

## **SUSTAINABLE DEVELOPMENT OF URBAN WATERBODIES USING ESPA APPROACH: A CASE FROM AHMEDABAD, INDIA**

**<sup>1</sup>NEERU BANSAL & <sup>2</sup>MADHU BHARTI**

<sup>1</sup>Associate Professor, Faculty of Planning & Public Policy, CEPT University, Gujarat, India

<sup>2</sup>Professor, Faculty of Planning & Public Policy, CEPT University, Gujarat, India

### **ABSTRACT**

The proportion of world population living in cities has surpassed rural population. Cities are therefore facing major challenges in maintaining and restoring the environmental ecology on which they depend for their functioning and at the same time provide equitable access to natural and manmade resources to all city dwellers. Waterbodies significantly improve the quality of life in urban areas as they have an intrinsic aesthetic and recreational value. However, unplanned and unregulated urbanization has led to large scale degradation of quality and quantity of waterbodies. Communities/Governments over time have tried to find out innovative approaches for development and management of these waterbodies. Ahmedabad, the seventh largest city in India, the largest city in Gujarat and its commercial capital is dotted with a large number of waterbodies of varying sizes. Currently as per records of local body, 48 waterbodies exist within the city limits. This paper presents some of our recent work taken up under the programme “Supporting Urban Sustainability”- a collaborative programme supported by SIDA and SWEDES. The aim of the project is to suggest an alternative model for development of waterbodies that can conserve the ecosystem, help alleviate poverty and contribute to strong sustainability in urban setting. ESPA seeks to tie together various requirements with reference to social and environmental issues in a holistic manner, recognizing the interdependence between human beings and nature.

**KEYWORDS:** Ecosystem Services, Poverty Alleviation, Sustainability, Urbanization, Waterbodies

### **INTRODUCTION**

The proportion of world population living in cities has surpassed the rural population as percentage of people living in urban areas in 2011 was 52.1% (UN: World Urbanization Prospects, 2012). Cities are therefore, facing major challenges in maintaining and restoring the environmental ecology on which they depend for their functioning and at the same time provide equitable access to natural and manmade resources to all city dwellers. Historically villages and cities have developed around the waterbodies, with the people having high level of dependence on them for livelihood, food, fodder, recreation etc. Waterbodies significantly improve the quality of life in urban areas as they have an intrinsic aesthetic and recreational value. Apart from human beings, there is an array of other living and non living communities interacting in and around the waterbodies leading to development of micro and macro ecosystems. The unplanned and unregulated urbanisation has led to large scale degradation of quality and quantity in the waterbodies. (Ramchandra, 2001)

Communities/Governments over time have tried to find out innovative approaches for development and management of waterbodies. The Ministry of Environment and Forest (MOEF), Government of India, has formulated a National Lake Conservation Plan (NLCP) since June 2001. The objective of the scheme is to restore and conserve the urban and semi-urban waterbodies and other unique freshwater eco systems of the country degraded due to waste water discharge through an integrated ecosystem approach. The activities covered under NLCP are also defined which are of

physical development in nature like diverting the sewage discharge, solid waste management, waterbody cleaning, strengthening of bund etc (NLCP 2001). NLCP does not address the issue of dependency of neighbouring communities on the waterbody for their livelihood. One of the early and large waterbody related development project in Indian context was the “Integrated Waterbody Conservation Programme” taken up by Government of Madhya Pradesh (M.P.) (1995-2004), funded by Japan Bank of International Corporation (JBIC). The project activities focused on preventive and curative measures for increasing the water storage capacity, water quality improvement, catchment area protection (Mukharjee, 1999). Unfortunately in the development of the project; poverty alleviation was not a priority area. In the Indian context, a number of Public Interest Litigations (PIL) have been filed in various High Courts (HC), requesting the courts to intervene for redevelopment, conservation, management of the waterbodies. The local Governments have responded by taking up redevelopment of the waterbodies and the surrounding areas. Most of this development is specifically for regulating by physical development processes so as to redevelop the waterbodies for recreation purpose ignoring the other possible relationships and dependencies that residents may have with the waterbody.

The recent initiatives by United Nations Environment Programme (UNEP) have developed alternative models for environmental sustenance of ecosystems whereby it is proposed to integrate the physical development of waterbodies with the communities living around the waterbody. Ecosystem is described by United Nations Environment Programme (UNEP) / Institute for International Economic Policy (IIEP) - 2004 and Millennium Ecosystem Assessment - 2003, as the life blood of human societies, economies and identities around the world. The range of services provided by ecosystems are categorized into provisioning - food, fiber, fuel etc, regulating - purification, detoxification, mitigation of drought, floods and other natural hazards, cultural – aesthetic values attached to ecosystem, embracing spiritual enrichment etc and supporting services that enable provision of the services in the above 3 categories. E.g. soil formation, nutrient recycling, growth, primary production, etc.

The Ecosystem Services Approaches to Poverty Alleviation (ESPA) proposes to address the comprehensive needs of the communities with reference to their dependence on waterbodies. ESPA seeks to tie together various requirements with reference to social and environmental issues in a holistic manner, recognizing the interdependence between human beings and nature.

This paper presents part of our recent work taken up under the programme “Supporting Urban Sustainability”- a collaborative programme supported by Swiss International Development Agency (SIDA) and Swedish International Centre of Education for Sustainable Development (SWEDES). The aim of the programme is to suggest an alternative model for development of waterbodies using ESPA approach that can conserve the ecosystem, help alleviate poverty and contribute to strong sustainability in urban setting. This also intends to address other issues of shelter, sanitation, livelihood and possibility of management of the developed urban assets by the local community. The SUS programme was introduced in six cities - (i) Ahmedabad, India (ii) Arusha, Tanzania (iii) Dhaka, Bangladesh (iv) Makana/Grahamstown, South Africa (v) Malmö, Sweden (vi) Mangaung/Bloemfontein, South Africa.

The Ahmedabad team consisted of professionals from the Ahmedabad Municipal Corporation (AMC), the urban local body responsible for city governance; Centre for Environment Education (CEE) working in the field of environment education; CEPT University, an academic institution; Environmental Planning Cooperative (EPC), a consultancy organization in the field of urban planning, policy research and advocacy and Self Employed Women Association (SEWA), an organization supporting self-reliance and full employment for women. The team was steered by the facilitator from CEE.

The paper is organized in 8 sections. After presenting a brief introduction in section 1, the methodology is described in section 2. The Ahmedabad city details are outlined in section 3. Section 4 talks about waterbodies in Ahmedabad and their status. This is followed by selection of study area in Section 5. Section 6 discusses in detail the case of Saijpur and its waterbody. The redevelopment plan for Saijpur waterbody is discussed in section 7 followed by conclusions in section 8.

## **METHODOLOGY**

The proposed redevelopment plan of the waterbody using ESPA approach has evolved using three approaches:

### **Case Study Reviews**

Since 2004 Ahmedabad has witnessed programmes for restoration of waterbodies in and around the city. A number of such projects taken up by Ahmedabad Urban Development Authority (AUDA) and Ahmedabad Municipal Corporation (AMC) have been completed. The case studies revealed that project interventions have been mainly in areas of physical development, having regulating requirements (mitigation of floods, improvement of water quality, rehabilitation of slum residents etc). This process helped to identify the missing links between the “programme of restoration of waterbodies in Ahmedabad” and Ecosystem Services approaches to Poverty Alleviation (ESPA) as outlined by UNEP.

### **Interviews & Focus Group Discussions**

Specific interviews were conducted with the decision makers so as to be able to understand the possibilities and limitations of local bodies. Focus group discussions (FGDs) were conducted at site among the residents living around the waterbody. Nearly 150 women from 6 residential clusters having a combined population of 40000 participated in the Focused Group Discussions (FGDs). These women were in the age group: 22yrs – 50yrs. The key stakeholders like the community representative, senior citizens, mothers with young kids, women carrying out livelihood activities around the waterbody also took part in the FGD's. A number of women from the localities are also members of the local NGO i.e. Self Employed Women Association (SEWA). These women tend to be more vocal and assertive of their expectations in the process of development of waterbody. The discussions reflected on the existing and proposed use of ecosystem and necessary policy interventions required for development and maintenance of the waterbody for poverty alleviation.

### **Site Observations**

A number of visits to the waterbody were carried out to observe and comprehend the activities that are carried out by the residents, having an impact on the waterbody. The land around the waterbodies is used for diverse activities like recreation, garbage dumping, processing of products for marketing etc. Water quality test were carried out to get a fair idea about the quality of water in the waterbody specifically with reference to Bio Chemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), fecal contamination. With the help of satellite images (year 2005) and (Year 2010), it was possible to understand how the waterbody has been shrinking. A study of the ground water levels at city level was carried out from secondary sources to understand how these levels have been depleting over time.

## **AHMEDABAD CITY**

Ahmedabad, located in western India is the seventh largest city in the country. It is the largest city in Gujarat State and is also its commercial capital. The city of 466 sqkm is divided by river Sabarmati into eastern and western parts. The eastern Ahmedabad has emerged as low income residential area due to proximity of various industrial units. The Ahmedabad Municipal Corporation is responsible for providing civic needs and amenities to the population living within

its jurisdiction. As per Census 2011, the city has a population of 5.57 million. As per a study carried out by CEPT University in 2003-2004, about 35% of the city population lives in slums (CEPT University 2003-2004). The city falls in dry and arid climatic zone and has sandy soil. The mean temperature ranges from 41.30C in summer to 26.30C in winter.

The city receives an average rainfall of 782 mm. The city has very few open spaces and green spaces. The open green space available is 0.37sq.m area per person against a specified standard of 8-10sq.m per person (City Development Plan, Ahmedabad 2006). The city, though relatively flat, is dotted with a number of waterbodies holding rainwater.

### **STATUS OF WATER BODIES IN CITY**

In Ahmedabad, the numbers of waterbodies have reduced from 200-210 in 1960 to 81 in 2002 (Dhulia, Dimpy. 2003). Out of these, 48 currently exist in AMC area. Most of the waterbodies in AMC area are shallow with depth less than 3m. As the city lies in hot and arid zone, these waterbodies dry up prior to arrival of monsoon.

Often the migrants and poor income households who are not able to afford any other kind of shelter in the city tend to settle down on the land surrounding the waterbody. Many slums in Ahmedabad are located around these waterbodies. These settlements often have poor sanitation and infrastructural provisions, which leads to further deterioration of the waterbodies. Many of these are being used for disposal of sewage, dumping of solid waste and for open defecation in the surroundings leading to deterioration of water quality. These people being a part of the vote bank, the city government finds itself unable to remove the encroachments.

Dense building construction and road construction activity leads to disruption in the natural drainage pattern and reduced amount of surface runoff reaching the waterbodies. With time this results in diminishing of size of the waterbodies. The loss of green cover leads to increase in silt reaching the waterbodies, reducing their effective depth.

Fortunately, this situation is beginning to change. A ruling by Gujarat High Court dated 02/08/2002 on a group of Public Interest Petitions demanding revival of the waterbodies had directed the State Government, all Area Development Authorities and Local Bodies to protect, maintain and preserve all the waterbodies in the State. In the past decade, many waterbodies have been retained even as the city has grown around them. Presently, there are a number of waterbody development projects that are ongoing. The AMC and Ahmedabad Urban Development Authority (AUDA) have begun developing waterbodies in and around Ahmedabad with an “integrated approach” since 2004. Under this approach, it is proposed to undertake works for revival, catchment area development and beautification of the waterbodies. However, this approach did not propose to address the poverty alleviation issues.

### **SELECTION OF STUDY AREA**

While looking at the issue of selecting a waterbody for detailed study in Ahmedabad using the ESPA approach, the following selection criteria was followed:

- It should be a perennial waterbody.
- There should be slums/squatter settlements around the waterbody.
- The location of the waterbody should be within urban activity zone.

Based on the above selection criteria, Saijpur waterbody was selected for a detailed study.

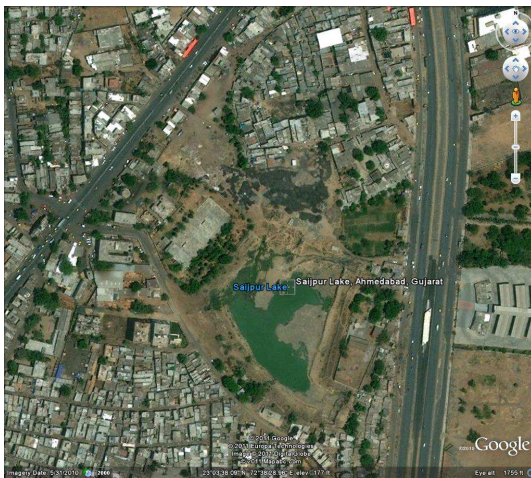
### **SAIJPUR – A CASE STUDY**

Saijpur waterbody is located in Saijpur Bogha ward (administrative unit) of Ahmedabad in North-eastern part of the city, in a predominantly residential area. It is flanked by Naroda Road on the west and National Highway No.8 on the

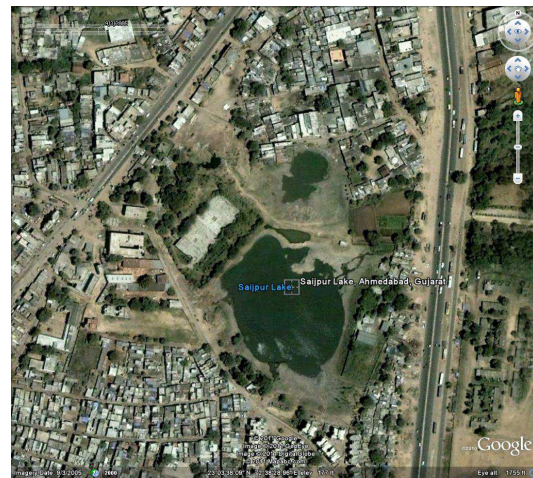
east. This waterbody is rain fed, with an approximate area of 41000 sqm. Saijpur Bogha ward is predominated by low income households, working in the industrial units in the vicinity. Through the detailed study at Saijpur waterbody; a number of issues were identified which needs to be addressed during the redevelopment of the waterbody. These issues can be broadly classified into the following:

### Environmental Degradation

The water quality test carried out by AMC for Saijpur waterbody shows that the quality of water was highly degraded with bio- chemical oxygen demand (BOD) as high as 45 mg/l, chemical oxygen demand (COD) as 187.49 mg/l and fecal coliform as 900 MPN/100ml. The efforts of AMC to introduce aquatic life in the waterbody a few years back have failed. As the water quality was extremely poor, no biodiversity was found. From comparison of Google images of March 2005 and May 2011, it was observed that the size of the waterbody in 2011 was approximately less than half its size in 2005. The reason was encroachment by informal settlements and decrease in surface runoff reaching the waterbody due to construction and other physical developments in the neighbourhood, thus blocking the water flow. During site visits by Ahmedabad team, it was observed that the banks of the waterbody were steep and eroded. There is no physical boundary to define the waterbody and its surrounding. The surroundings of the waterbody were being used for open defecation by the surrounding residents.



**Fig. 1: Saijpur Waterbody: Google Image May 2011**



**Fig. 2: Saijpur Waterbody: Google Image March 2005**

### Social Amenities

The local area lacks the presence of green areas, recreational areas and children play areas. There is no community space where elders of the community can interact. Other social amenities like anganvadi, public library etc is not present in the vicinity. The FGDs with the surrounding population revealed that people expect that redevelopment plan of the waterbody would incorporate the development of social amenities.

### Livelihood Issues

The area surrounding the waterbody is of low income group. The FGDs revealed that the men are mainly employed in the nearby industries as casual workers. Some of the women work as domestic help and some as street vendors. A few are engaged in home based activities like embroidery work, tailoring work etc. Most of the households do not have permanent source of employment.

The livelihood of these workers is not sustainable and often seasonal. Elders in the surrounding communities do not have any livelihood options as they cannot commute long distance. Currently, the surrounding communities are not dependent upon waterbody for their livelihood.

## **REDEVELOPMENT OF WATERBODY**

Many groups had a stake in the redevelopment of the waterbody. The community living around the waterbody, the Ahmedabad Municipal Corporation (AMC), the local urban body responsible for providing civic needs and amenities to the population living within its jurisdiction, the architecture agency hired by the local body for preparing the design for development of the waterbody, the NGOs (like SEWA) who are working in the area for economic development of the women in the area, the SUS team who wanted to build ESPA component in the waterbody redevelopment plan.

Based on the understanding of the waterbody, neighbourhood area, ward and the city; the Ahmedabad team under the SUS programme proposed a set of interventions required. It is suggested that the waterbody is not seen in isolation but in the larger context of the land- use and activities around the waterbody. There is a large section of urban poor population who are residing on the periphery of the waterbody. The waterbody redevelopment proposal has to be relevant to the local context and the population living around it. These interventions can be grouped in four major heads i.e. Physical interventions, Social development, Livelihood aspects and Operation and management, required. Each of these aspects cannot be treated as a separate compartment but are closely integrated with each other.

### **Physical Development**

The depth of the existing waterbody is shallow. It therefore requires desilting. The soil so removed can be used in the landscaping. Ahmedabad being a water scarce region, it is very critical that the rain water is not allowed to run off and is drained into the waterbody. It is therefore suggested that storm water from nearby areas be diverted to it. This will help in maintaining water levels and will also help in recharge of groundwater by constructing recharge well in the bottom of the waterbody. To ensure that quality of water is maintained, it is necessary to ensure that the sewerage and waste water from the surrounding housing societies/ slums and hutments, do not flow to the waterbody. For this, sufficient precautions by AMC and a comprehensive sewerage network plan needs to be taken up.

Large numbers of hutments are located near the waterbody surrounding it. It is suggested that re-development be taken up without any adverse effect on the local population. Efforts to be made to enlarge the scope of the project where in-situ housing up-gradation including water and sanitation infrastructure, or resettlement of the effected households is taken up. In view of the neighbourhood and the residential areas surrounding the waterbody, it is essential that sufficient public amenities in the form of public toilets and bath complexes need to come up. This needs to be developed immediately as high level of open defecation was observed at the site. It is suggested that the sanitation blocks be so designed such that separate entrances are provided for local residents and visitors.

Since the neighbourhood lacks presence of open green areas, it is suggested that walking track around the waterbody be developed. After redevelopment, the lake is likely to have many visitors. Parking requirements need to be addressed at the design stage itself. The parking spaces can have multiple uses e.g. a weekly informal market can be integrated into the way the space use is planned.

### **Ecological Development**

Several species of flora and fauna need to be introduced in the waterbody and the surrounding area, this would help in generation of aquatic life in the waterbody. Use of hardy native vegetation would minimize watering requirements, especially in the dry season. In the shallow areas of the waterbody emergent plants such as native species of typha or cat-

tails would promote biodiversity and assist in supporting the aquatic ecosystem. The waterbody-side has a number of local trees growing which should be retained/ protected. Newer plants added should be indigenous; those that could attract water birds to nest, fruit trees that could attract a variety of birds, insects and small animals. Plantation of trees conducive to the local environment, having good canopy, durability should be taken up. Instead of having the entire waterbody bound by a hard edge, the parts where a green area is being envisaged can be developed as a soft edge or a green embankment by planting grasses such as Dharu which will bind the soil and prevent any erosion. Ground cover plant species could also be an alternative for softer embankments.

### **Social Development**

The waterbody is surrounded by number of slum hutments and poor income households. During the FGD's local residents expressed their great need for social infrastructure. It is suggested that through the redevelopment of the waterbody, sufficient social development measures which can have a direct social impact on the local residents be taken up. It is therefore, suggested that a library cum reading room be developed at site. As the local area lacks sufficient space for children to play, it is suggested that development of a proper playground for the children with play equipments be taken up as part of the waterbody development. In view of lack of places for senior citizens for interaction, it is suggested to develop integrated community areas. The existing temple complex needs to be developed in a manner that the space around temple is accessible to all the local residents and the temple continues to functions as focal point of local social activities.

### **Livelihood Aspects**

The local residents residing in hutments and slums are having low incomes. It is necessary that the waterbody redevelopment plan addresses income generating activities for the surrounding urban poor. Convergence of the physical development with the livelihood aspects specially the operation and maintenance of the waterbody and the garden areas, maintenance of the fruit bearing trees, maintenance of social amenities is essential. It is proposed that the maintenance of the waterbody and the surroundings can be taken up by the resident community through Community Based Organisations (CBO's). This is likely to yield better results and increase the ownership of waterbody by the surrounding communities. Lot of economic activities in the neighbourhood is informal in nature taking place on roadsides in the form of vegetable vendors, handcarts selling different products etc.

It is suggested to earmark a dedicated space in the redevelopment plan where these activities can be located. Small Kiosk and vending spaces may be developed and provided to the members from surrounding community. The rents from these Kiosks can be used for the maintenance of the waterbody and surroundings. Development of Kiosk/ vending spaces can be taken up on experimental basis at Saijpur and later developed in other city gardens and waterbodies.

### **Significant Achievement & Current Status**

The significant achievement of the concept plan is the fact that no informal settlers will be evicted when the waterbody is restored. This is different from the development approach adopted for the other waterbodies in the city. At Saijpur, it is proposed to include the surrounding communities in the maintenance of the area, thereby creating a sense of ownership of the asset and develop livelihood opportunities.

The local body has made budgetary provisions for the redevelopment and tenders have been floated for the restoration of the waterbody. During the regional level workshop to monitor the progress of the SUS programme, the concept plan for development of this waterbody as per the ESPA approach was presented to various stakeholders in the city. The deputy municipal commissioner representing AMC agreed to the concept plan for implementation.

## CONCLUSIONS

Urbanization is a critical threat to ecosystems worldwide. Urban areas may be a threat to the ecosystems through direct habitat conversion and through various indirect effects such as waste disposal, encroachment, disruption in natural drainage paths etc. While waterbodies are being developed within Ahmedabad since last decade, the initiative proposed through this paper intends to explore developing a holistic, inclusive, sustainable and collaborative model for waterbody development. The project proposes that the redevelopment process in and around the waterbody should be focused on physical development, social development, livelihood aspects, operational and management issues. The proposals put forward are replicable for other waterbodies in Ahmedabad and elsewhere.

## ACKNOWLEDGEMENTS

The authors acknowledge the support provided by SWEDESD and SIDA. We sincerely acknowledge the learnings with the support of Ahmedabad collaborative team and facilitators. Officials from Ahmedabad Municipal Corporation have patiently discussed the issues and possible interventions at various instances. This study would not have been completed without the participation of the local community in the FGDs and the interviews.

## REFERENCES

1. Ahmedabad Municipal Corporation, (2011). Report on Saijpur Lake Water Analysis (27-9-2011), Ahmedabad.
2. Amalendu Jyotishi, R Parthasarathy. Reservoir Fisheries Management Experience of Tawa in Madhya Pradesh. Economic and Political Weekly, Vol 42, No 5, Feb 3, 2007: 409-415.
3. CEPT University, (2003) Wealth and Well Being Impacts of Slum Up-gradation and Improved Services Delivery to the Poor, Gujarat, Western India. (Supported by Water and Sanitation Program-South Asia, World Bank. Ahmedabad.
4. City Development Plan, 2006, Ahmedabad Municipal Corporation and Ahmedabad Urban Development Authority.
5. Dhulia Dimpi, 2003. Rejuvenation of the Waterbodies/Gamtaals in and around Ahmedabad. PG Dissertation, CEPT University, Ahmedabad.
6. Ecosystems, ecosystem services and their linkages to poverty reduction in Uganda (May-2006): Centre for Research Analysis limited (CRA), Kampala.
7. Ground Water Scenario in Major Cities of India, 2011. Central Ground Water Board, Ministry of Water Resources, Government of India.
8. <http://www.susprogramme.wikispaces.com>, visited 27 July 2012.
9. L.Naselli-Flores 2008. Urban Waterbodies: Ecosystems at Risk, Worthy of the Best Care. Proceedings of Taal 2007, The 12th World Waterbody Conference: 1333-1337.
10. Mukharjee A 1999. Conservation and Management of Bhoj Wetlands, India. Urban India (150-175).
11. National Waterbody Conservation Programme 2001. Ministry of Environment & Forest, New Delhi.
12. Pancholi Diana 2007. Strategies for Waterbody Development in Urban Context – A case of Ahmedabad. PG Dissertation, CEPT University, Ahmedabad.



13. Poverty and the Environment – Understanding Linkages at the Household Level. 2008. The World Bank, Washington DC.
14. Pradhan Manisha, Latkar pallavi 2008. Shallow Waterbodies in Urban Areas: Ecological Restoration of Waterbodies in Thane City. Proceedings of Taal 2007, The 12th World Waterbody Conference: 1628-1634.
15. Ramchandra T.V.. Restoration and Management Strategies of Wetlands in Developing Countries. Electronic Green General, Issue 15, Dec 2001.
16. Surface Tension the War over City Waterbodies is heating up. Cases on protection of urban wetlands. Centre for Science and Environment. Compilation. (CSE,s New Delhi).
17. United Nations, Department of Economic and Social Affairs, Population Division, (2012). World Urbanization Prospects, the 2011 Revision: Highlights. New York.

