation and Restoration of Water Bodies in Urban Areas	Central Public Health and Environmental Engineering Organization (CPHEEO) operates as a technical wing under the MoHUA (CPHEEO, 2021). The organization has prepared the advisory document for governments and planning practitioners to guide them to restore, conserve, manage and maintain the urban lakes as an inseparable part of the entire ecosystem (CPHEEO, 2013). The document addresses lake conversion, climate change, encroachment and the impact of urbanization on lakes. Inferences from the document (CPHEEO, 2013): <ul style="list-style-type: none"> • To conserve the urban water bodies, they must be notified in the municipal land use records as the municipal assets. The urban water bodies include urban lakes, stormwater drains, step-wells, trenches around old forts, wells, and artificial water bodies like ponds. • ULBs should take the lead in addressing the issues with the urban water bodies. Therefore, they are responsible for monitoring the water quality of the water body regularly. The document also suggests that the ULBs should prepare a clear vision of the lake regarding the rejuvenation of water bodies. • A State Level Advisory Committee and a Lake Conservation Authority at the state level should be established for robust water management in the state. • City development plans must consider the delineation and protection of catchment areas, feeder channels, and pond/ lakes and restore or protect them to the extent possible. Moreover, the urban water bodies should be designated as a separate land use classification that is legally tenable, and a storm water management plan should be prepared for each city (CPHEEO, 2013). 	
2014	URDPFI Guidelines	MoHUA has prepared the URDPFI guidelines to assist the administrators, planners, and planning practitioners in preparing and implementing the urban development plans. According to the guidelines considering climate change and its impact on development, Regional Plans and Development Plans must incorporate the possible impact of climate change on development (Ministry of Urban Development, 2014). While highlighting climate change and its adverse impact, the guidelines recommend the following consideration should be taken into account while formulating the plans: <ul style="list-style-type: none"> • The guidelines classify urban water bodies (lakes, ponds, and tanks) under the eco-sensitive zone to conserve and protect them from getting converted for urban development activities. The guidelines emphasise conducting environment suitability analysis by applying non-development buffer around water bodies while estimating land availability for any kind of urban development activities; however, the guidelines failed to specify the size of the buffer. • Analysis of the hydrological system concerning their catchment basins, and based on the analysis, the catchment areas should be conserved. 	
2015	AMRUT Guidelines (Atal Mission for Rejuvenation and Urban Transformation)	Mission aims (along with another aspect of water supply, sewage, stormwater drainage, urban transport and green spaces) rejuvenate urban water bodies specifically for drinking water supply and recharging groundwater (AMRUT, 2021).	
2019	Guidelines for Urban Water Conservation Jal Shakti Abhiyan	It is crucial to undertake conservation, restoration, recharge and reuse of water while addressing the water scarcity issues. In this pursuit, the Ministry of Jal Shakti has launched Jal Shakti Abhiyan (JSA) (Jainer, 2020). Following are the thrust areas of the Abhiyan: <ul style="list-style-type: none"> • i. Rain Water Harvesting (RWH), ii. Reuse of Treated Waste Water, iii. Rejuvenation of Water Bodies, iv. Plantation (Ministry of Jal Shakti, 2019) 	
2019	CPHEEO- Manual for Storm Water Drainage System	The manual is a guiding document in recommending effective measures in water conservation, protection from flooding, enhancing water security in urban areas.	

Year	Name of Program, Schemes & other	Features Related to Water Bodies
1982	Ramsar Convention on Wetlands (https://www.ramsar.org/)	By signing the Ramsar Convention Wetland treaty in 1982, India took a significantly important step to protect, conserve, rejuvenate wetlands, and achieve sustainable development. The treaty provides the framework for national action and international cooperation to conservation and wise use of wetlands and their resources (Ramsar, 2021). Under this intergovernmental treaty, a presently total of 42 wetlands of international importance are identified in India as Ramsar Sites, to be conserved through local and national actions and international cooperation (Ramsar, 2021). MoEF&CC is responsible for the management of Ramsar Sites in India (Ramsar, 2007). However, the convention includes only those wetlands that are eligible under the Ramsar Site Criteria, and typically, small lakes and water bodies are not eligible as Ramsar sites.
1985	Constitution of the Ministry of Environmental and Forest and Climate Change (erstwhile Ministry of Environmental and Forest) - MoEF&CC	The constitution of the Ministry aims to manage environmental issues comprehensively and integrated manner at the central level. It is a step towards conservation and protection of the environment and emphasises the sustainable use of natural resources for development purposes. MoEF&CC is a nodal agency in the administrative structure of the Central Government for the planning, promotion, coordination and overseeing the implementation of India's environmental and forestry policies and programs (MoEF&CC, 2021). The primary concerns of the Ministry are the implementation of policies and programs relating to the conservation of the country's natural resources, protection of the environment, afforestation and regeneration of degraded areas, ensuring the welfare of animals, and the prevention and abatement of pollution (MoEF&CC, 2021). Since the inception, the Ministry has introduced a policy, rules, programs, and guidelines to protect and restore water bodies and wetlands and minimise alarming development consequences.
1987	National Wetland Conservation Program (NWCP)	MoEF&CC has designed the NWCP program. The program is a milestone initiative towards preventing and conserving wetland. Since the land resources belong to the State Governments/UT Administration, they are responsible for managing the wetlands and implementing the NWCP to ensure their wise use (MoEF&CC, 2009). However, the minimum area requirement for identifying wetlands is 100 ha, unless it has some exceptional ecological or other significance; and the program does not cover small urban lakes and wetlands (MoEF&CC, 2009).
2001 (Revised in 2008)	National Lake Conservation Plan (NLCP)	It is a centrally sponsored scheme designed by MoEF&CC, exclusively aimed at restoring the water quality and ecology of the lakes in different parts of the country (MoEF&CC, 2008). The scheme's objective is to restore and conserve the urban and semi-urban lakes of the country degraded due to wastewater discharge into the lake through an integrated eco-system approach (MoEF&CC, 2008). Limitation- A minimum area for identification of lakes is 10 ha with a minimum of 3m of the depth
2005	Repair, Renovation and Restoration (RRR) of Water Bodies	The Ministry of Jal Shakti had launched the scheme for comprehensive improvement and restoration of water bodies and their catchment areas, groundwater recharge, and increased storage capacity of the water bodies linked to the agricultural activities (Ministry of Water Resources, 2017). <ul style="list-style-type: none"> Rs. 300 crores under the scheme was sanctioned in respect of 1,098 water bodies in 26 districts of 15 States with a target to create 0.78 lakh ha of additional irrigation potential (Ministry of Water Resources, 2017).
2006	Environmental Impact Assessment (EIA) Guidelines	In 2006, Environmental Impact Assessment (EIA) Guidelines were published (by the MoEF&CC) as a management tool to minimise the adverse impact of the activities and proposed development on the environment. The guidelines aim to minimise the adverse impacts of development projects, rapid industrialisation on the environment and reversing those trends, leading to climate change in the long run (Ministry of Environment & Forests, 2006a).
2008	National Action Plan on Climate Change (NAPCC) & National Water Mission	The Government of India launched NAPCC to address the issues related to the climate change. National Water Mission is developed under NAPCC to conserve water resources, minimise water wastage and equitable water distribution across the country and states (Ministry of Jal Shakti, 2021).
2015	Integrated Watershed Management Program (IWMP)	Department of Land Resources of the Ministry of Rural Development is responsible for implementing the Integrated Watershed Management Program (IWMP) (Ministry of Agriculture and Farmers Welfare, 2021). It is a multi-sectoral and multi-dimensional program to augment the source of water through rainwater harvesting. The program aims to restore ecological balance by harnessing, conserving and developing degraded natural resources such as soil, vegetative cover and water (Land, 2021). The department has prepared operational guidelines for the convergence of various programs with IWMP to achieve the program's aim.
2016	National Plan for Conservation of Aquatic Eco-systems (NPCA)	MoEF&CC has introduced the National Plan for Conservation of Aquatic Eco-System (NPCA) by merging the NLCP with the National Wetland Conservation Program (Initiated by the Ministry in 1985) for holistic conservation and restoration through an integrated and multidisciplinary approach. <ul style="list-style-type: none"> The principal objective of the NPCA is to have holistic conservation and restoration of lakes & wetlands for achieving desired water quality enhancement. Besides, the program aims to improve biodiversity and eco-system through an integrated and multidisciplinary approach with a common regulatory framework.

¹Ministry of Water Resource, River Development and Ganga Rejuvenation presently known as Department of Water Resource, River Development and Ganga Rejuvenation under Ministry of Jal Shakti, Government of India.

Table 2: Gujarat State Statutory Mechanism for Water Management - Protection and Conservation of Water bodies

POLICY		
Year	Name of ACT	Features Related to Water bodies & Park and Open Spaces
2002	Gujarat Disaster Management Policy	GSDMA has formulated the Gujarat Disaster Management Policy to establish systems, structure, programs, and resources for reducing disaster risks and preparing for and responding to disasters threats in the State of Gujarat. It has laid out the principles for disaster management in the state(GSDMA, 2002). Further, it clarifies the roles and responsibilities of all associated stakeholders for pre, during and post disaster occurrences. Moreover, it has established a coordination mechanism between GSDMA and other stakeholders for disaster management and to augment all the stakeholders' capacity.
2002	Gujarat Disaster Management Policy	GSDMA has formulated the Gujarat Disaster Management Policy to establish systems, structure, programs, and resources for reducing disaster risks and preparing for and responding to disasters threats in the State of Gujarat. It has laid out the principles for disaster management in the state (GSDMA, 2002). Further, it clarifies the roles and responsibilities of all associated stakeholders for pre, during and post-disaster occurrences. Moreover, it has established a coordination mechanism between GSDMA and other stakeholders for disaster management to augment all the stakeholders' capacity.
ACT		
1879 Amendments- 1976, 1977-80,81,86,89, 1993-95,97-2003 & 2017	The Bombay Land Revenue Code 1976- Bombay Land Revenue (Gujarat Amendment) Act	<p>Bombay Land Revenue (Gujarat Amendment) Act, 1976, was originally enacted in 1879 as The Bombay Land Revenue Code 1879. The Act has been judicious to consolidate and amend the law relating to revenue officers, assess and recover land revenue, and other matters connected with the Land Revenue Administration (Government of Gujarat, 1976).</p> <p>According to section 37 of the Act, all land that is not the property of specific landowners belongs to the government, by saying this: the bed of the sea, harbors, creeks, rivers, streams, nallas, lakes, and tanks, all canals, water-courses, all standing and flowing water and all lands wherever situated, which are not the property of individuals, are the property of the government. Further, it shall be lawful for the Collector to dispose of them in such manner as he may deem fit or authorized by general rules sanctioned by the government (Government of Gujarat, 1976).</p>
1963	Gujarat Municipalities Act	<p>The Act provides for the constitution of municipalities in the state and empowers them to manage municipal affairs (Government of Gujarat, 1963).</p> <ul style="list-style-type: none"> • According to section 5, every transitional area shall have a constituted Nagar Panchayat and a Municipality in every small urban area (Government of Gujarat, 1963). • According to the Act, construction and maintenance of drainage, water supply, and sewage network are the municipality's duties. <p>The Act empowers the municipalities to develop by-laws for securing, managing and protecting public parks, gardens and open spaces.</p>

ACT		
1976 (Amended in 1988)	Gujarat Town Planning And Urban Development Act (GTPUDA)	<p>An Act was passed to consolidate and amend the law relating to the making and execution of development plans and Town Planning Schemes (TPSs) in Gujarat.</p> <ul style="list-style-type: none"> An Urban Development Authority is empowered to prepare the Draft Development Plan (DP) under Section 9. It can publish the plan under section 13 once it is sanctioned by the State Government (GOG, 1976). <ul style="list-style-type: none"> As mentioned in the Act, the development plans shall incorporate proposals for preservation, conservation, and development of natural scenery, landscape, natural reserves (water bodies and watercourse), and sanctuaries. The Act empowers the authority to prepare one or more town planning schemes to implement the final development plan. <ul style="list-style-type: none"> Under section 40 (3-e & f), the authority can reserve land for public facilities such as open spaces, gardens, recreation grounds, and green belts to protect and conserve eco-sensitive areas. The schemes may also make provision for drainage, sewerage, surface or sub-soil drainage and sewage disposal (GOG, 1976). <p>According to the Area Development authority's power and functions described in Section 7 of the Act, the authority should carry out surveys to prepare development plans and town planning schemes; however, the Act does not include the required surveys. As the Act does not mandate the types of surveys required, the authority may solely determine the types of surveys to undertake for the DP and TPS preparation.</p>
1978	Gujarat Water Supply & Sewerage Board Act	<p>The Act aims to establish the Gujarat Water Supply and Sewerage Board (GWSSB) for the rapid development and proper regulation of water supply and sewage service in Gujarat (Government of Gujarat, 1978). The Board is responsible for preparing, executing, promoting, and financing the schemes related to water supply, sewage and sewage disposal.</p>
1999 Amended 2006	Gujarat Infrastructure Development Act	<p>The purpose of the Act is to give a legal framework and roadmap for Public Private Partnership for finance, construction, maintenance and operation of infrastructure projects (Government of Gujarat, 1999). Gujarat Infrastructure Development Board (GIDB) is a statutory organization of the Gujarat Government, constituted according to the provision of the Act to serve the Act's purpose (GIDB, 2021).</p> <p>According to the Schedule III of the Act, a person may submit the project proposal related to social services to the people, including community services and public utilities. For this, he/she may have a concession agreement with the government (Government of Gujarat, 1999).</p> <p>For this, he/she may have a concession agreement with the government (Government of Gujarat, 1999).</p>

ACT		
2003	Gujarat State Disaster Management Act	<p>The Act intends to provide structure for effective disaster management in Gujarat (Government of Gujarat, 2003). Under the provision of the Act, the Gujarat State Disaster Management Authority (GSDMA) was constituted for integrated and coordinated disaster management in the state. Further, the Act has laid out a framework for the authority to administrate disasters for both pre-and-post disaster occurrences. GSDMA is primarily responsible for promoting an inte-grated and coordinated disaster management system for preventing and mitigating disaster effects at the state, district, city, village and community levels. GSDMA's re-sponsibility is to prepare disaster management plans and strategies according to the guidelines prepared by the NDMA.</p>
2008	Metropolitan Planning Committee Act	<p>The Metropolitan Planning Committee Act of Gujarat administers the Metropolitan Planning Committee's con-stitution in every Metropolitan area to prepare the draft development plan for the Metropolitan Area (Government of Gujarat, 2008). Metropolitan Area means an area having a population of ten lakh or more, com-prised within one or more districts and several municipal-ities or panchayats or other contiguous areas, as specified by the government by public notification (Government of Gujarat, 2008).</p> <p>According to the functions stated in the Act, the commit-tee is responsible for preparing a draft development plan for the metropolitan area, incorporating common con-cerns and interests by both the municipalities and the panchayats. The purpose of the Act is to manage the development at the regional level and peri-urban areas.</p>
2008	District Planning Committee Act	<p>The Gujarat Government has enacted the District Plan-ning Committee Act to establish the District Planning Committee to consolidate the plans prepared by the pan-chayats and the municipalities in a draft development plan for the district (GoG, 2008). The Act empowers the committees to take action to protect and conserve the eco-sensitive areas in their district.</p>
2013 Amended in 2019	Irrigation and Drainage Act	<p>The state government enacted this Act to facilitate irriga-tion and drainage system in Gujarat. The Act empowers the state government to build canals and field channels for water supply and irrigation purposes (Government of Gujarat, 2013). It also enables the state government to draw and execute a scheme for drainage work for public health, protection from floods or other accumulation of water, and the improvement of proper cultivation or irri-gation purposes (Government of Gujarat, 2013).</p> <p>Further, the Act identifies rivers, lakes, ponds, natural drainage channels, and percolation wells as a canal (Government of Gujarat, 2013). So, when required, the state government can build percolation wells, drainage networks for public health and safety and protection of the environment.</p>
POLICY		
2014	Gujarat Irrigation and Drainage Rules	<p>According to the provision of the Gujarat Irrigation and Drainage Act, the Government of Gujarat has prepared the Gujarat Irrigation and Drainage Rules. The Rules will apply to all works related to the construction and mainte-nance of irrigation, drainage and water supply networks (Government of Gujarat, 2014). The rules have laid down the regulations and manner of construction and mainte-nance of field channels and water supply system.</p>

Table 3: Gujarat State Institutional Framework for Water Management and Supporting Preparation and Implementation of LRIL Projects

INSTITUTIONAL FRAMEWORK AT STATE LEVEL		
Govt. Department	Name of Gov. Agency/ Institution/ Board	Role and Responsibility
Climate Change Department		<ul style="list-style-type: none"> The department coordinates with the Government of India, the National Clean Development Mechanism (CDM) Authority, United Nations Framework Convention on Climate Change and other national and international agencies on the issues related to Climate Change (Climate Change Department, 2021). The department is responsible for evolving new strategies for environmental conservation concerning air, water and land, and undertakes actions required to mitigate and adapt to impacts of Climate Change (Climate Change Department, 2021). The department has prepared the Gujarat State Action Plan on Climate Change to build a sustainable and climate-resilient future for the people of Gujarat and enable a low carbon pathway for the state's economic growth (Climate Change Department, 2020). <ul style="list-style-type: none"> The Action Plan recommends developing a Comprehensive Drainage Master Plan for urban areas based on the background studies to manage water logging in the region. It also recommends that the plan shall include phasing of projects, operation and maintenance arrangement, and funding mechanism apart from the proposals and recommendation.
	Gujarat Energy Development Agency (GEDA)	<ul style="list-style-type: none"> Agency operates under the aegis of the Climate Change Department to provide advice and guidance on research and project development in the context of climate change (Climate Change Department, 2020). The agency promotes and encourages maximum utilization of clean technologies to boost the economy and develops new technologies for climate change adaptation and mitigation (Climate Change Department, 2020).
Commissionerate of Rural Development		<p>The department works towards having sustainable and inclusive growth of rural Gujarat through a multi-pronged strategy for the betterment of rural Gujarat (Rural Development, 2021).</p> <ul style="list-style-type: none"> Along with many other duties, the department is also responsible for improving water conservation by developing better drought-proofing methods in rural areas, constructing water harvesting structures, irrigation canals, soil and moisture conservation systems, and facilitating solid and liquid waste facilities. <p>The department facilitates the Pradhan Mantri Krushi Sinchayee Yojana (Designed by the Ministry of Agriculture & Farmer Welfare, Government of India). The Yojana's main objective is to have an integrated watershed development program to restore the ecological balance by harnessing, conserving and developing degraded natural resources such as soil, vegetative cover, and water (Ministry of Agriculture and Farmers Welfare, 2021) (Rural Dev, 2021).</p>

INSTITUTIONAL FRAMEWORK AT STATE LEVEL

Govt. Department	Name of Gov. Agency/ Institution/ Board	Role and Responsibility
Forests and Environment Department		<ul style="list-style-type: none"> The department was constituted under the Indian Forest Act. Protection, conservation and development of forest and wildlife are the department's prime responsibilities (Forests and Environment Department of Gujarat, 2021). The department aims to conserve and develop all the natural resources (including water bodies). It also aims to grow trees on a sustainable basis and increase tree cover outside the forest areas by planting the trees on low productive and non-productive lands (Forests and Environment Department of Gujarat, 2021).
Gujarat Revenue Department		<ul style="list-style-type: none"> The department is responsible for recording and maintaining information related to the land through 7/12 documents. Land records are being maintained for various purposes, including levy and collection of various taxes and land revenue (Revenue Dept., 2021). The 7/12 documents contain information related to survey number, existing land uses, landowner and land area. The department has digitized the 7/12 documents under the Computerization of Land Records Project (Revenue Dept., 2021). For Gujarat state, information related to land can be obtained from the AnyROR website by the department. The department is responsible for the allocation of government land for non-agricultural purpose. According to the Bombay Land Revenue Code concerning the revenue records, all water bodies in the states fall under the District Collector's ownership. A collector is the head of the revenue administration of the district. He is responsible for implementing provisions of various Acts in his District (Revenue Department, 2021).
Gujarat Road and Building Department		<ul style="list-style-type: none"> The department is in charge of all activities related to the planning, construction and maintenance of all government roads and buildings (RnB, 2021). The Parks & Gardens Office of the department maintains and develops new parks and gardens in Gandhinagar, Ahmedabad, Vadodara, Surat, Ahwa, Saputara and Dharampur (RnB Gujarat, 2021).
Narmada, Water Resource, Water Supply & Kalpsar Department		<ul style="list-style-type: none"> The department was established to administrate the water sector in the state. The department governs the domestic water supply, both in rural and urban areas. The department also administrates the implementation and operation of water schemes. It manages, develops, conserves, and protects water and related re-sources in an environmentally and economically sound manner (NWRWS, 2021). The department has prepared the draft Gujarat Water Policy 2015, which has not yet been published (NWRWS, 2015). Gujarat Engineering Research Institute (GERI) and Water and Land Management Institutes (WALMI) are state-level institutes established under the department. They are responsible for designing, construction and management of water re-sources and water supply service in the state. The department has launched the Water Harvesting Scheme for water conservation and to improve groundwater recharge. Under this scheme the department is deepening the water tanks to harvest and store maximum rainwater during mon-soon and also recharge groundwater. Besides, the department is also constructing the talavadis (small water tanks), check dams and bori bandhs in rural areas to recharge the underground water level supporting agricultural activities (NWRWS, 2021). The department is responsible for designing, developing, operating and maintaining the irrigation canal network in the state.

INSTITUTIONAL FRAMEWORK AT STATE LEVEL		
Govt. Department	Name of Gov. Agency/ Institution/ Board	Role and Responsibility
Urban Development & Urban Housing Department (UD&UHD)		<ul style="list-style-type: none"> The department evolves policies, regulations, programs and schemes related to urban development and urban housing to provide a better standard of living in ur-ban areas. The department monitors the implementation of projects under the JnNURM and the AMRUT Mission. Gujarat International Finance Tec-City (GIFT), Ahmedabad-Gandhinagar METRO, Sabarmati Riverfront Development, BRTS are this depart-ment-initiated projects (UD&UHD, 2021). For organized and timely development in the cities/ urban areas, the department's administrative structure has been divided into 11 institutes/ departments based on the functions and jurisdictions. Total 15 urban development authorities, eight municipal corporations, 156 municipalities, 10 area development authorities and district urban development agencies (DUDA) are working under the Urban Development & Urban Housing Department (UD&UHD, 2021).
	Town Planning and Valuation Department (TPVD)	<ul style="list-style-type: none"> TPVD is one of the 11 institutions/department that operates under the UD&UHD. Chief Town Planner (CTP) is the administrative authority of the department. The department's main objective is to secure balanced and planned development in the urban areas of Gujarat (TPVD, 2021). The department is involved in preparing policies, standards, and guidelines for urban & regional planning. It is also responsible for imparting technical support and assisting the state government in urban & regional planning and land valua-tion matters. The department is the sanctioning authority for the draft regional and develop-ment/ master plans and draft the Town Planning Scheme prepared by urban/area development authorities or Urban Local Bodies (ULBs).
	Commissioner of Municipalities Administration	<ul style="list-style-type: none"> The department is responsible for the allocation of government land for non-agricultural purpose. As per the Bombay Land Revenue Code concerning the revenue records, all water bodies in the states fall under the district collector's ownership. A collector is the head of the revenue administration of the district. He is responsible for implementing provisions of various Acts of his district (Revenue Department, 2021).
	Gujarat Urban Development Mission (GUDM)	<ul style="list-style-type: none"> GUDM is a state level nodal agency for the Jawaharlal Nehru National Urban Renewal Mission (JnNURM), AMRUT and Smart City Mission (UD&UHD, 2021). It is an implementing nodal agency for urban development schemes for water supply and underground drainage system as a part of Swarnim Jayanti Mukhya Mantri Shaheri Vikas Yojana (GUDM, 2021). It supports the Urban Local Bodies (ULBs) and communities in planning, building, operating, managing and maintaining projects under various sectors like BRTS, roads, overbridges, and other physical urban infrastructure. Physical urban infrastructure includes water supply, sewerage, solid waste management, drainage system, water bodies and rainwater harvesting system (GUDM, 2021).

INSTITUTIONAL FRAMEWORK AT STATE LEVEL		
Govt. Department	Name of Gov. Agency/ Institution/ Board	Role and Responsibility
Gujarat Revenue Department		<ul style="list-style-type: none"> The department is responsible for recording and maintaining information related to the land through 7/12 documents. Land records are being maintained for various purposes, including levy and collection of various taxes and land revenue (Revenue Dept., 2021). The 7/12 documents contain information related to survey number, existing land uses, landowner and land area. The department has digitized the 7/12 documents under the Computerization of Land Records Project (Revenue Dept., 2021). For Gujarat state, information related to land can be obtained from the AnyROR website by the department. The department is responsible for the allocation of government land for non-agricultural purpose. According to the Bombay Land Revenue Code concerning the revenue records, all water bodies in the state fall under the District Collector's ownership. A collector is the head of the revenue administration of the district. He is responsible for implementing provisions of various Acts in his District (Revenue Department, 2021).
Gujarat Road and Building Department		<ul style="list-style-type: none"> The department is in charge of all activities related to the planning, construction and maintenance of all government roads and buildings (RnB, 2021). The Parks & Gardens Office of the department maintains and develops new parks and gardens in Gandhinagar, Ahmedabad, Vadodara, Surat, Ahwa, Saputara and Dharampur (RnB Gujarat, 2021).
	Gujarat Industrial Development Corporation (GIDC)	<ul style="list-style-type: none"> The corporation administrates and regulates water supply and drainage for the industrial sector.
	Gujarat Municipal Finance Board	<ul style="list-style-type: none"> Gujarat Municipal Finance Board was established under the Gujarat Municipal Finance Board Act, 1979. The Board's primary responsibility is to provide grants and loans for basic and infrastructure facilities through various development schemes for ULBs (GMFB, 2021).
	Gujarat Pollution Control Board (GPCB)	<ul style="list-style-type: none"> According to the Water (Prevention and Control of Pollution) Act, the Government of Gujarat has constituted the GPCB to protect the environment and prevent and control water pollution in Gujarat (GPCB, 2021). Its primary functions include monitoring water and air quality, effluent analysis, inspections of effluent treatment plants, guidance to the industry and other agencies, and coordinating with local bodies and industries to implement various projects. The Board is responsible for monitoring the water quality of water bodies across the state.

INSTITUTIONAL FRAMEWORK AT STATE LEVEL		
Govt. Department	Name of Gov. Agency/ Institution/ Board	Role and Responsibility
	Gujarat State Disaster Management Authority (GSDMA)	<ul style="list-style-type: none"> • It is a state level nodal agency that plans, facilitates, coordinates, and monitors work for pre-disaster preparedness and mitigation activities, including training and capacity building of all the stakeholders involved in disaster management. It is also responsible for reconstruction and rehabilitation post-disaster (GSDMA, 2021). • It assists the state government in formulating the policy related to disaster management, and rehabilitation, reconstruction, and recovery post-disaster. • The authority may review draft development plans prepared by various authorities and recommends necessary measures to be incorporated for disaster management (Government of Gujarat, 2003). • Under the guidance of NDMA, the authority has prepared the State Disaster Management Plan 2016-17 (SDMP), which has been shared with all the concerned government departments and associated stakeholders for its implementation. The authority has also prepared district disaster management plans containing roles and functions of various stakeholders and mitigation measurements. • GSDMA has prepared a comprehensive Hazard Risk and Vulnerability Atlas (HRVA) for the state, covering six significant hazards: Earthquake, Tsunami, Flood, Cyclone, Drought, and Chemical and Industrial hazards. HRVA is a GIS platform based Atlas prepared for government and related agencies for disaster mitigation and management activities and land use planning (Gujarat State DMA, 2021).
	Gujarat State Watershed Management Agency (GSWMA)	<ul style="list-style-type: none"> • The agency works towards creating sustainable rural livelihoods in Gujarat through scientific and integrated watershed development (GSWMA, 2021). • GSWMA is a nodal agency for implementing the Integrated Watershed Management Program (IWMP) in Gujarat (GSWMA, 2021). For carrying out the implementation of IWMP, the District Watershed Development Units (DWDU) has been formed for all districts.
	Gujarat Water Infrastructure Limited (GWIL)	<ul style="list-style-type: none"> • GWIL is a government company formed for establishing a bulk water infrastructure project for the drinking water (bulk water pipe grid based on Narmada Water) across the state. • It ensures equitable and efficient distribution of drinking water to GWSSB, Nagarpalikas, Corporations and Industries.
	Gujarat Water Resource Development Corporation Ltd. (GWRDC)	<ul style="list-style-type: none"> • GWRDC functions under the Narmada Water Supply & Water Resources Department of the State (NWRWS, 2021). • It is an autonomous body, which is primarily responsible for the survey, assessment and planning of groundwater resources in the state. It is also responsible for planning and designing artificial recharge schemes. The department also manages drainage and drainage based irrigation within the catchment areas of major canal systems (GWRDC, 2021).

INSTITUTIONAL FRAMEWORK AT STATE LEVEL		
Govt. Department	Name of Gov. Agency/ Institution/ Board	Role and Responsibility
	Gujarat Water Supply and Sewerage Board (GWSSB)	<ul style="list-style-type: none"> This is an independent board that provides safe and adequate drinking water and manages sanitation services in Gujarat. It is responsible for ensuring drinking water and sanitation services throughout the states, except to the large cities administered by the Municipal Corporation. Other responsibilities (GWSSB, 2021): <ul style="list-style-type: none"> To plan and implement the drinking water supply and sanitation policy To implement water supply and sewerage schemes in rural areas and urban areas, except for municipal corporation areas. To coordinate the water and sanitation program with the Government of India.
	State Environment Impact Assessment Authority, Gujarat (SEIAA)	<ul style="list-style-type: none"> SEIAA is a Central Government Authority that has been constituted by the State Government but acts on behalf and reports to the MoEF&CC (Government of India, 2017). It is mandatory for the projects listed under the Schedule A and B of the Environment (Protection) Rules, 1986 to obtain Environmental Clearance (EC) certificate either from MoEF&CC or from the SEIAA before the construction/ development of the projects. SEIAA, Gujarat is responsible for assessing the environmental impacts of the large projects (like the Sardar Sarovar Project), making sure no adverse impacts on the environment, and suggesting the mitigation steps if necessary before releasing the EC certificate.
	Sardar Sarovar Narmada Nigam Ltd. (SSNNL)	<ul style="list-style-type: none"> It is a government organization established to implement the Sardar Sarovar Narmada Project - A large and multi-purpose water resource project designed to provide irrigation and drinking water for the drought-prone region and secure power supply. SSNNL is responsible for the operation and maintenance of the project. The organization is also responsible for bulk water supply for domestic and industrial purposes, both in the state's rural and urban areas.
	Water and Sanitation Management Organization (WASMO)	<ul style="list-style-type: none"> This organization was established for decentralized water supply management in rural Gujarat. It promotes, develops, and strengthens community participation for village water supply schemes.

INSTITUTIONAL FRAMEWORK AT DISTRICT LEVEL	
Name of the Department	Role and Responsibility
District Planning Board	<ul style="list-style-type: none"> Each district has its District Planning Board and is responsible for preparing prospective plans, five-year plans, and annual plans for its district. The Board reviews and evaluates district level schemes and facilitates the implementation. It also formulates schemes for the betterment of its district and administers fund for the schemes.
District Urban Development Agency (DUDA)	<ul style="list-style-type: none"> DUDA is a coordinating organization established to integrate & coordinate various urban development policies and schemes at the district level. The agency monitors and supervises urban development schemes at the district level and ensures effective and efficient utilization of allocated grants and resources for various urban development schemes.
District Watershed Development Units(DWDUs)	<ul style="list-style-type: none"> For carrying out the implementation of the IWMP on the ground, District Watershed Development Units (DWDU) at the district level have been formed under GSWMA. GSWMA is the decision-making authority regarding IWMP, while DWDU is the project implementation agency (PIA). There is a DWDU in each district of Gujarat, which is a subsidiary of the GSWMA and not an independent organization in itself (DWDU, 2021) (GSWMA, 2010).
Executive Planning Committee	<ul style="list-style-type: none"> The Executive Planning Committee has been formed to assist the District Planning Boards. The district collector chairs the committee. The committee scrutinizes each proposal submitted for funding. Further, it also examines whether the proposals comply with the guidelines issued by the state government or not before approving.
Taluka Planning Committee	<ul style="list-style-type: none"> The committee formulates and prioritizes proposals according to the needs of villages falling within its jurisdiction. It is responsible for monitoring the process of works being implementing in the taluka.

INSTITUTIONAL FRAMEWORK AT ULBS LEVEL	
Name of the Department	Role and Responsibility
Municipal Corporation	<ul style="list-style-type: none"> • Presently there are eight municipal corporations in the state, and all are operating under the Urban Development and Housing Department of Gujarat. • The corporations are headed by the state government appointed Municipal Commissioners. • Planning for economic and social development, regulating land-uses & building constructions according to the city-development plan, providing public health and safety, urban poverty alleviation, and building roads and other infrastructure are the responsibilities of the municipal corporations. Corporations are responsible for providing all essential services to their citizens, such as water supply, sanitation, solid waste management, transportation, fire service, which are some of the key services. <p>Corporations are also responsible for executing their development plans by preparing and implementing the town planning schemes.</p>
Municipalities/ Nagarpalikas	<ul style="list-style-type: none"> • Gujarat Municipalities Act, 1963 provides for the constitution of municipalities (Nagarpalika) for every small urban area in the state (Government of Gujarat, 1963). Under the provision of the Act, at present, there are 156 municipalities in Gujarat. All these municipalities function directly under the supervision of the Commissioner of Municipalities Administration Department. • Broadly, the municipalities are responsible for constructing and maintaining the water supply, sanitation, sewerage and drainage system, road network, and other essential services within their jurisdiction. It is their responsibility to ensure that all development in their jurisdiction is in accordance with the GDCR adopted by the state government (COMA, 2021).
Urban Development Authority and Area Development Authority	<ul style="list-style-type: none"> • Presently, Gujarat has 15 Urban Development Authorities and 10 Area Development Authorities (UD&UHD, 2021). • Under the GTPUD Act, these authorities are responsible for carrying out the preparation and implementation of development plans for their respective regions. • Authority's functions also include the preparation and implementation of town planning schemes for executing their development plans. • Authorities are also in charge of developing the infrastructure like road, sewerage, water supply and other basic civic amenities within their jurisdictions.



2

URBAN LOCAL BODIES (ULBS) FOR AHMEDABAD CITY AND ITS AGGLOMERATION AREA, GUJARAT

In the case of Ahmedabad, the city and its agglomeration area is governed by two LUBs - Ahmedabad Municipal Corporation (AMC) and Ahmedabad Urban Development Authority (AUDA).

At present, the Ahmedabad City's total area is 464.16 sq.km (AMC, 2021), with a 5,585,528 population (according to the 2011 census). AMC is the governing body for the city area, while AUDA is the administrative body for the city's agglomeration area.

Though both the governing bodies are empowered to prepare development plans for their jurisdictions, in 2012, AMC and AUDA jointly prepared their DP for 2021, covering both the jurisdictional areas. The primary purpose of the joint development plan is to have an integrated, robust and sustainable development in the city and its peripheral areas.

Ahmedabad Municipal Corporation (AMC)

The Ahmedabad Municipal Corporation, established in 1950 under the Bombay Provincial Corporation Act, 1949, is responsible for the civic infrastructure and administration of Ahmedabad (AMC, 2021). A Municipal Commissioner is the administrative head of the AMC. For smooth administration, the city is divided into six zones - central, north, east, south, west, southwest, and northwest. Further, each zone is split into wards - a total of 48 wards.

According to section 63 and 66 of the Bombay Provincial Municipal Corporation Act, the AMC is responsible for certain obligatory and discretionary services (AMC, 2021).

The AMC has undertaken several innovative initiatives for better governance, including issuing municipal bonds (AMC, 2021). The corporation successfully raises funds by issuing municipal bonds to finance development projects within its jurisdiction. This has been made possible by AMC's sound financial management, which has resulted in a healthy revenue surplus in recent years (AMC, 2021).

Table D-1: Institutional Framework of Ahmedabad Municipal Corporation

AHMEDABAD MUNICIPAL CORPORATION	
For easy governance, the roles and responsibilities of the AMC are distributed in several departments.	
AMC Departments (related to water management and SUI projects)	Role and Responsibilities
Central Laboratory, Engineering Department, (Under Environmental Services)	<ul style="list-style-type: none"> The laboratory is engaged in checking the water quality of the drinking water, industrial wastewater quality and sewage quality monitoring. The laboratory also monitors the River Sabarmati and various lakes of Ahmedabad city for water quality and environmental safety purposes (Central Laboratory, 2021).
City Planning Department	<ul style="list-style-type: none"> The department is responsible for the preparation and implementation of town planning schemes. It is also involved in updating the city development plan in association with AUDA.
Drainage Department (Environmental Services)	<ul style="list-style-type: none"> The department is responsible for setting up and maintaining new sewerage treatment plants, sewage pumping stations and stormwater pumping stations (AMC Departments, 2021). Development of stormwater drainage networks and maintenance of the stormwater and drainage trunk lines are the department's responsibility.
Garden Department	<ul style="list-style-type: none"> The corporation has initiated several measures to increase the green cover to make the city green and beautiful (AMC Departments, 2021). The department primarily works towards improving the city environment by greening the city with the roadside plantation, developing new parks and gardens, improving the existing parks and gardens, and developing urban forestry (AMC Departments, 2021). Maintenance of the existing parks and gardens, and improving the lake surroundings are also the department's responsibilities.
Housing and Slum Networking Project Department (Urban Poor & Housing)	<ul style="list-style-type: none"> The department is working on the rehabilitation and redevelopment of slum dwellers and responsible for constructing houses for the urban poor (under various rehabilitation and housing schemes) and improving the livelihood of slum dwellers and the urban poor (AMC Departments, 2021).
Solid Waste Management (Under Environmental Services)	<ul style="list-style-type: none"> The department is responsible for collections, transportation, treatment, and disposal of solid waste according to the Solid Waste (Management & Handling) Rules 2016. Door to door collection, street sweeping, conducting information, education and communication activities for awareness among the citizen are also the responsibilities of the department (Corporation, 2009). AMC has prepared Public Health Bye-laws (PHBL) for effective enforcement and maintaining discipline (AMC, 2015), sanctioned by the Government of Gujarat and Notified in the Government Gazette.

² Obligatory services include drainage, fire, health & medical, streetlights, water supply, sanitation, maintenance of monuments and open spaces and primary education services.

³ Discretionary services include tree plantation, construction and maintenance of public parks and gardens and factory for the disposal of sewage, destruction culling of animals and birds causing a nuisance, and many other discretionary services for public health and safety and smooth functioning of the city.

AHMEDABAD MUNICIPAL CORPORATION

Town Development Department (Town Planning Services)	<ul style="list-style-type: none"> • Granting building permission for new construction and alteration of the existing building according to the GDCR (General Development Control Regulations) is the department's primary responsibilities. In addition, permission for amalgamation and subdivision of land is the responsibility of this department.
Water Operation (Electrical & Mechanical, Under Environmental Services)	<ul style="list-style-type: none"> • The department administers the operation and maintenance of different water distribution stations and bore wells located in various parts of the city.
Water Project Department - (Environmental Services)	<ul style="list-style-type: none"> • The department liaisons with the State Government to get the required quantity of raw water from the Narmada Main Canal, Dholka Branch Canal and Shedhi Branch Canal (AMC Departments, 2021). Later the raw water is treated and converted to potable water according to CPHEEO norms (AMC Departments, 2021).

Ahmedabad Urban Development Authority (AUDA)

Ahmedabad Urban Development Authority (AUDA) was established in 1978 by the Gujarat Government to facilitate planned sustainable development in the area falling outside the AMC area (AUDA, 2021). The Ahmedabad Urban Development Authority (AUDA) region covers total of 1,866 sq.km, comprising areas of the surrounding five districts.

The authority's primary functions include preparing the Development Plans for the Ahmedabad Urban Agglomeration, and preparing and implementing the Town Planning Schemes. AUDA is also responsible for monitoring and controlling development activities in accordance with the Development Plan. Besides, the authority is also in charge of developing the infrastructure like road, sewerage, water supply and other basic civic amenities within its jurisdiction (AUDA, 2020). Besides, the authority regulates the private development in accordance with the development plan proposals.

Although AUDA's role is limited to undertaking planning and infrastructure development, the authority also provides solid waste management facilities and maintains roads.

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what are these double colons in UD&UHD line above?



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