Threats on the Existing Lakes/ Water Bodies in Dhaka

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"The 'environment' is where we live; and development is what we all do in attempting to improve our lot within that abode. The two are inseparable."

- Our Common Future
  - The World Commission on Environment and Development (WCED)

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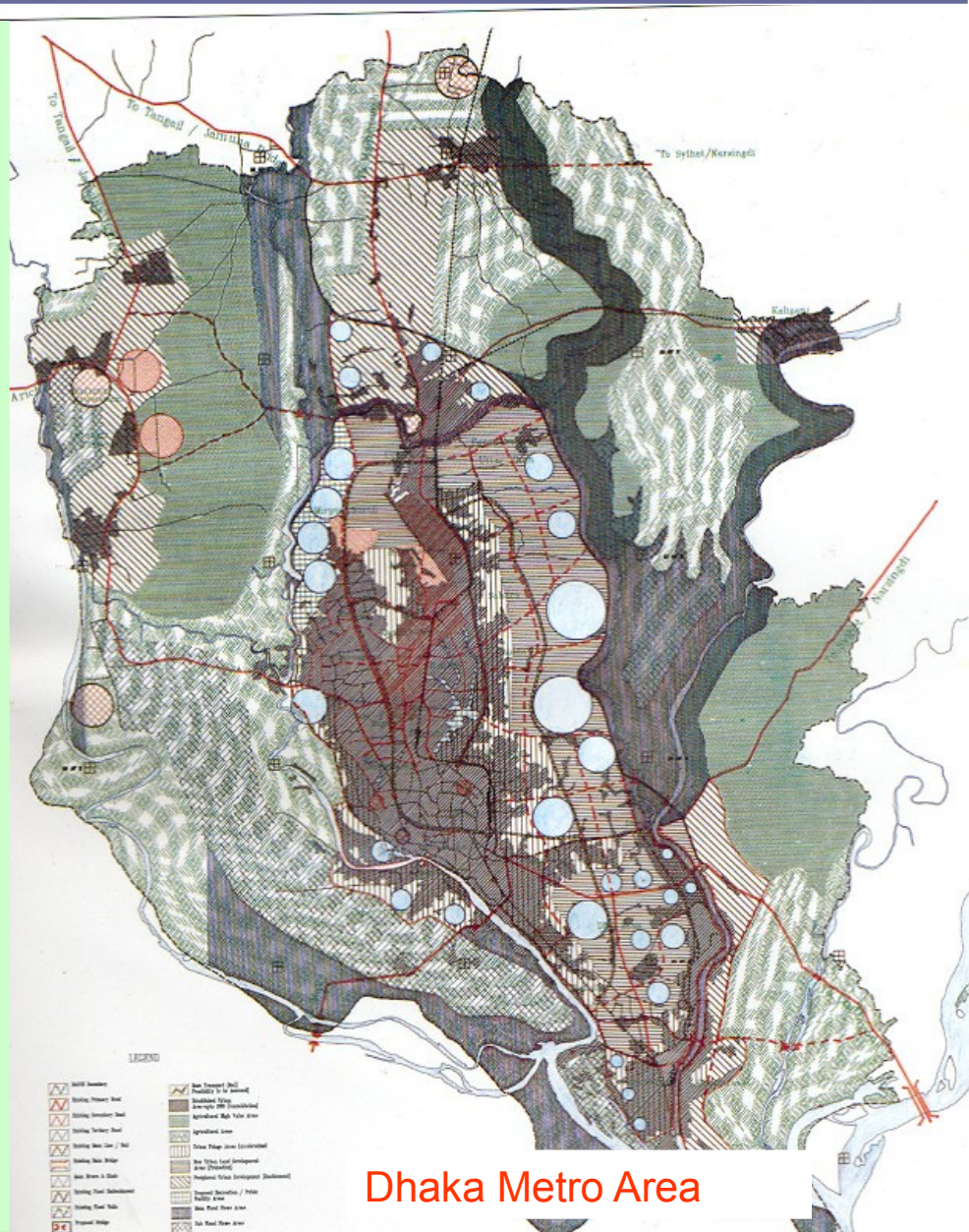
CONTENT

- **Brief Introduction to Dhaka**
- **Value of Wetlands of Dhaka**
- **Threats on Water Bodies of Dhaka**
- **Dhaka: Planning & Development Control**
- **Prospects and Constraints**

Introduction to Dhaka

- 9th largest mega City with growth rate 4.2%
- Area :1528 sq.km
- The area of Dhaka expanded 17.88 times from 1951. And population had increased 25.09 folds.



Dhaka Metro Area

Climate change Impact

(i) Floods/ drainage congestion

(ii) Heat stress

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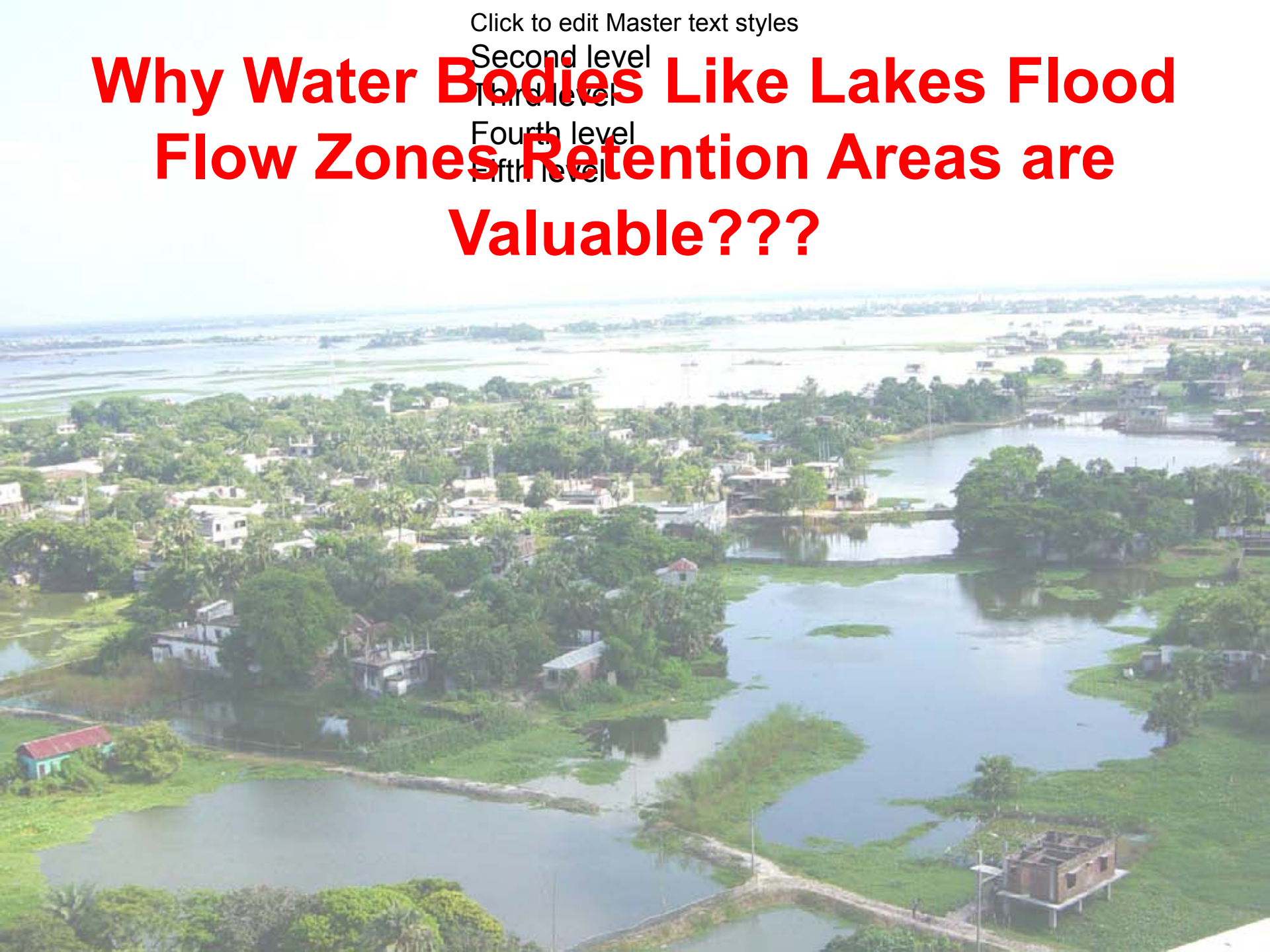
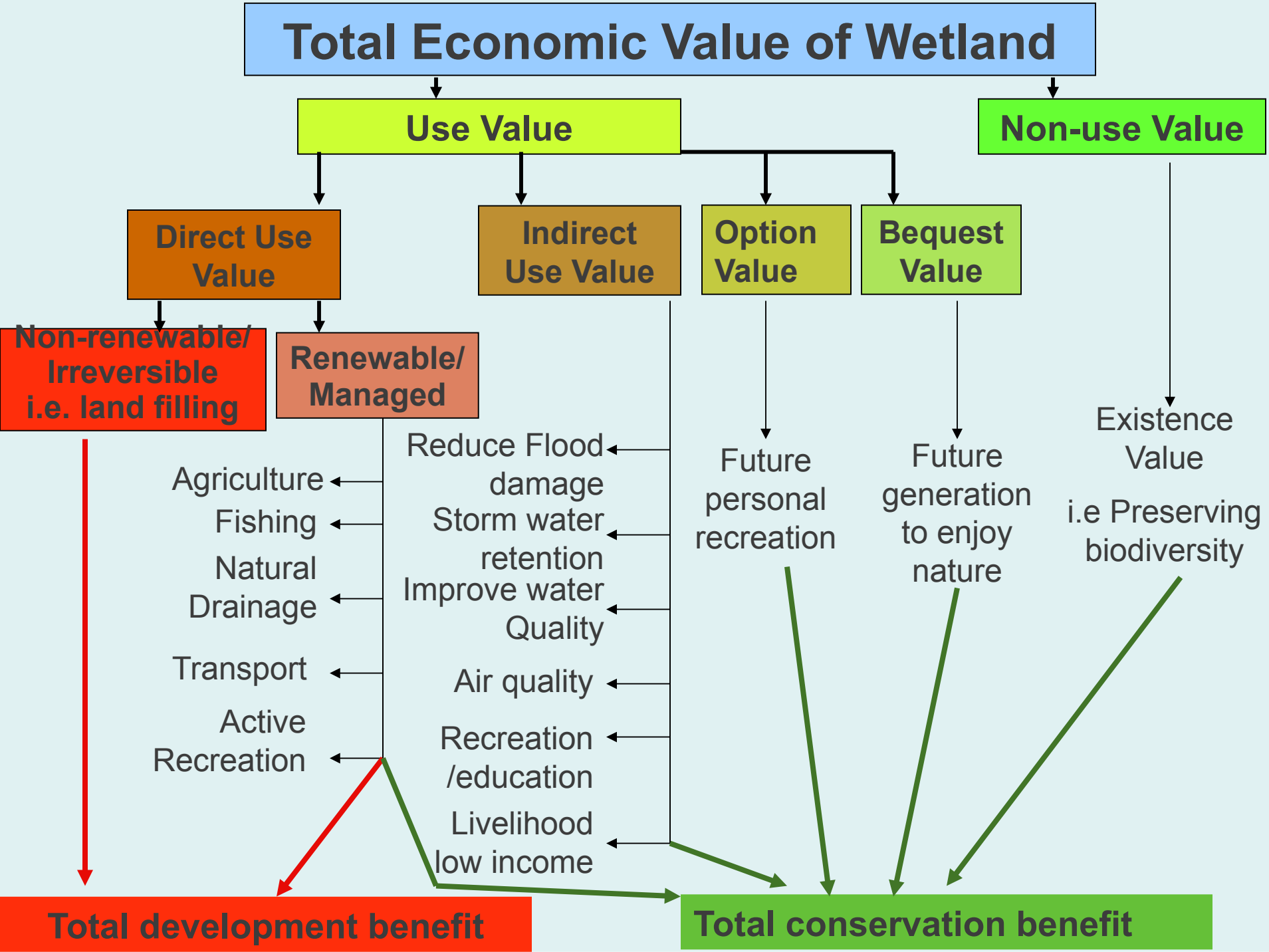
Why Water Bodies Like Lakes Flood Flow Zones, Retention Areas are Valuable???




Total Economic Value of Wetland
Use Value
Non-use Value
Direct Use Value
Indirect Use Value
Option Value
Bequest Value
Non-renewable/ Irreversible i.e. land filling
Renewable/ Managed
Agriculture
Fishing
Natural Drainage
Transport
Active Recreation
Reduce Flood damage
Storm water retention
Improve water Quality
Air quality
Recreation /education
Livelihood low income
Future personal recreation
Future generation to enjoy nature
Existence Value
i.e Preserving biodiversity
Total development benefit
Total conservation benefit

Economic Valuation of Ashulia Wetland

❑ Direct Use Values

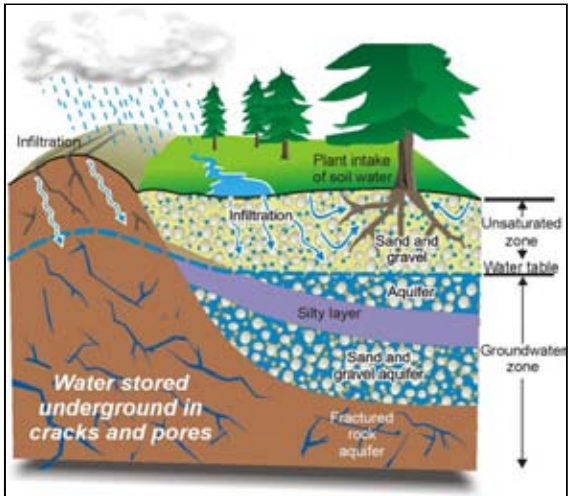
Agriculture

Fisheries

Recreation

❑ Indirect Use Values

Ground Water Recharge Function



Source: Rafiq, R, 2012

Flood Control Function

❑ Agriculture






❑ Fisheries

❑ Recreation

Economic Valuation of Ashulia Wetland

Annual Value (TK) of the floodplains in the year 2010

- Agriculture = 125,212,039
- Fisheries = 342,049,513
- Recreation = 180,809,942
- Flood Control = 60,621,519
- Ground Water Recharge = 50,803,967

Total Annual Value = 759,496,980

Total Annual Value per Hectare = 7,06,501

= 0.71 million

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- **Temperature has increased 0.3oC over past 40 years**
- **Annual mean precipitation has increased by 0.25%**
- **3-day consecutive maximum rainfall has increased by 0.1%**
- **Average peak discharge at major rivers are increasing**

Climate Change and Flood Scenario

Climate Change Impact on Dhaka

Climate change Impact On Dhaka

(i) Floods/ drainage congestion
(ii) Heat stress

- It is difficult for an urbanized area to deal with heavy rainfall within a short duration. Sufficient amount of retention area and flood flow zones are required to accommodate the excess water

- **As an adaptive measure, it is necessary to undertake management tools to save remaining wetlands of Dhaka.**

Flood in Dhaka

River Flood (External Flooding)

- Flood plains remain inundated in certain part of the year by river flood.
- Major floods in 1954, 1955, 1970, 1974, 1980, 1987, 1988, 1998 and 2004.
- **In 1988 inundated about 85% of the city (depth .3 to 4.5 m).**
- **1998 flood affected 56% of the city.**
- **2004 flood inundated 50% of the city.**
- In 1998 flood, 64 affected wards of Dhaka City had estimated total damage of of **Tk 2.0 billion or $US 41.0 million** (Mohit and Akther, 2002) .

Rain Flood (Internal Flooding)

- Water logging is a severe problem in monsoon.
- Drainage system of Dhaka serves less than 25% of the urban area. The remaining areas drain through overland flow into adjacent water courses or depression areas and eventually causes flooding.
- Dhaka city dwellers experienced the flooding due to heavy rainfall **(341 ml, highest in last 50 years) in September, 2004**. The two-day long monsoon rainfall almost collapsed the entire city function.

Flood in Dhaka-2004

Sufferings of residents of Dhaka

Storm water flooding in 14 September 2004

BUET Campus on 14 September 2004

টানা বৃষ্টিতে নগরীর ধানমন্ডি এলাকায় রাপা প্লাজা সংলগ্ন মিরপুর রোডে পানি ভেঙে চলাচল করতে বাধ্য হয়
লোকজন -প্রথম আলো

Source: Khan et al., 2010 IWFM, BUET

Heavy rain storms on May 22, 2006

- The metrological office recorded 52 mm rainfall in Dhaka since the midnight of Thursday till 6:00 pm at May 22, 2006.
- The city experienced 38 mm rainfall 3 hours from 6:00 to 9:00 am in the morning at May 22, 2006.

Water logging on July 23, 2007

- The worst affected were Azimpur, and the old parts of the city. The Meteorological Office recorded 134 millimeters of rain in Dhaka between 6:00am and 3:00pm
- WASA sources said the drains can deal with only 10 millimeters (mm) of rain an hour. The city has 150 square kilometers of storm drains, whereas it needs at least 260 sq kms to collect runoff from heavy shower.

July 28, 2009

- The heaviest rain in 53 years battered Bangladesh's capital Tuesday, leaving at least six people dead and stranding thousands in their swamped homes.
- The national weather office said 333 mm of rain fell in 12 hours in Dhaka, an overcrowded city of about 10 million people - the most in a single day since 1956

Dhaka Water Crisis

Growing Urban Population

Increase of Water Demand

Deep Tube Wells

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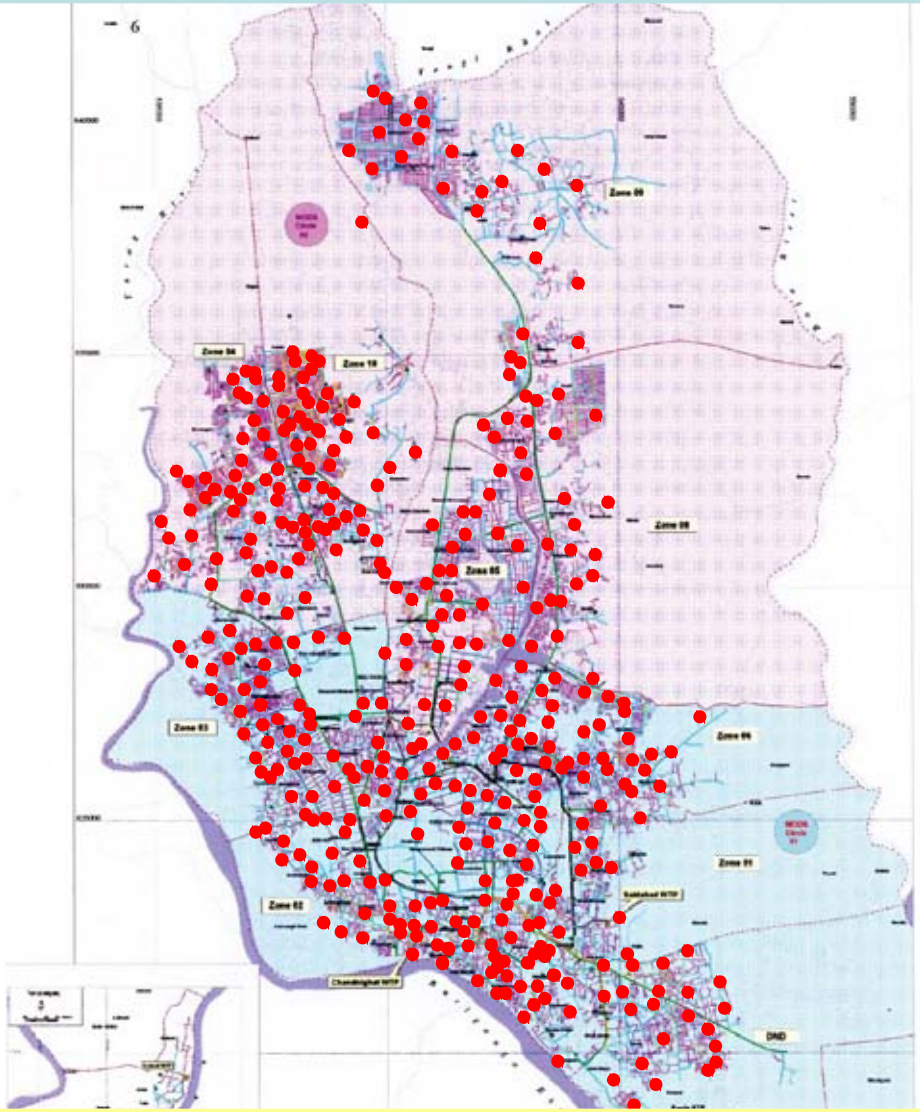


DWASA is abstracting GW intensively through **536 DTWs** from 11 of its Zones. 1996-2007: Ground Water Depletion: 3

Destruction of Wetland

Dying rivers of Dhaka

1,000 acre land enchroached.
60% pollution by industries.
82% human excreta discharged to city directly.
1,000 brick kilns along river bank.

Dhaleshawari River Flowing Between Narayanganj and Munshiganj

(Daily Star report, August 02, 2011)

Dying rivers of Dhaka

Bamboo fence for earth filling in Dhaleshari river near Dikrir Char of Narayanganj.

(Daily Star report, August 02, 2011)

Dying rivers of Dhaka

Encroachment of Turag at Kamarpara of Tongi

(Daily Star report, August 02, 2011)

Encroachment of Balu at Rupganj.

(Daily Star report, August 02, 2011)

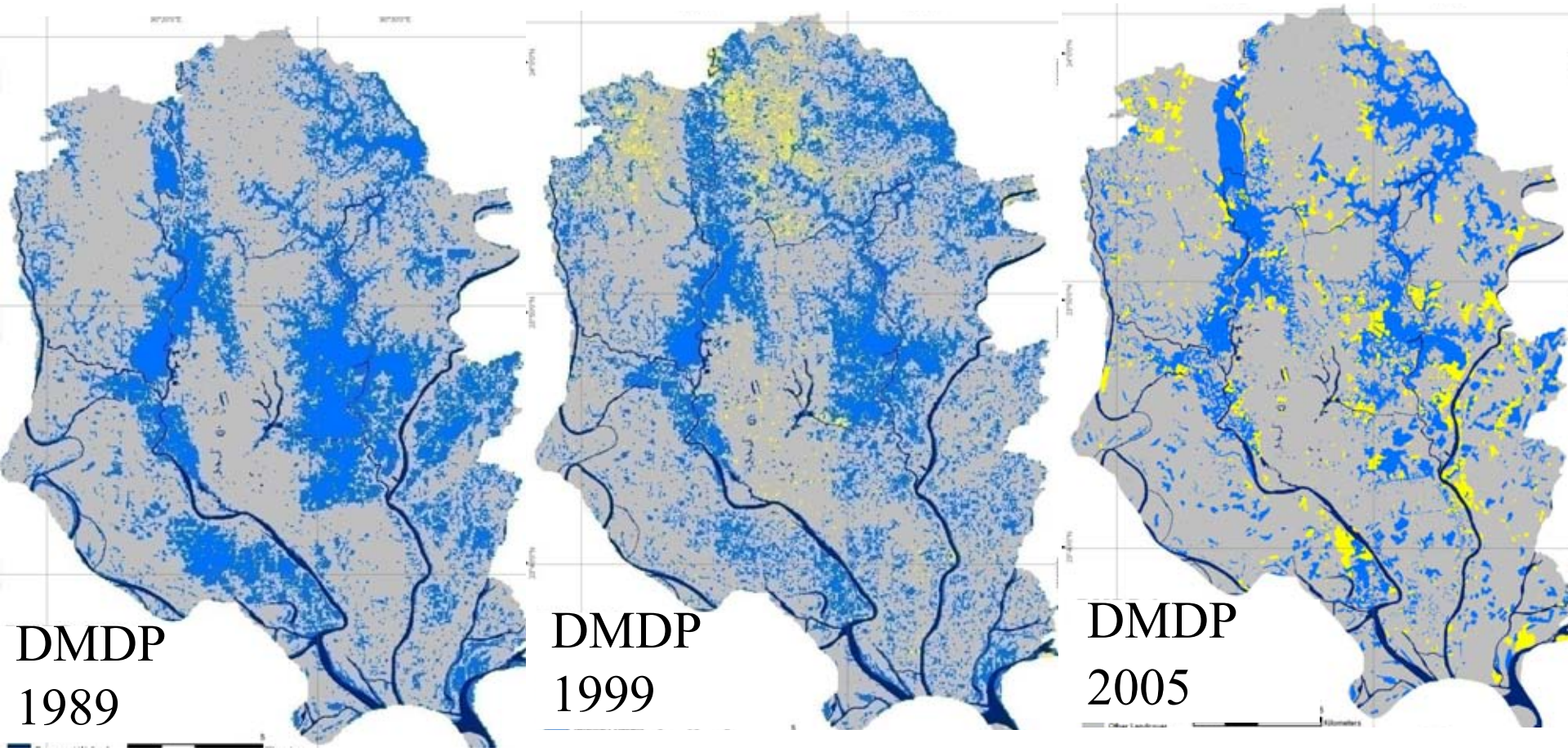
Dying rivers of Dhaka

Unapproved housing project on flood plain which narrowed down Balu in Khilkhet.

(Daily Star report, August 02, 2011)

Eastern Fringe: Retention Area of DHAKA

Wetlands of Dhaka Metro in the year 1989,1999 & 2005



Wetland Converted wetland Other

Source: Analysis of Lansat TM/ETM Image of Years 1989, 1999 and IRS LISS Image of 2005

Wetlands of Dhaka in the year 1989,-1999-2005

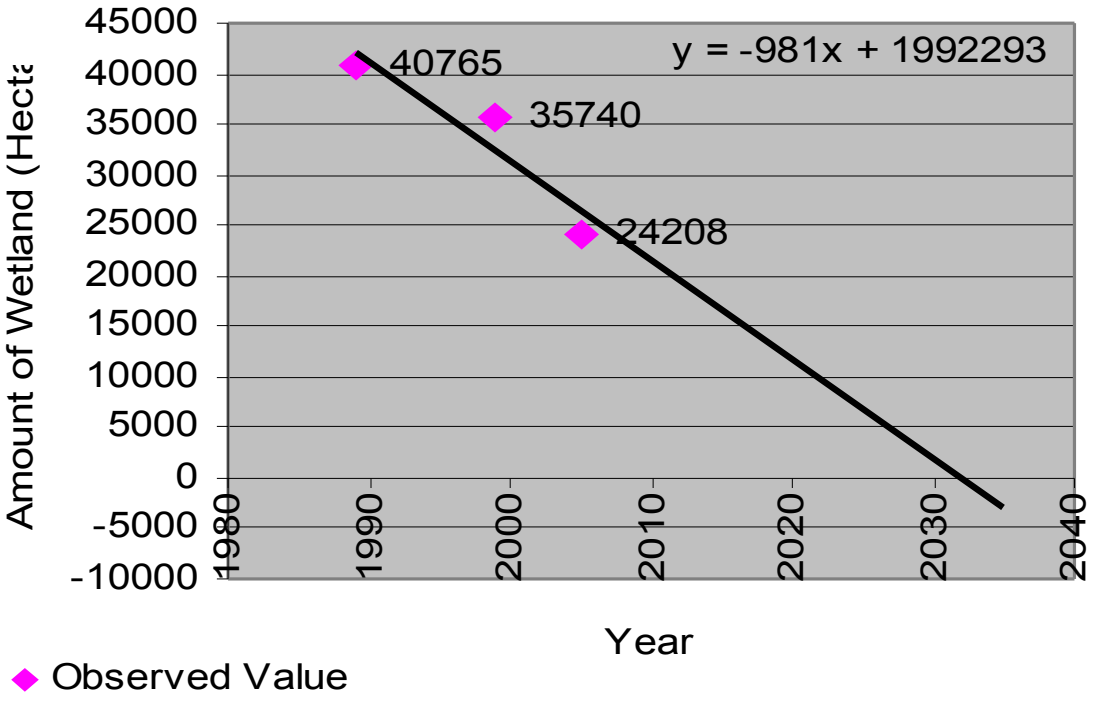


Figure 6: Trend of loss of wetland in Dhaka Metro

Source: Analysis of Lansat TM/ETM Image 1989, 1999 and IRS LISS Image of 2005

Declining Wetland of Dhaka Metro

- 1989: 28.5% of total area of Dhaka
- 1999: 25% of total area of Dhaka
- 2005: 16.9% of total area of Dhaka

Annual Rate of loss of wetland during

- 1989-1999: 502.4 hectare/year.
- 1999-2005 : 1922 hectare/year

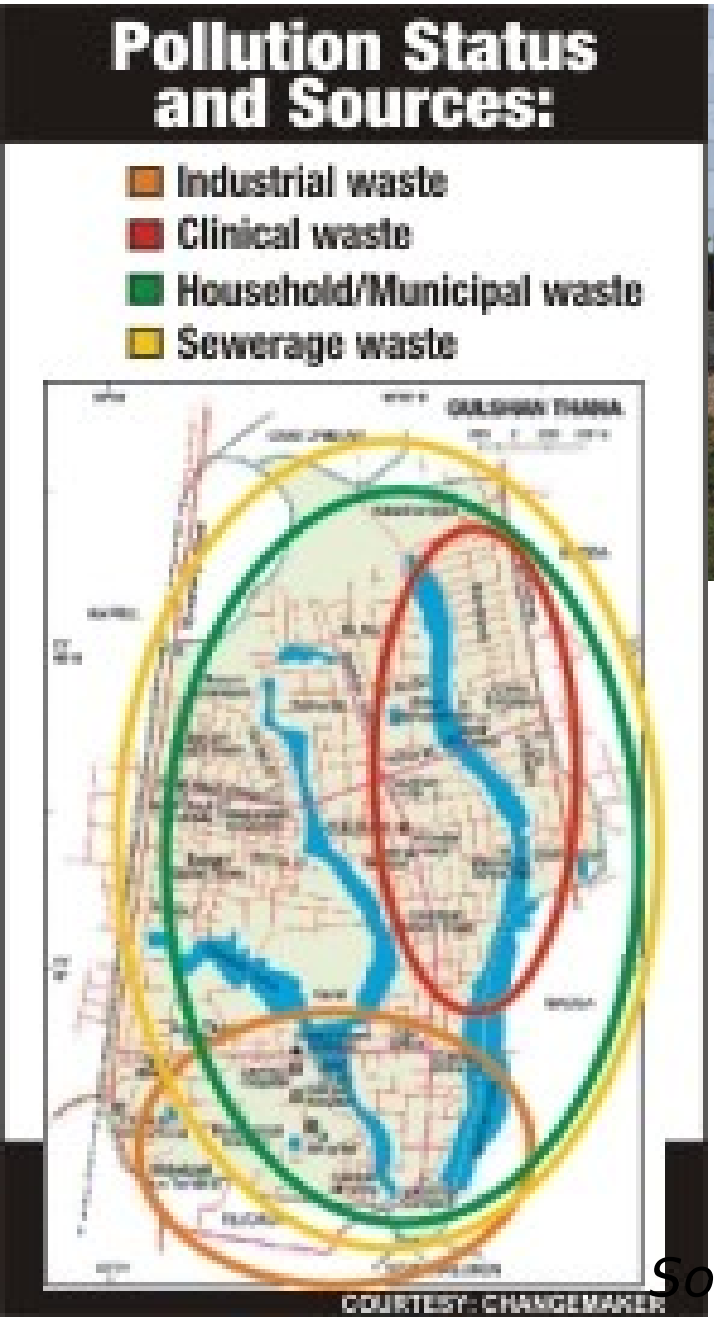
Conversion of wetland, Outside DMDP: Image 2012

Summary and Major Findings

Salient Characteristics of Wetland Conversion

- Faster loss of wetland during the period 1999-2005 than 1989-1999.
- Restricted Flood Flow zones are under severe development pressure.
- Only 16.9% of Dhaka's land area remains as wetland.
- Mostly developed by private land development companies for housing projects.
- Most projects do not have any approval from regulating authority.

Gulshan-Baridhara-Banani Lake



Source: Zaman, M, 2006 Dying Lakes, Daily Sta

Encroachment of Gulsan Lake

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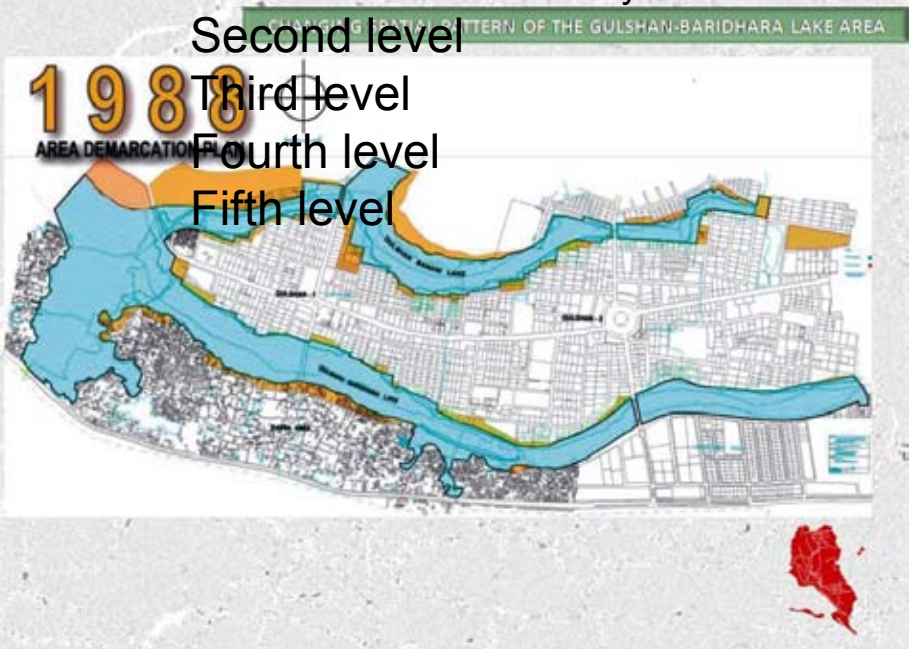
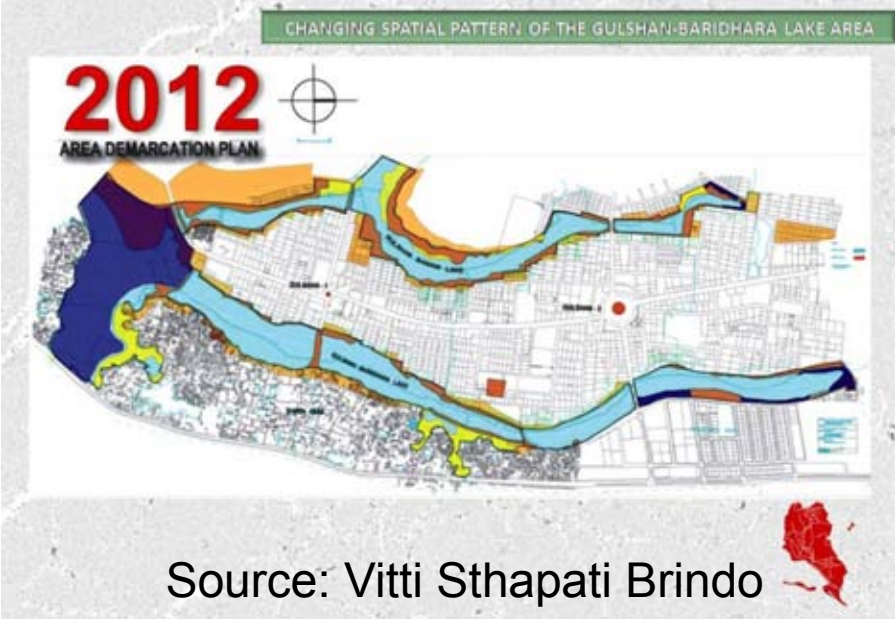




Source: Vitti Sthapati Brindo

Flood Action Plan

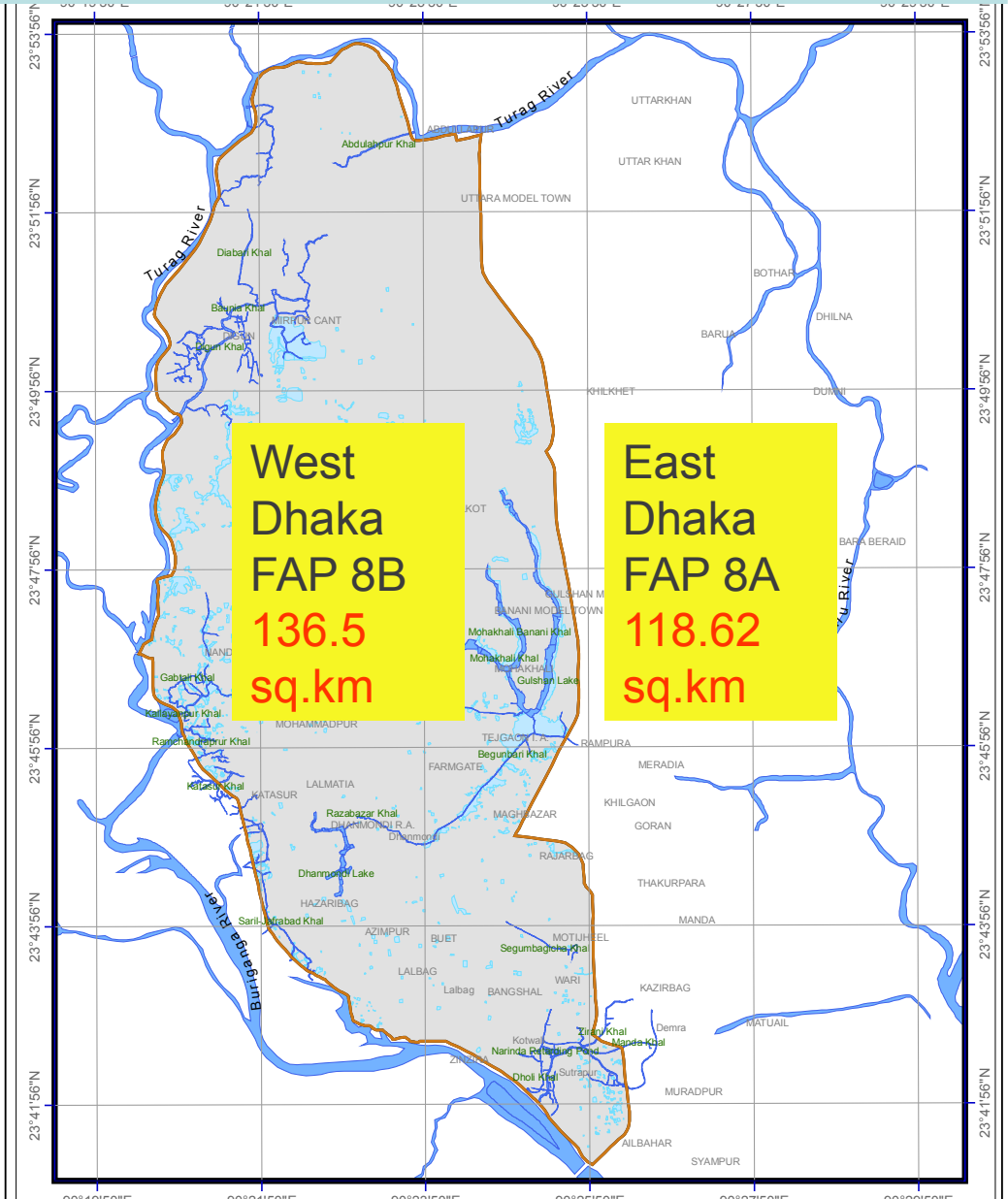
- Following the severe floods of 1987 and 1988, **National Flood Action Plan (FAP)** was formulated.
- During 1988 flood, about 77 percent areas of Dhaka City (total area 260 sq. km) were submerged to depth ranging 0.3 to over 4.5 meter
- Dhaka city is divided into 12 drainage zones for Storm water drainage planning in the master plan for flood protection (JICA 1992).

Flood Action Plan (FAP 8A & 8B)

Objective of FAP to provide a relatively flood free living environment within the framework of a long term flood protection program for Dhaka.

Proposals include:

- construction of embankment
- improvement of *khal* (canal)
- construction of pumping station
- acquiring land for retention pond.



Encroached Canals of West Dhaka

Name of the Canal	Total Area (ha)	Effective area (ha)	Encroached area (ha)	% of Encroachment
Abdulahpur Khal	9.99	5.28	4.71	47.14
Baunia Khal	8.1	6.35	1.74	21.51
Begunbari Khal	4.14	2.39	1.75	42.27
Dholi Khal	9.74	1.26	8.48	87.08
Diabari Khal	31.94	27.66	4.28	13.4
Digun Khal	21.93	17.65	4.28	19.52
Gulshan Khal (Lake)	41.52	28.22	13.3	32.02
Kallyanpur Khal	6.71	3.56	3.15	46.87
Segunbagicha Khal	1.22	0	1.22	100
Katasur Khal	6.89	2.56	4.34	62.97
Paribag khal	0.24	0.11	0.13	53.55
Mohakhali Khal	28.15	19.11	9.04	32.12
Ramchandraprur Khal	2.37	0.63	1.74	73.41
Total	**172.94**	**114.78**	**58.16**	

Encroached Canals of West Dhaka

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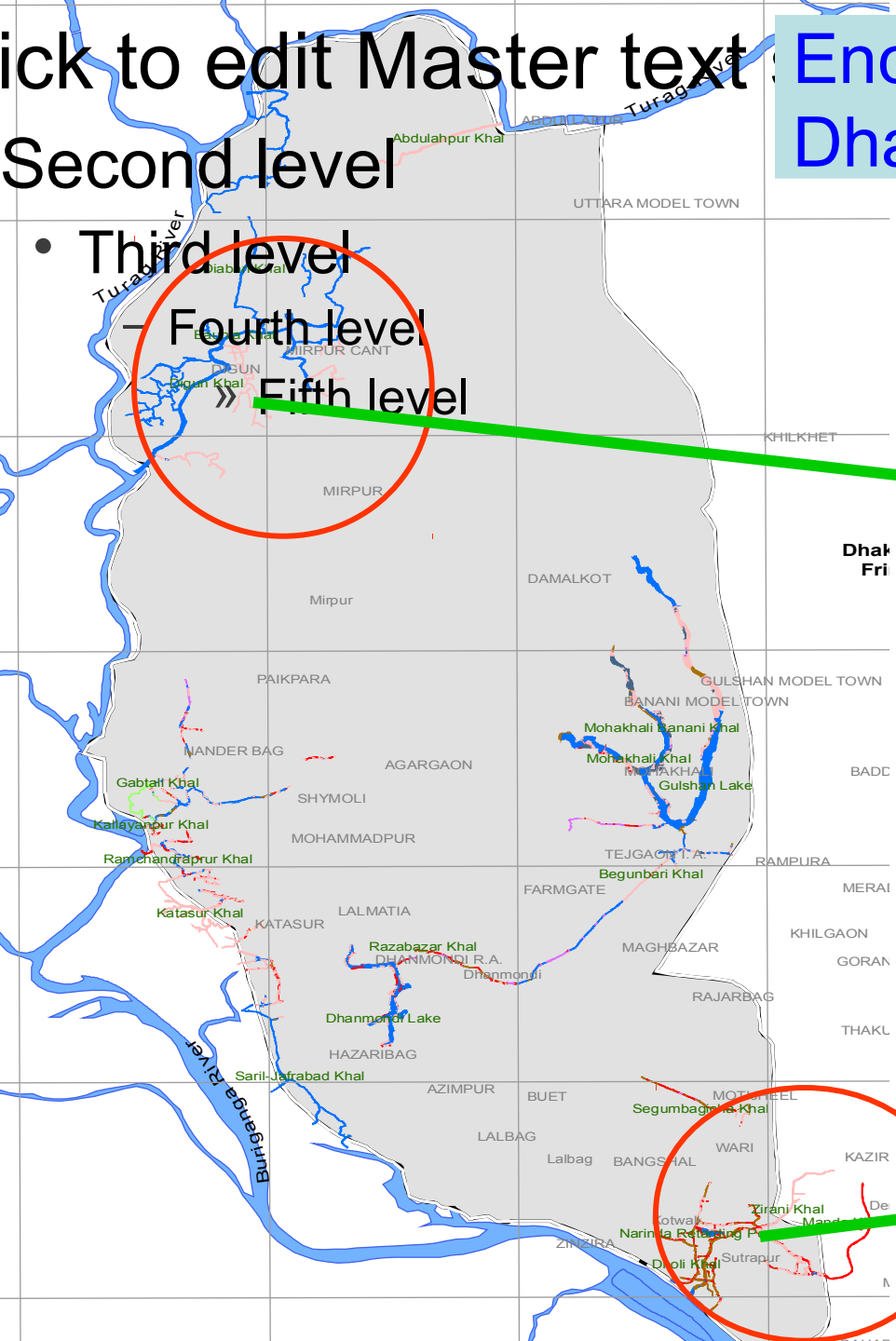


Industrial Pollution and Waterbody

A single dying factory along the river Shitalakkhya create this layer of deadly froth. Hundreds of such factories have turned the river into a lifeless water body. *Source: Amran Hossain*

Pollution and Water Body

Source: Daily Star

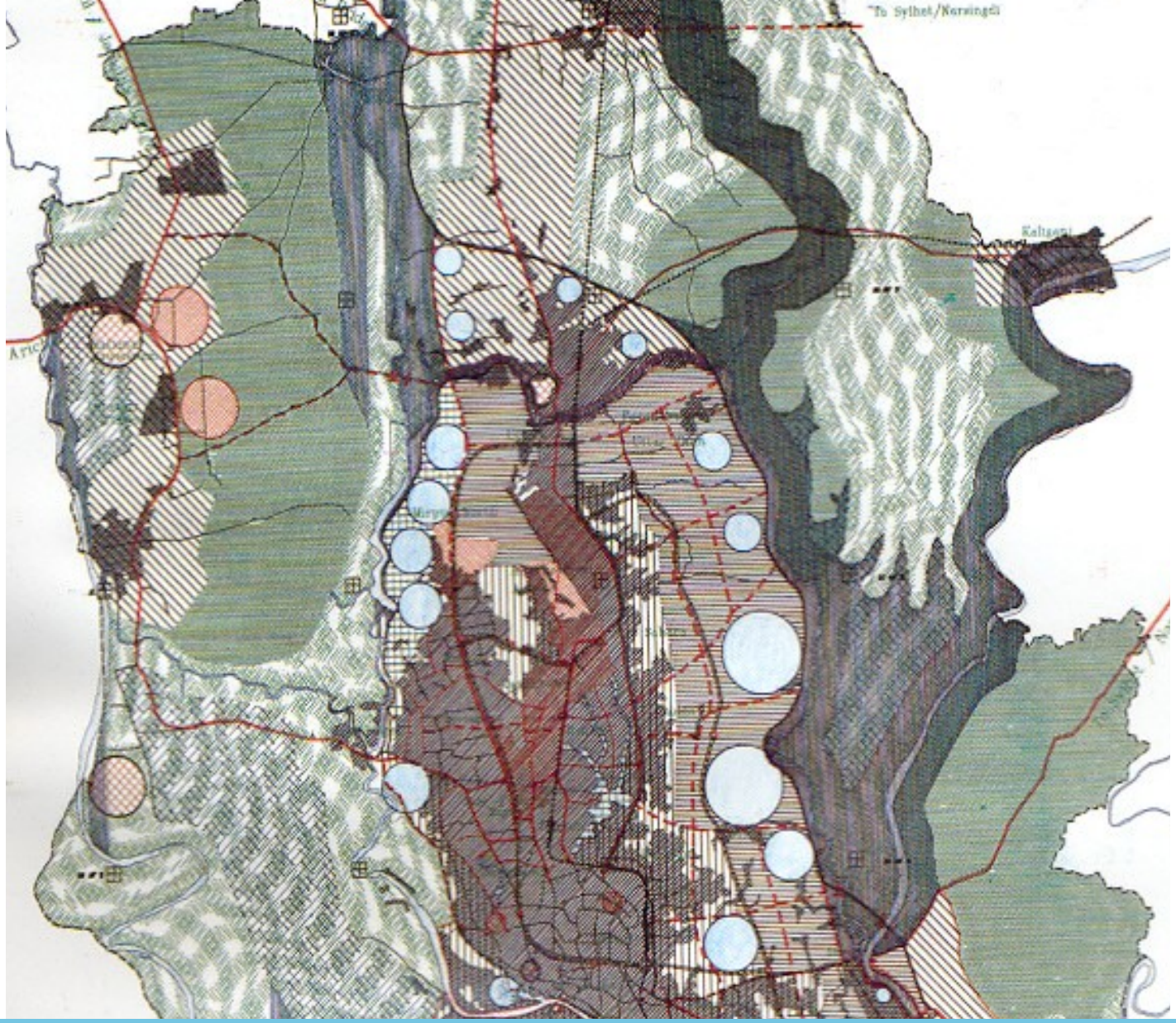
Solid Waste & Sewage Pollution of Waterbody

Solid waste Dolai Khal

Open Toilets on Waterbody

Municipal waste disposal into city water bodies

Dhaka city population generate about 4,000 tons of solid waste, of which less than 50% is disposed in the landfill site and a significant part goes into the water bodies



Planning and Development Control Related with Wetland

Water Related Policies and Acts of Bangladesh

- *National Water Management Plan, 2004*
- *Bangladesh Water Development Board Act 2000*
- *Urban Water Body Protection Law 2001.*
- *Irrigation Water Rate Ordinance 1983*
- *National Water Policy, 1999*
- *Water Resources Planning Act 1992*

Water Related Policies and Acts of Bangladesh

- National Environment Policy 1992
- Environment Conservation Act 1995
- Environment Conservation Rules 1997
- Environment Court Act 2000
- Wetland Protection Act 2000
- National Policy for Safe Water Supply and Sanitation 1998
- Groundwater Management Ordinance 1985
- Water Supply and Sewerage Authority Act 1996
- National Forestry Policy 1994
- National Fisheries Policy 1998
- National Agriculture Policy 1999
- Industrial Policy 1999.
- EIA Guidelines for Industries 1997
- Dhaka Metropolitan Development Plan,1997
- Municipal Ordinance, 1993

Planning & Development Control

- First Master Plan in 1959 covering an area of 829 sq. kms.
- The strategy plan prepared in 1980 was not implemented.
- In the year 1992, the DMDP project was undertaken. Plan was published in 1997.

Components of Dhaka Metropolitan Development Plan

***Structure Plan*:** It provides a long term strategy for the 20 years (1995-2015) for the development of Metro Dhaka.

The Urban Area Plan (UAP): It presents an interim mid term strategy for 10 years (1995-2005) and covers for the development of urban areas within Metro Dhaka.

Detailed Area Plan (DAP): It provides detailed planning proposals for specific sub-areas of Dhaka

Wetlands in Dhaka Metropolitan Development Plan

Laws and Policies to Conserve and Manage Flood Flow Zones in Dhaka Metro

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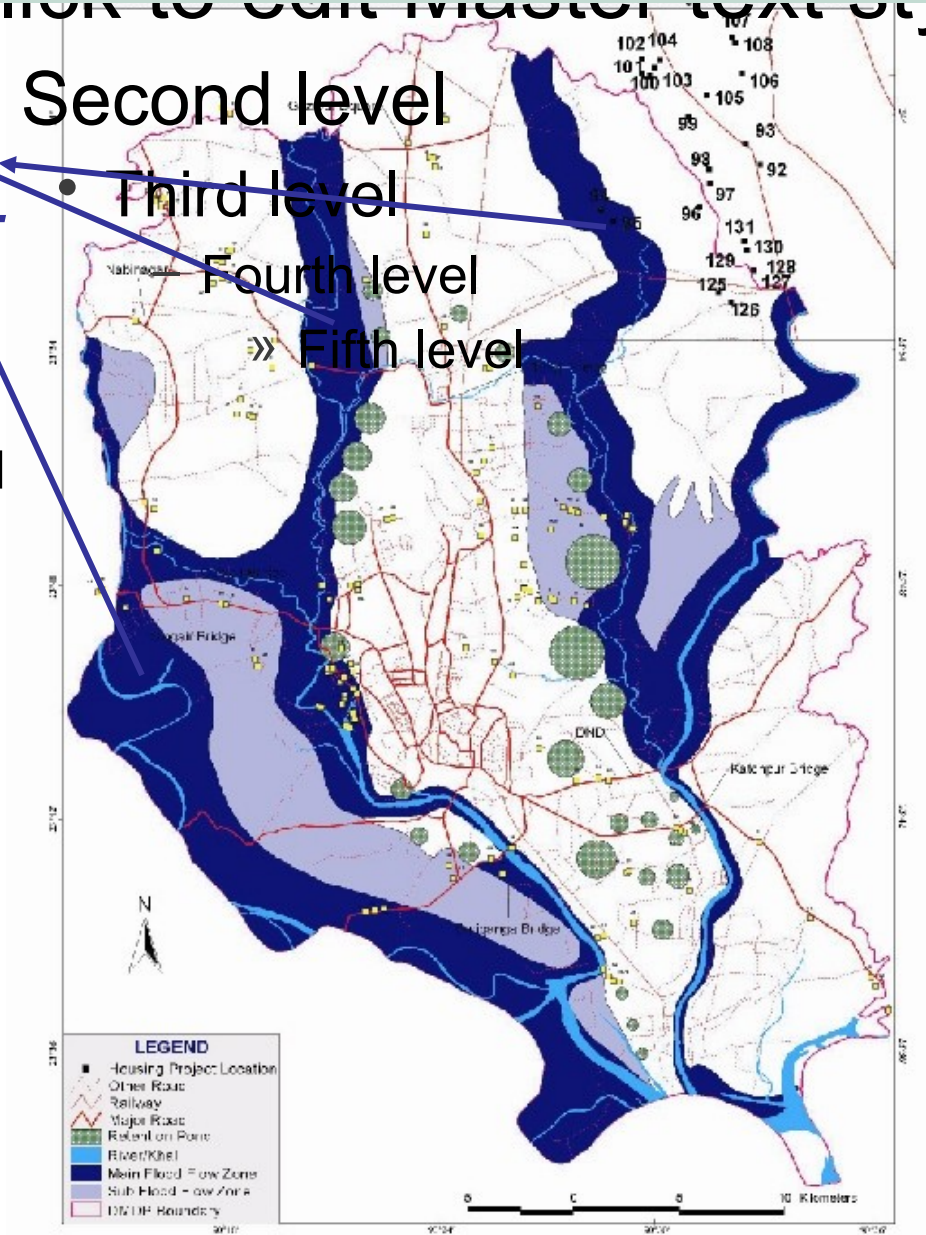
FLOOD ZONE POLICY RS/3- FLOOD-FLOW ZONES

Land development, within the designated flood plain areas of the DMDP Structure Plan, will be controlled in order to avoid obstructions to flood flow.

Main Flood Flow Zone

Land Development for residential, commercial and industrial development including raising the level of land via land filling will strictly be prohibited.



Laws and Policies to Conserve and Manage Flood Retention Ponds in Dhaka Metro

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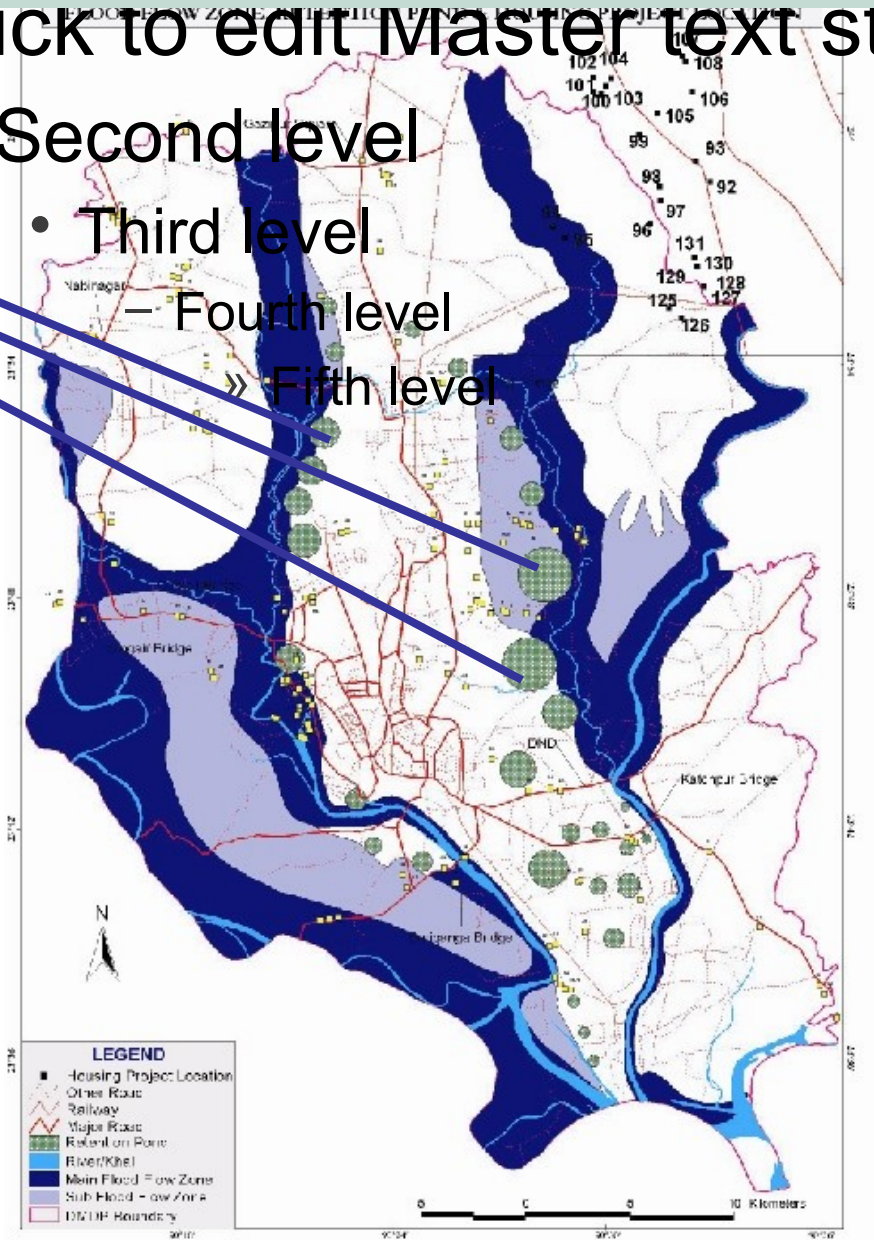
POLICY RS/5 – FLOOD RETENTION PONDS

Control will be maintained over the areas designated in the DMDP Structure Plan for flood retention ponds in order to ensure that they remain capable of fulfilling their primary function of water storage at times of flooding.

The use of the land within designated pond areas to be restricted to the following activities:
Agriculture; (ii) Fish cultivation and (iii) Recreation.



Efforts to Save Wetlands

Detailed Area Plan (DAP)

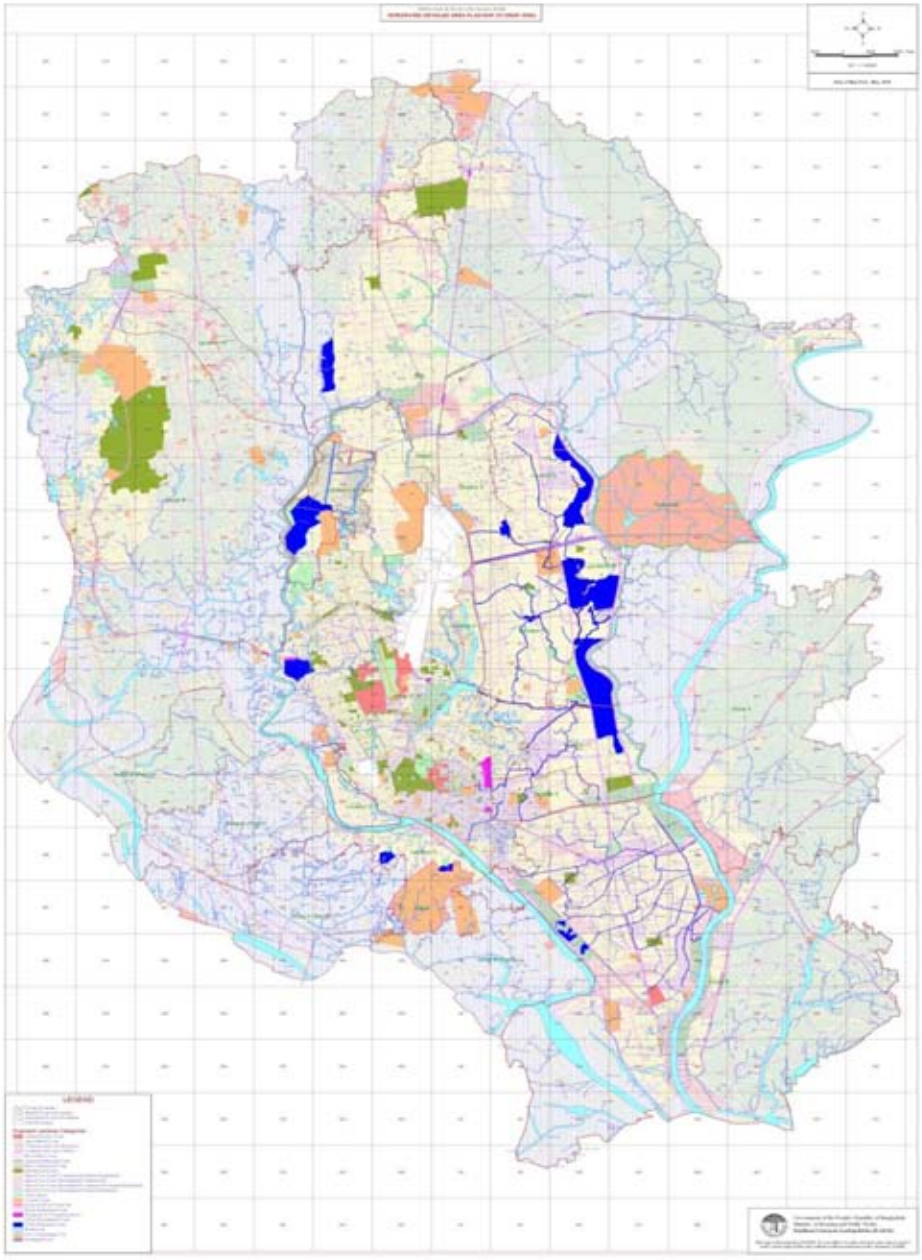
DAP is finalized after long battle with private developers and other vested interest groups.

Following organizations played important role for gazette notification of DAP

- **BIP (Bangladesh Institute of Planners)**
- **BAPA (*Bangladesh Poribesh Andolon,* Bangladesh Environemnt Movement)**
- **IAB (Institute of Architects Bangladesh)**
- **Bangladesh Environemntal Lawyers Association (BELA)**
- **Center of Urban Studies (CUS) are working together to study the proposed DAP and suggest necessary modification**

Detailed Area Plan:
Flood Flow Zone and Retention Pond

Landuse	Hectare	% of Total Area
Flood Flow Zone	30215.12	21%
Water Retention Area	2241.97	2%
Water Body	8447.14	6%

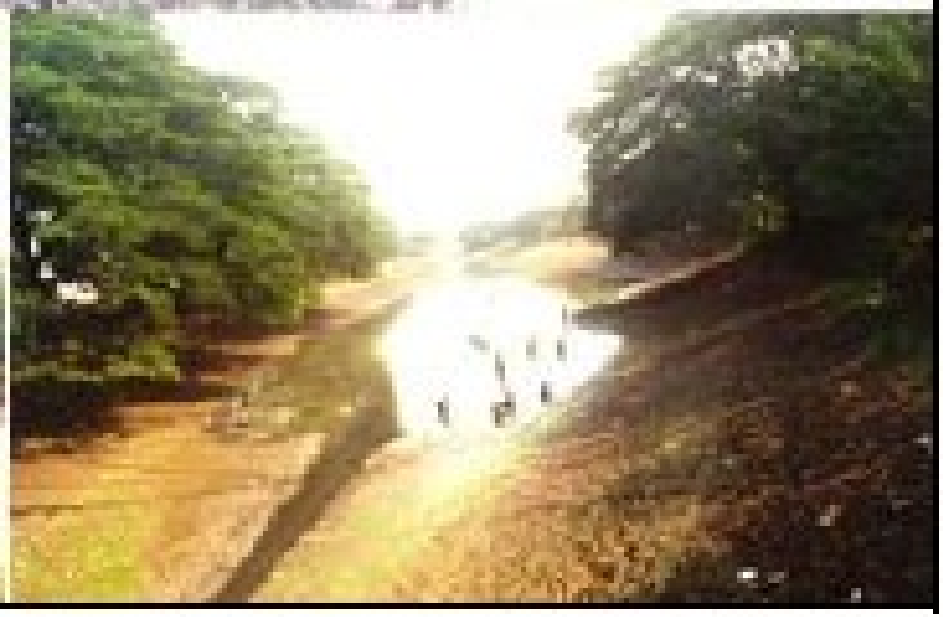


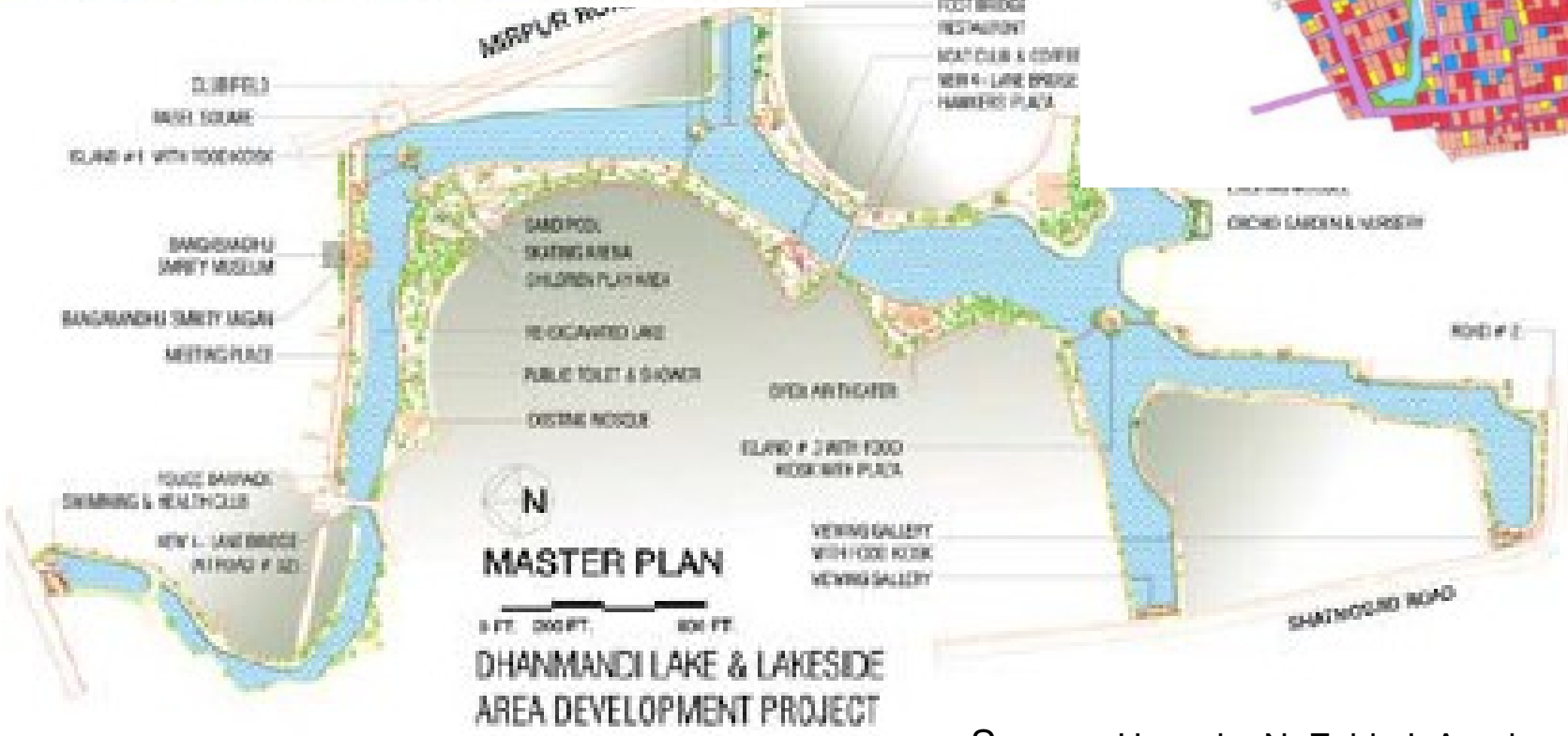
Legal Stands

- Metro Makers & Developers Ltd Vs RAJUK (WP no 5103/2003) Flood Flow Zone, Savar
- Jamuna Group Vs RAJUK (WP 63/2001) Flood Flow Zone, Asulia
- East West Vs RAJUK (Case No 24/2002 Badda Thana)
- East West Vs RAJUK (Case No 41/2003 Badda Thana)
- East West Vs RAJUK (WP no 1597/2007) RiverView Project, Keraniganj
- Eastern Housing Vs RAJUK (Case No 87/2004 Savar Thana), Mayakanon Savar
- Amin Mohammad Land Ltd Vs RAJUK (Case No 07/2003 Demra Thana) , Green View Model Town
- Rupayan Real Estate Ltd Vs RAJUK (Case No 52/2004, Uttara Thana)

Human Rights and Peace for Bangladesh (HRPB) filed the writ petition on December 6, 2010. Construction and earth filling in Haikkar Khal at Mohammadpur in the capital.

Dhanmondi Lake





Source: Hossain, N; Zahir, I; Apurba, P, 2009

Life in Dhanmondi Lake

Photo source: Hossain, N; Zahir, I; Apurba, P, 2009

Hatirjheel Project

Hatirjheel development is a noteworthy project recently taken up by the government on October 8, 2007.

Hatirjheel Project

ACCESS & CIRCULATION TRANSPORTATION

LAKESHORE ALIGNMENT

EAST WEST TRANSIT

NORTH SOUTH CONNECTION

MARITIME TRAFFIC WATER TAXI

TOURIST BOAT

BRIDGE LINK

PADESTRIAN WALK
CYCLE TRACK

BUS ROUTE

ENVIRONMENT

WATER RETENTION

WATER TREATMENT

UNDERGROUND WATER RECHARGE

REVIVAL OF BIODIVERSITY

IMPROVEMENT OF MICROCLIMATE

CIVIC FACILITIES

GREEN

- THEMATIC GARDEN
- PLAYGROUND
- PICNIC AREAS (FAMILY)
- FOREST

PLAZAS

- PARKING
- MEETING POINTS
- NODES
- OPEN AIR THEATER,
- SITTING AREA GHAT,

PLATFORM

KIOSK & PAVILION

- INFO BOX, POLICE, TOILETS
- SALES KIOSK
- REFRESHMENT BAR

Hatirjheel Project

Reclamation and Excavation of Canal

- 43 canals in Dhaka city.
- Dhaka WASA started to remove unauthorized structures in 26 canals of Dhaka.
- Roads, box culverts, structures obstruct water flow in 17 canals. WASA does not have control over remaining 8 canals.
- Prepared detail report on the status of canals.

Civic Society and Media

Plate B.2 Save the Buriganga Movement, Bangladesh Paribesh Andolon and Nirbheek jointly organise a human chain on a boat on the Buriganga River in Swarighat area demanding steps to save rivers. (Source: The Daily Star 31/05/2009)

Civic Society and Media

Date	Title
29/05/2003	Clean Buriganga drive stops at illegal religious sites
16/07/2003	Utility system loss and Buriganga conservation city priorities
28/07/2003	Can we save our water bodies?
10/09/2003	Fresh eviction drive soon on Buriganga
15/09/2003	Legal cover to plunder Buriganga
19/09/2003	The water bodies of Dhaka-Part II
16/10/2003	Save Buriganga
20/10/2003	66 illegal structures cleared off Buriganga
22/10/2003	49 more illegal outfits knocked down in clean Buriganga drive
23/10/2003	Encroachers come back as 112 more structures demolished
25/10/2003	Activists call for non-stop demolition
26/10/2003	Action against Buriganga grabbers
26/10/2003	Gian encroachers knocked down
27/10/2003	Fence off Buriganga, stop grabbers' return
30/10/2003	Integrated plan to save Buriganga announced
2/11/2003	Encroachers slip through dragnet
3/11/2003	Buriganga hits a new pollution high
15/12/2003	Buriganga encroachers raising heads again
19/12/2003	Human habitat and national priorities
20/12/2003	River raiders and polluters on the loose
29/12/2003	Buriganga: a river or a refuse ground
30/12/2003	Buriganga again: pollution is killing Dhaka's lifeline

243 reports to save Buriganga River (May 2003 to December 2010) in Daily Star

Socio-cultural Issues

Possible Intervention

Conservation program must include local people. Formation of local wetland protection body.

Institutional & legal support for local people with grass root teams.

Prevention of land speculation through land management policy

Awareness generation among all

Economic Issues

Possible Intervention

Reform of taxation policy to Reduce financial gain from land holding

Banning of advertisement of unauthorized projects in media.

Publication of list of unauthorized land development projects

Introduce incentive for cultivator to conserve wetland

Institutional & Planning Issues

Possible Intervention

Formation of wetland protection cell & Networking Among actors

Autonomy and strengthening of planning agency with decentralized structure

Enforcement of existing rules and acts.
Demarcation of wetland on Ground

Appropriate development strategy to accommodate Future growth

Views of Officials and Experts

- Application of law should be ensured.
- Immediate demarcation of wetland area is necessary.
- Discourage investment on land.
- Without acquisition and incentive program, it would be very difficult to control use of private property.
- **Political will is very important.**

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Lets Work Together to Save Remaining Water Bodies of Bangladesh Before it Gets to Late

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