

68th NATIONAL TOWN AND COUNTRY PLANNERS CONGRESS

**‘National Missions:
Spatial Planning and
Implementation Initiatives’**

11 – 13 January, 2020
CIDCO Exhibition Center,
Navi Mumbai

INSTITUTE OF TOWN PLANNERS, INDIA
4-A, Ring Road, I. P. Estate, New Delhi



National Missions: Spatial Planning and Implementation Initiatives

India is transforming, the trajectory of this socio-economic transformation is being guided by a number of National Missions and programs of different ministries. Ministry of Housing and Urban Affairs is also contributing to this change through their programs like Smart Cities Mission (SCM), Swachh Bharat Mission (SBM), Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Pradhan Mantri Awas Yojana (PMAY), Heritage City Development and Augmentation Yojana (HRIDAY) and Urban Transport. To promote economic development, Government of India, under their Make in India Program, has plans to develop Industrial corridors cutting across boundaries of the states. These initiatives include Delhi-Mumbai Industrial Corridor (DMIC), Bengaluru-Mumbai Economic Corridor (BMEC), Chennai-Bengaluru Industrial Corridor (CBIC), Vizag-Chennai Industrial Corridor (VCIC), Amritsar-Kolkata Industrial Corridor (AKIC) and Defence Industrial Corridors in UP and Tamil Nadu. In addition to these corridors, Industrial Clusters / Integrated Townships are also being developed under National Manufacturing and Investment Zones (NMIZ) program. Several Special Economic Zones (SEZ) have already been developed to boost development of export-oriented industries. India and Asian Development Bank are developing East-Coast Economic Corridor (ECEC) to boost development of coastal areas.

Ministry of Railway has a program of Dedicated Freight Corridors (DFC) as well as Redevelopment of Railway Stations. Development of National Highways is also a priority of Government of India and during 2018-19 the rate of construction of national highways has been 30 km per day. While Ministry of Tourism has a program of development of theme-based tourist circuits like Buddha Circuit, Sufi Circuit, Coastal Circuit, Desert Circuit, Eco-Circuit, Wildlife Circuit, etc. It also has a program of Pilgrimage Rejuvenation and Spiritual Augmentation Drive (PRASAD). Under the Sagarmala Program, the Government of India intends to unlock potentials of waterways and coastline and is developing six mega-ports.

In addition to development of railways, highways and air ports for passengers and cargo movement, India is also developing waterways. Under the National Waterways Act 2016, 111 National Waterways have already been declared. The Inland Waterways Authority of

India, Ministry of Shipping is developing stretches of rivers: Ganga, Brahmaputra and West Coast Canal as National Waterways.

The National Action Plan on Climate Change has eight Missions including National Solar Mission, National Mission for Enhanced Energy Efficiency, National Mission on Sustainable Habitat, National Water Mission, National Mission for Sustaining the Himalayan Ecosystem, Green India Mission, National Mission for Sustainable Agriculture, and National Mission on Strategic Knowledge for Climate Change.

India is committed to achieve the Sustainable Development Goals (SDGs). There are 17 SDGs and some of these include Clean Water and Sanitation (Goal-6), Industry Innovation and Infrastructure (Goal-9), Sustainable Cities and Communities (Goal-11), and Climate Action (Goal-13).

The developmental impulse generated by these Missions and programs is translated, on ground, through spatial planning. Urban and Regional Planning, thus, plays a significant role in this national transformation. The spatial plans promote planned development and provide necessary legal support to matters pertaining to land, land use change and land management. Taking this into account, the Institute of Town Planners India has dedicated its 68th National Town and Country Planners Congress to be held on 11 - 13 January 2020 at Navi Mumbai to the main theme - 'National Missions: Spatial Planning and Implementation Initiatives', and the Sub themes of the Congress are - 'Urban and Regional Planning and Development Strategies' with a particular focus on infrastructure. 'Spatial Planning and Sustainable Development Goals' with an emphasis on SDG-6 and SDG-11, dealing with water security and planning respectively; 'Urban and Regional Governance' as underpinned in the National Missions. In addition to these a local theme is christened to 'Spatial Implications of Sea Port, Air Ports and Transport Corridors'

Navi Mumbai

Navi Mumbai, a planned city on the west coast of Maharashtra is divided into two parts, North Navi Mumbai and South Navi Mumbai, for the development of Panvel Mega City, which includes the area from Kharghar to Uran. Navi Mumbai has a population of 1,119,477, as per the 2011 census. In fact the area was mooted in 1971 to be a new urban township of Mumbai by the Government of Maharashtra. For this purpose, a new public sector undertaking - the CIDCO was established. Navi Mumbai is home to various educational institutions offering

courses in several streams including engineering, medical sciences, interior design, and hotel management. Various multinational corporations have their head / branch offices across the city, making it an active business hub.

During Congress the climate of Navi Mumbai will be warm but pleasant having average temperature of 25°, with least humidity of 51%.

Exhibition

An exhibition on “National Missions: Spatial Planning and Implementation Initiatives” is being organized during the Congress. It would provide an opportunity to various stakeholders to showcase their efforts and success stories. In order to book space in the exhibition and to secure other details, please contact **Shri Avinash Patil, Exhibition Coordinator** (Mobile No. 9552269650).

Call for Papers

Papers are invited on the main theme and sub-themes not exceeding 3,000 words, along with hard and soft copy in MS Word to reach, the Secretary General, ITPI, New Delhi before 10th December 2019. The Institute of Town Planners, India reserves the right to accept, edit or reject any of the technical paper without assigning any reason.

Registration Fee

- **Advance Registration**
(before 20th December, 2019)
Sponsored Delegates : ₹ 7,000/-
Non-members : ₹ 5,000/-
Members : ₹ 3,000/-
- **Spot Registration**
Sponsored Delegates : ₹ 7,500/-
Non-members : ₹ 5,500/-
Members : ₹ 3,500/-
- Cheques and drafts only will be accepted with Registration Form. For spot registration either cash or draft only will be accepted.
- Registration fee once paid will not be refunded.
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- State Government: ₹ 10,00,000/-
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- Commercial Presentation (10 minutes) ₹ 1,00,000/-
- Exhibition Stall 10×10 feet ₹ 1,00,000/-

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Nhava Sheva, Navi Mumbai
- Maharashtra Airport Development
Company Limited (MADC)
- Delhi Development Authority

For Details

- Visit Website: www.itpi.org.in

PROGRAM

Saturday, 11th January, 2020

- Inauguration of Congress
- Inauguration of Exhibition
- Plenary Session :
‘National Missions: Spatial Planning and
Implementation Initiatives’
- Workshop Sub-Theme - I :
‘Urban and Regional Planning and
Development Strategies’
- Workshop on Sub-Theme - II :
‘Spatial Planning and Sustainable
Development Goals’

Sunday, 12th January, 2020

Workshop on Sub-Theme - III :

- ‘Urban and Regional Governance’
- Workshop on Local Sub-Theme :
‘Spatial Implications of Sea Ports, Air Ports
and Transport Corridors’
- Commercial Presentations
- Valedictory Sessions

Monday, 13th January, 2020

- Field Visits



REGISTRATION FORM

1. Name of the Participant (Ms/Smt./Shri):

2. Designation: _____
3. Name of the Organization with Address:

4. Mobile No.: _____
5. Email ID : _____
6. Registration Number (in case of ITPI Member)

7. All Accompanying Persons needs to be Registered as Delegate:

8. Category of Registration : Sponsored / Non-sponsored / ITPI Member

9. Mode of Payment of Delegation Fee: (Cheques / Drafts / Cash): ₹ _____

10. For Accommodation Directly Contact the Hotels on their Mobile or Email Id, given in the list. These Hotels are nearer to the Venue of the Congress.

Date:

Signature

For Further Information Contact

Pradeep Kapoor, Secretary General,
Institute of Town Planners, India
4-A, Ring Road, I.P. Estate, New Delhi - 110 002
Phones: 011-23702452, 23702454
Mobile: +91 9829210716
Email: ntcpcongress@gmail.com

Jitendra L. Bhople, Chairman, MRC (Mumbai)
Plot No.100, Sector -15, C.B.D. Belapur
Navi Mumbai, Maharashtra - 400614
Phone : 022-27576162, Mob : +919967291943

Milind B. Patil, Coordinator of Congress
Senior Planner (MMRDA), Mukti Purpose Hall,
2nd Floor, Near Oswal Park, Pokharan Road No.2,
Majiwada, Thane (West) - 400601
Phone: 022 21712195/97, Mob : +919987058833

FOR ACCOMMODATION CONTACT DIRECTLY

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Guest Houses of Various State Government
are in the vicinity of Congress Venue.

IMPACT OF URBANIZATION ON LANDUSE AND LAND COVER CHANGE AND SUSTAINABLE DEVELOPMENT OF WATER BODIES - A CASE STUDY OF BANGALORE

Akshatha N.

Research Scholar, School of Planning and Architecture, University of Mysore,

Prof. Shankar B.

Director of Institute of Development Studies, and Professor, Urban and Regional Planning,
School of Planning and Architecture, University of Mysore

1. INTRODUCTION

In India process of Urbanization gained momentum with start of Industrial revolution in 1970s followed by globalization in 1990s. The degree of urbanization has increased from 27.7%(2001) to 31.1%(2011) with a decadal increase of 3.3%. Rapid urbanization is the main reason for complex and uncontrolled pattern of urban physical growth and continuous change in land use and land cover (LULC). Urbanization in various developing countries reveals that urban physical growth has carried at outskirts. Urbanization as resulted in decline of water bodies, arable land, natural vegetation cover, habitat destruction, climate at local, regional and global scales. In most of developing countries urbanization is referred as dynamic process for the growth of urban population resulting in landuse and landcover (LULC) changes. The spatial characteristics of Land use and Land cover (LULC) are useful in understanding the various impact of human activity on the overall ecological condition of the urban environment. Currently water bodies are under varying degree of environmental degradation due to the various anthropogenic activities and encroached due to urban expansion.

2. BACKGROUND OF BANGALORE

Bangalore ranks 5th most crowded metropolis in India with a population of 8,495,492 as per 2011 census and covers an area of 741 km². The city is located in south east of Karnataka, having an altitude of approximately 920 m sea level. City has grown considerably with respect to demography and spatially since its formation in 1537 AD to now. The main contribution to city growth is establishment of Information technology hubs (IT) and associated infrastructure due to liberalization in 1990s.

Bangalore periphery is acting as an engine of economic growth due to the setting up of industries and IT parks. Rapid change of Landuse and Land cover (LULC) has resulted in degradation and loss of water bodies. The naturally undulating terrain of Bangalore city with its hills and valleys have lend perfectly to the development of lakes that can capture and store rainwater. Bangalore as three main valley systems: Koramangala - Challaghatta, Vrishabhavati, Hebbal valley. Fig 1 illustrates valley system in Bangalore. Lakes in Bangalore form a unique irreplaceable system. These lakes play an vital role in influencing living condition of the people and their environs, recreational place for each neighborhood involving in community participation, home for flora and fauna; they form a chain of hydrological connection, helps in recharging ground water, regulates micro climate and finally improves aesthetics of the city.

3. MATERIALS AND METHODS

Multi-dimensional methodology involves both quantitative and qualitative data from various primary and secondary sources. Multi resolution remote sensing data of Landsat for period of 1992

and 1998 were downloaded from USGS earth explorer (<https://earthexplorer.usgs.gov/>). Thematic mapper of Land use and Land cover (LULC) 50k for years 2006 and 2016 of scale 1:50,000 data were downloaded from Bhuvan Indian geo Platform of ISRO. Drainage maps were collected from planning departments.

Remote sensing (RS) is an effective tool to detect and quantify the impact of spatial and temporal Land use and Land cover (LULC) changes. Various period of LULC are taken for comparative analysis. QGIS is used due to free and open source software which contains robust support of both vector and raster data processing. Gaussian maximum likelihood classifier (GLC) is used since it preserves the basic land use characteristics through statistical classification techniques using a number of well-distributed pixels. Water bodies under process of degradation are mainly due to rapid change of LULC. Proposals are done on the basis of direct interlink ages of sustainable development with other Sustainable development goals. Fig 2 illustrates methodology involved.

Fig. 1: Valleys in Bangalore

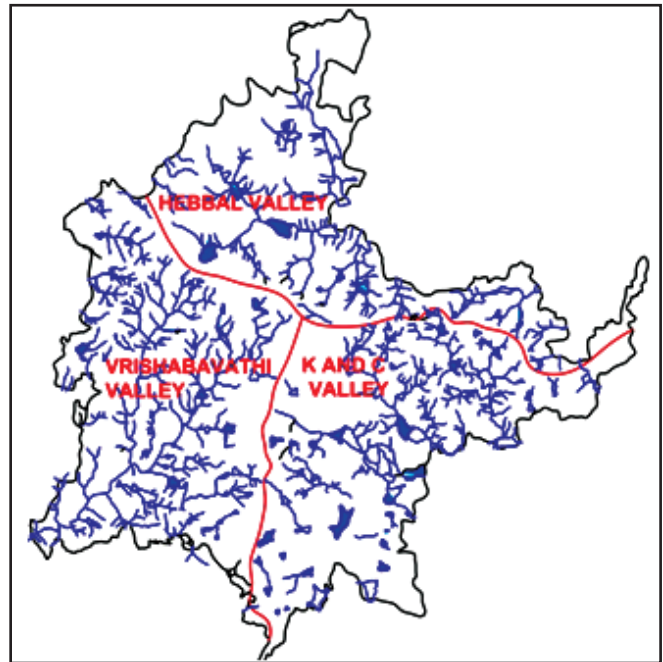
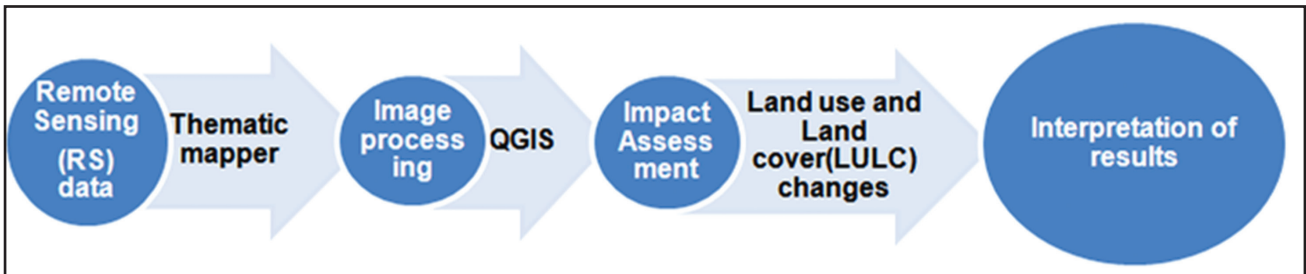


Fig. 2: Methodology



4. RESULTS AND DISCUSSIONS

The contrast and clarity of the LULC image made it possible to broadly classify the study area into built-up area, vegetation, water bodies and others (open space, barren land, etc). Table 1 illustrates Temporal Landuse and Land cover (LULC) changes. The statistics obtained from raster image illustrates that build-up percentage is increased from 8.22% (1992) to 37.03% (2012) due to different phases of economic growth like public sector, industries, offshoot of private sector and growth of IT sector. Percentage of vegetation is declined to 24.75% from 1992 to 2012 due to conversion into residential layouts, industrial activity, transport and communication infrastructure.

Percentage of water bodies is decreased from 1.45% (1992) to 0.72% (2012) due to anthropogenic activity of land filling/dumping for the urban construction. Fig 3 shows the temporal dynamics during 1992 to 2012. Most of the water bodies in Bangalore are encroached under urban expansion and shrunk due to eutrophication process. This is further enhanced by various pollutants discharged from different landuse. Encroachment of lake bed has contributed to low storage level. Dumping of

Table 1A: Land Use and Land Cover of Bangalore in %

Land use	Built up, Urban	Vegetation	Water	Others
Year	%	%	%	%
1992	8.22	58.80	1.45	31.53
1998	15	45	1.25	38.75
2006	23.64	37.78	0.99	37.59
2012	37.03	34.05	0.72	28.20

Table 1B: Temporal Land Use and Land Cover of Bangalore in Hectare

Land use	Built up, Urban	Vegetation	Water	Others
Year	Ha	Ha	Ha	Ha
1992	17314.11	123852.87	3063.69	65091.6
1998	29694.56	90076.07	2345.63	79665.86
2006	45906.25	76468.46	1285.96	74556.81
2012	75400.77	52900.35	1099.56	68648.55

building debris has altered the physical, chemical as well as biological integrity of the ecosystem. This has led to water pollution and silt formation finally affecting water holding capacity of lakes. Growth of water hyacinth and consumption of water by weeds have also reduced water holding capacity. Due to loss of water depth and shallowness has resulted in drying up of tanks due to evaporation. Fig 4 illustrates impact of LULC on water bodies of Bangalore.

Various socio economic, natural and anthropogenic factors are responsible for ecological degradation, shrinking and loss of Water bodies in Bangalore. Water bodies act as breeding place for various fauna like birds and aquatic animals; due to discharge of harmful sewage into Water bodies have caused severe threat to their survivability. Fig 4 illustrates impact of Land use and Land cover (LULC) changes on water bodies.

4.1 Encroachment

Greater Bangalore had 207 water bodies in 1973 which declined to 82 in 2012. Decline of Water bodies are mainly due to intense urbanization and urban sprawl. As shown in Fig 1 water bodies in Bangalore were lost due to in fill and conversion into residential layouts, playgrounds, sta-

Fig. 3: Land Use and Land Cover (LULC) of Bangalore

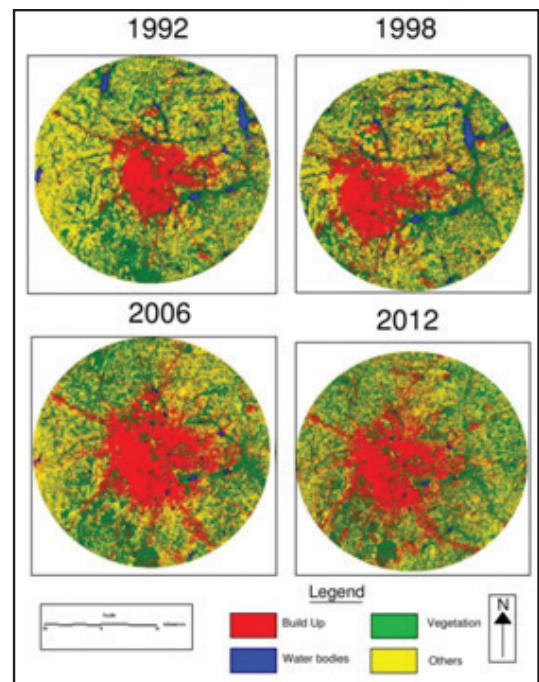
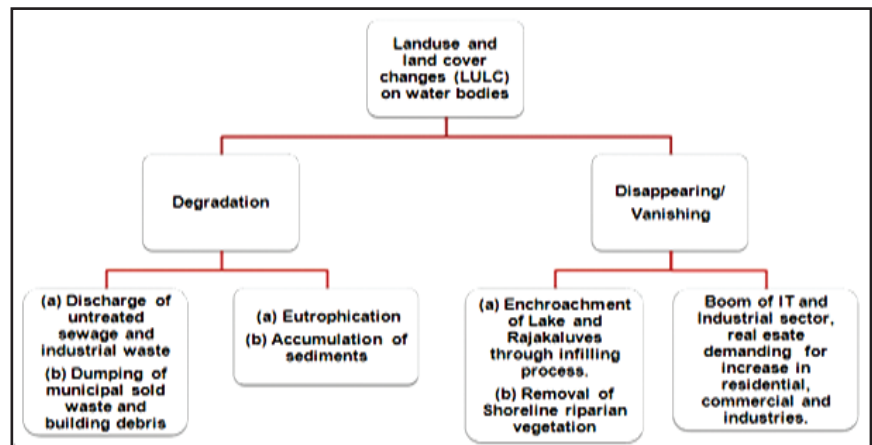


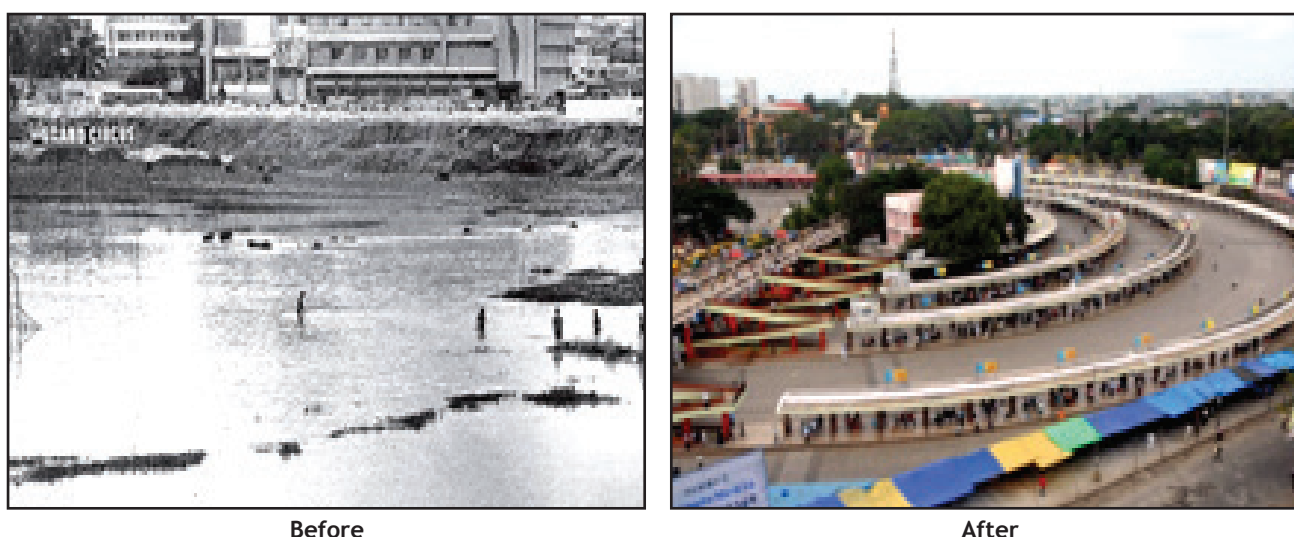
Fig. 4: Impact of LULC



In filling of tanks in Bangalore for urban expansion has resulted in complete encroachment of lake bed, Rajakaluve and loss of connectivity between tanks. Interception of catchment area due to breaching and diversion of waterways had lead in urban flood and non filling of tanks. Table 2 shows prominent lake conversion.

Table 2: Prominent lake conversion in Bangalore

Sl. No	Lakes	Converted
1	Dharmambudi lake	Kempegowda bus stand
2	Shoolay lake	Football stadium
3	Sampangi lake	Sports stadium
4	Akkithimannahalli lake	Hockey stadium
5	Sunkal lake	KSRTC regional workshops
6	Kormangala lake	National Dairy Research Institute
7	Hennur lake	HBR Layout
8	Jakarayana kere	Krishna floor mill
9	Vijinipura lake	Rajarajeshwari layout

Fig. 5: Dharmambudi Lake Conversion into Kempegowda Bus Stand

4.2 Pollution of Water

Dumping of building debris and discharge of untreated domestic sewage, industrial effluents into lake has contributed to low water quality resulting in loss of flora and fauna, pungent smell and finally aesthetics of the lake and its environs is lost. Most of the Bangalore lake water contains high level of phosphate, sulphate, alkalies etc. Discharge of untreated domestic and industrial effluents into lake not only pollutes the lake but also contaminates ground water. Contamination occurs when effluents percolates to ground, which creates a breeding ground for pathogenic organism. High level of pollutants contains heavy metals like copper, zinc, lead, nickel, chromium can be observed in Bellandur and Varthur lakes. Ground water around these lakes are highly polluted. Percentage of buildup area is more in these regions due to growth of IT and industrial sector, demanding for more residential units. Rapid change of land use and land cover (LULC) are main contributors for pollution. Each land use contributes to different amount of pollution like (a) industries - discharge of heavy metals and detergents, (b) agriculture- use of harmful fertilizers, (c) commercial and residential units. Figure 6 shows conditions of lakes in Bangalore.

Fig. 6: Pathetic Condition of Bangalore Lakes



4.3 Health Hazards

Contaminated lake water and dumping of solid waste around the lake bed has resulted in breeding place for mosquitoes causing malaria, Jaundice, cholera, skin diseases and breathing problems for people around the lake and environs.

4.4 Flora and Fauna

Healthy climate in the city was due to contribution of variety of rich fauna and flora around the lake. Due to loss of water bodies and spread area has adversely affected the flora and fauna. Polluted water in lake has affected the terrestrial ecosystem. Aquatic eco-system has disappeared mainly due to reduced oxygen level and harmful metals in polluted lake water.

4.5 Urban Flooding

Encroachment of lake bed and Rajakaluve has resulted in urban flooding damaging property, infrastructure and endangering life. Low lying areas are main affecting areas. Urban floods are mainly observed in many parts of Bangalore south due to terrain condition. Flood which took place in Bangalore on 2005 affected houses, infrastructure and several layouts of BTM layouts, Kormangala Bommanahalli and HSR layouts due to heavy rainfall. The loss of property was estimated to be Rs 500 crore in Bangalore urban district. Main reason for flooding was encroachment, inadequate drainage system, blockage in rajakaluve due to discharge of waste, loss of inter connectivity between lakes. Flooding took place recently in Hulimavu lake on 24th November 2019 located at Bangalore south was mainly due to breaching of lake bund, which affected 250 families and road users around lake and environs. Krishna layout, DLF road, BTM layout, Royal residency layout were affected areas. Lack of planning in flood plains, building debris in storm water and lowering of storage capacity of lake due to LULC changes are main reasons. Fig 7 shows urban flood at Bangalore.

Fig. 7: Urban Flooding in Bangalore



5. PROPOSALS

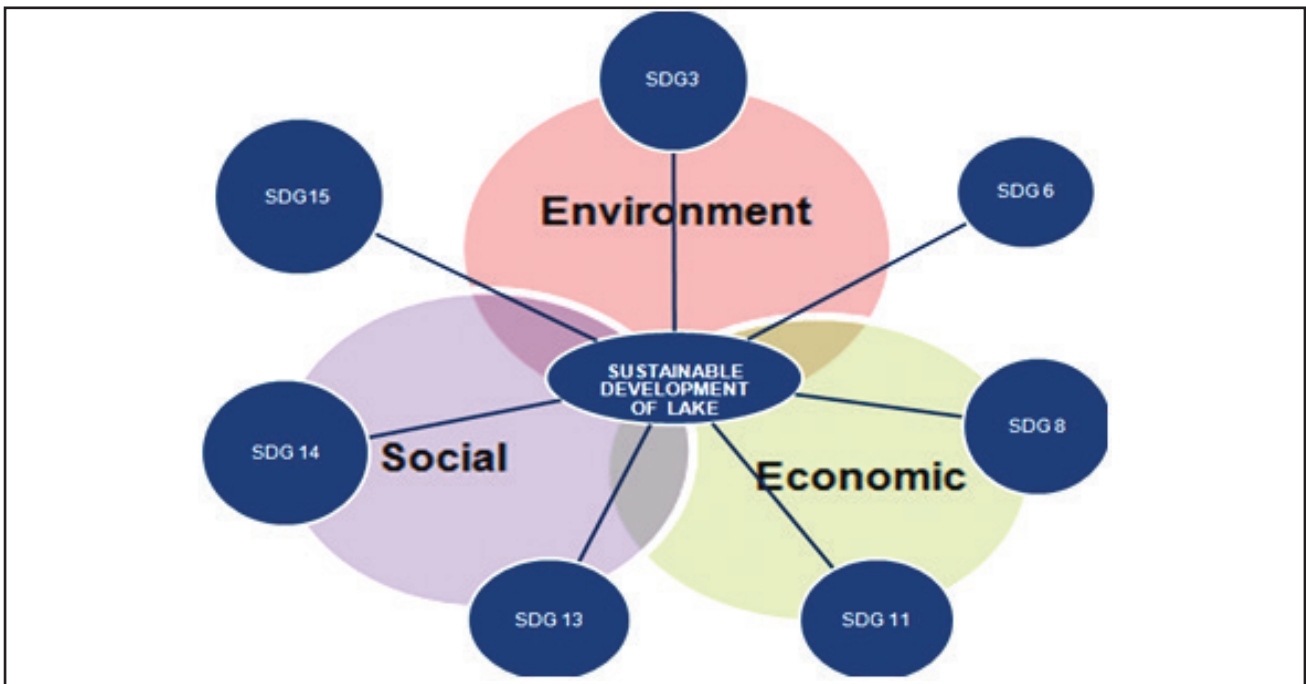
Sustainable development mainly focuses on ensuring balance between environment, economic and social elements. Agenda of sustainable development 2030 contains 17 sustainable development goals (SDGs), 169 targets and 232 indicators. SDGs can also be termed as Global goals which mainly aims to ensure peace and prosperity among people. SDGs were adopted by all United Nations member states in 2015 as a universal call to end poverty and protect the planet. According to 6th sustainable development goals (clean water and sanitation) targets to protect and restore water-related ecosystems, including wetlands, rivers, aquifers and lakes. Table 3 and fig 8 shows direct Interlinking between sustainable development of Bangalore lakes and SDGs.

Table 3: Sustainable Strategies for Lakes of Bangalore

SDGs	Roles of lakes	Proposals
SDG 3: Good health and well being	<ul style="list-style-type: none"> Waterborne diseases related to water pollution and contamination is reduced through process of sustainable development of lakes. Polluted lakes in Bangalore are causing severe problems related to health hazards for residents living around the lake and its environs. 	<ul style="list-style-type: none"> Intercepting, diverting and treating the pollution loads before it enters into lake. The sewage and sullage from the catchment should be stopped at a point, treated up to acceptable standards and only then be allowed to enter the lake More capacity STPs should be installed. Installation of Aerators improve water quality as well as reduce mosquito activity through continuous circulation of water in lake.
SDG 6: Clean water and sanitation	<ul style="list-style-type: none"> By 2020 protect and restore water-related ecosystems, including wetlands, rivers, aquifers and lakes. Protect lakes from degradation and drying up. 	<ul style="list-style-type: none"> Improve water quality through afforestation, riparian zone management, installation of aerators. Further encroachment process can be prevented through providing buffers zone as per NGT order around lake bed and Rajakaluve. Fencing around lakes.
SDG 8 : Decent work and economic growth	<ul style="list-style-type: none"> Water quantity and quality are essential tool for economic development. Promoting sustainable eco tourism around the lake is a key tool for generation of economy. 	Encouraging eco tourism through providing recreational activities like community axis, park axis and cultural axis.
SDG 11: Sustainable cities an community	<ul style="list-style-type: none"> Lakes play a vital role in community participation through recreation facilities. 	<ul style="list-style-type: none"> Encouraging Community participation through recreational activities like open gym, jogging track, park axis etc
SDG 13: Climate action	<ul style="list-style-type: none"> Lakes are main regulators of micro climate and carbon cycling. 	<ul style="list-style-type: none"> To achieve target 13.2, Role of lakes should be integrated with national policies, strategies and planning to foster climate resilience and low greenhouse gas emissions development.
SDG 14: Life below water	<ul style="list-style-type: none"> Presence of heavy metals, eutrophication and anthropogenic pressures in Bangalore lakes as resulted in decline of aquatic ecosystem. SDG 14.1 targets “prevent and significantly reduce aquatic pollution of all kinds, in particular from 	<ul style="list-style-type: none"> Implementation of Polluters pay principle as per 1974 water act. No new industries should be set up around eco sensitive area around the lake. Installing Surface and deep (diffusers) aerators improves the dissolved oxygen level for aquatic life which leads to healthier habitat

	land-based activities, including marine debris and nutrient pollution	for fish and other aquatic life. <ul style="list-style-type: none"> • Weeds can be removed through Desiltation process which enhances aquatic eco-sysytem.
SDG 15: Life on land	<ul style="list-style-type: none"> • Water bodies and terrestrial ecosystems are supreme importance for many complex cycles such as the water cycle, carbon cycle, nutrient cycle and nitrogen cycle. • Pollution of Bangalore lakes has lead to severe health hazards to terrestrial ecosystem. • Encroachment of Lake-bed and Rajakaluve in Bangalore has resulted in urban flooding, which affected many residential layouts and road users. 	<ul style="list-style-type: none"> • Remodeling of storm water drainage • Removing blockages in storm water drain • Strengthening of bund • More capacity STPs should be installed.

Fig. 8: Interlinking between Sustainable Development of Bangalore Lakes and SDGs



6. CONCLUSIONS

Impact of Urbanization on landuse and land cover changes as resulted in depletion and degradation of waterbodies. Number of Water bodies is reduced to 159 (1992) to 150 (1998) to (107 (2006) to 82 (2012) due to encroachment. Total Percentage of water bodies is reduced to 1.45% (1992) to 0.72% (2012). LULC also resulted in degradation due to discharge of untreated sewage into lake. There should be long term preventative approach directed for preventing the causes of lake degradation. Sustainable development of water bodies in Bangalore with direct interlinking of other SDGs results in environmental sustainability and well being of the residents around the lake and its environs, leads in community participation, improves aesthetics, increase flora and fauna.

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