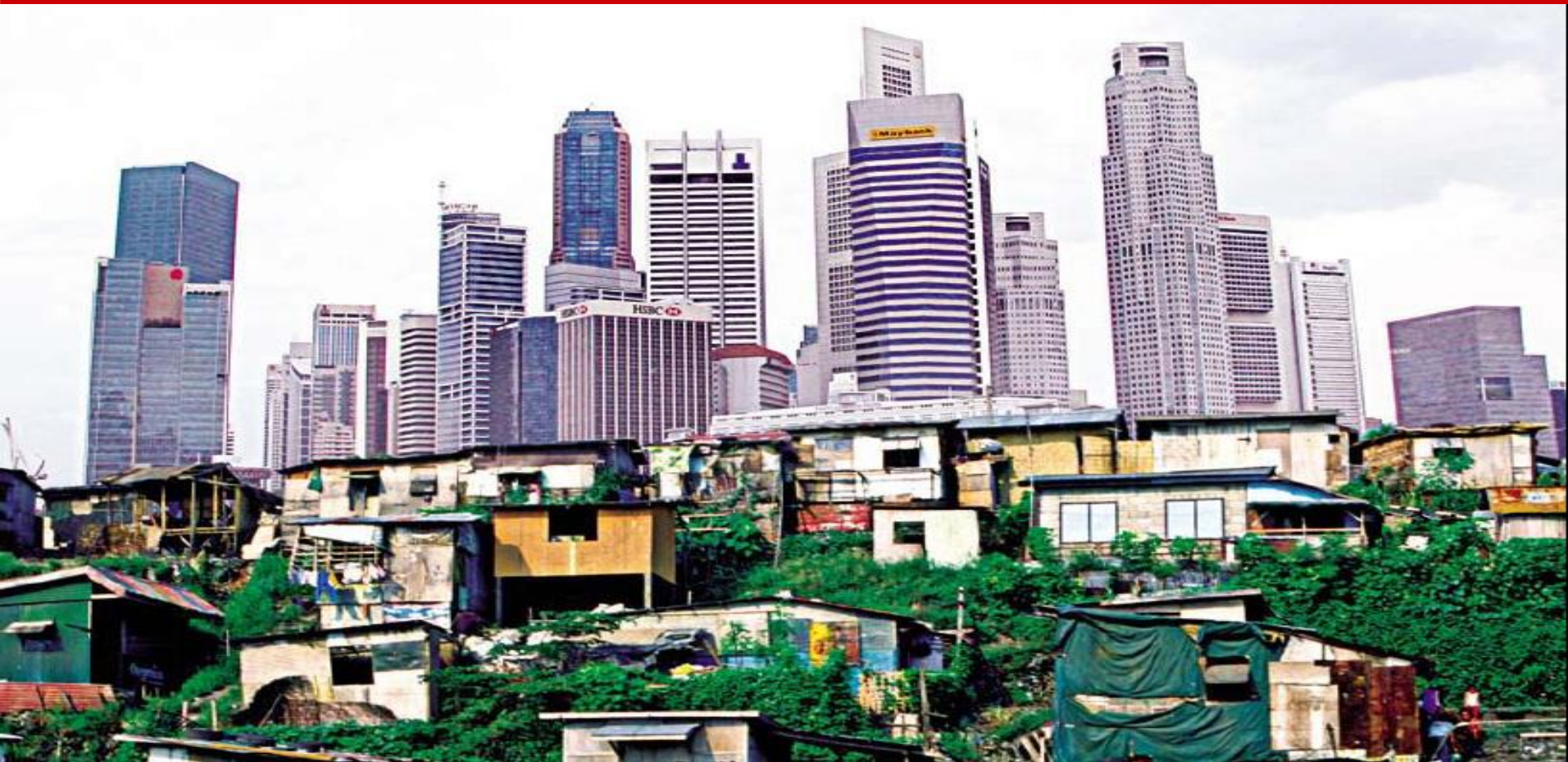
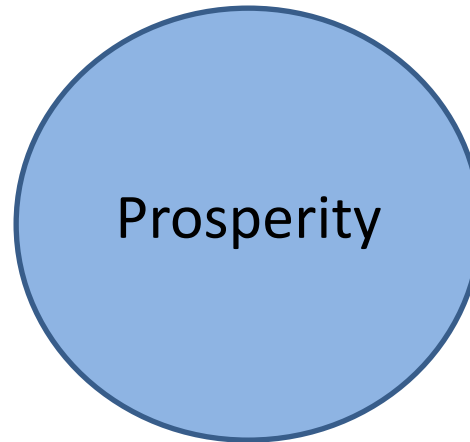
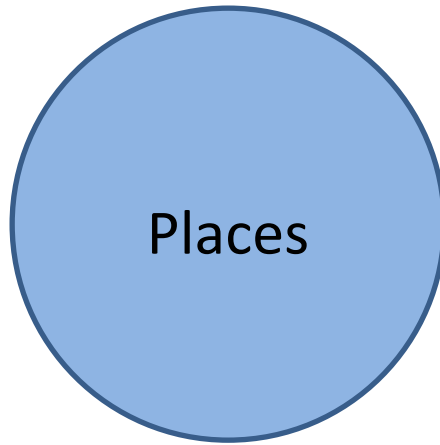
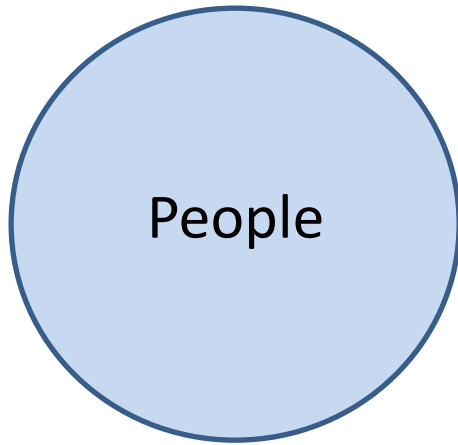


Urban Development and WATSAN services in Low and Middle-Income Countries

Dinesh Mehta, CEPT University, INDIA

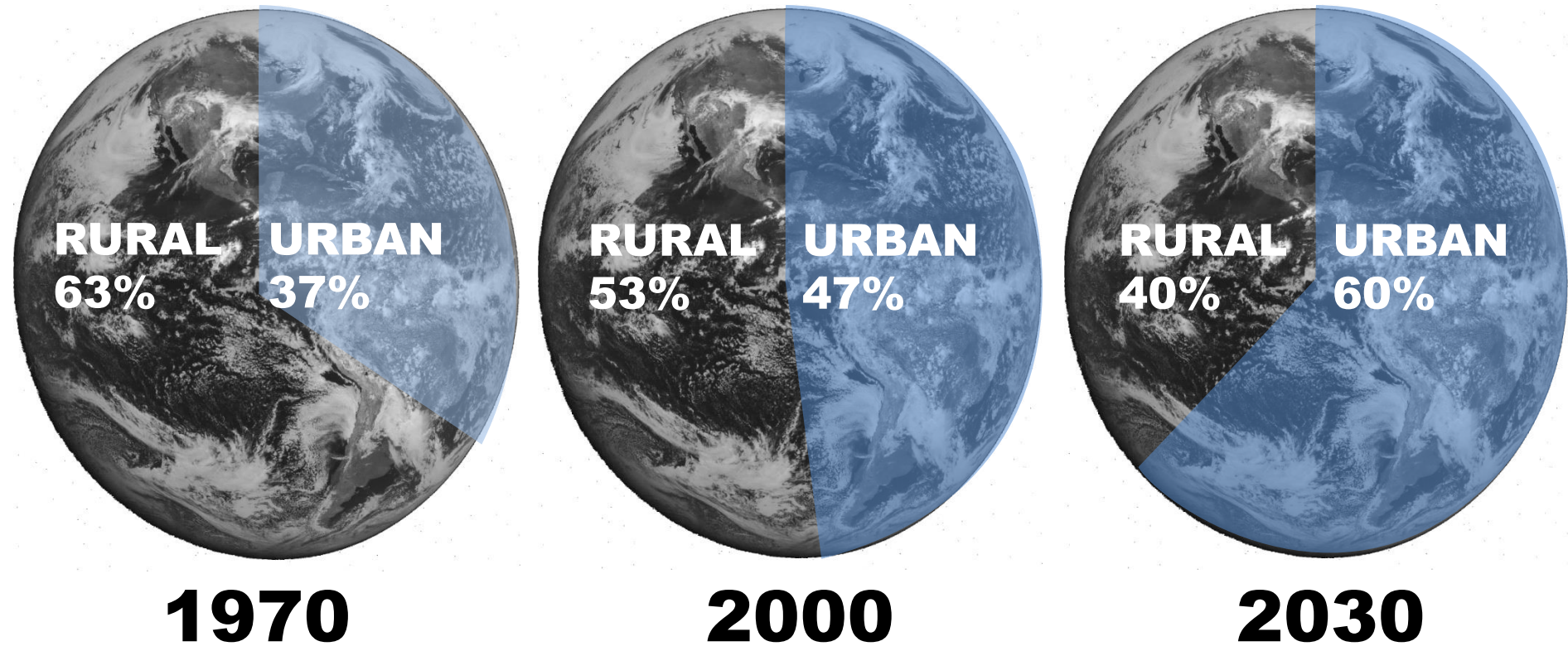


Urban Development – 4 Ps

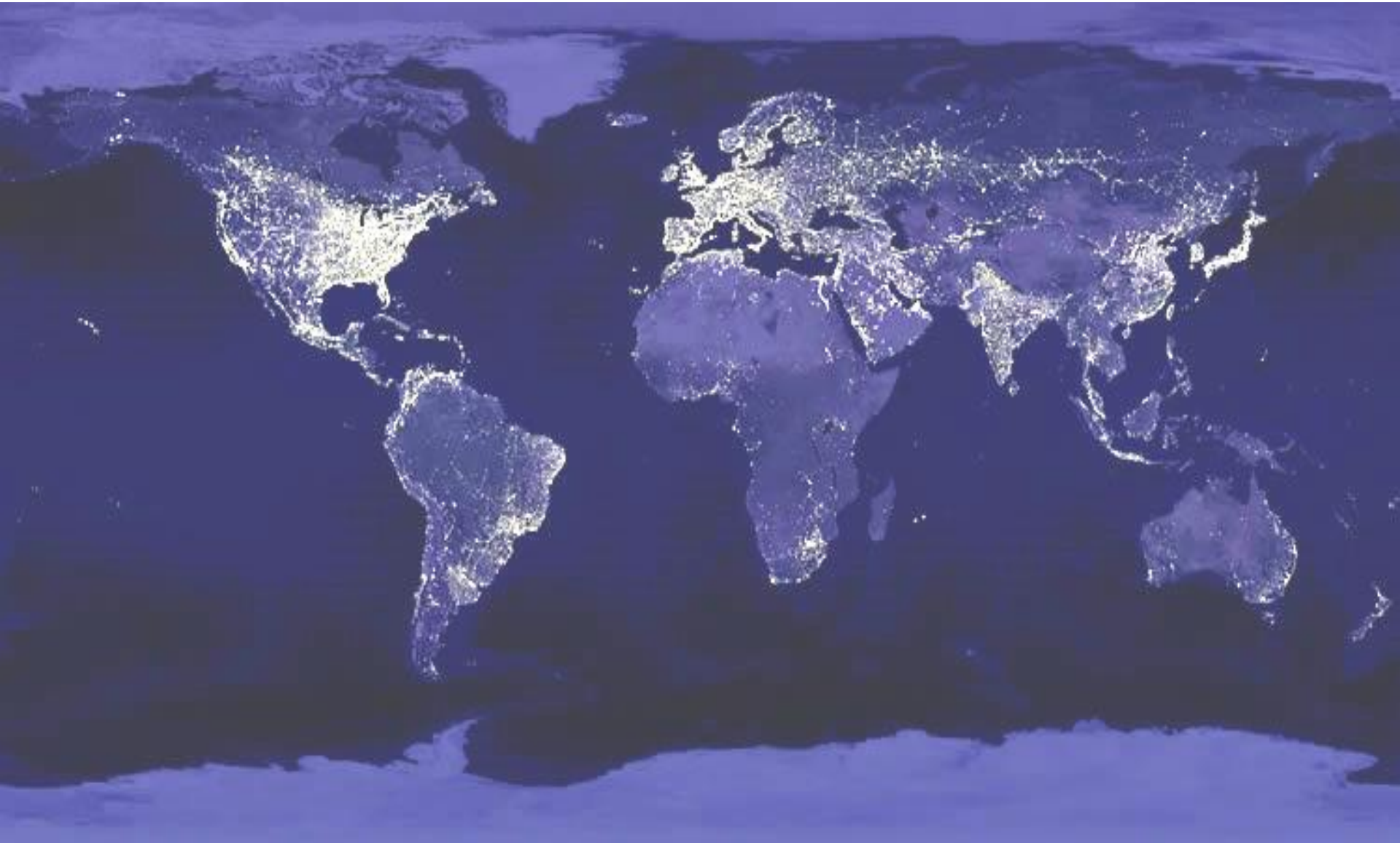


PEOPLE

GLOBAL POPULATION URBAN/RURAL



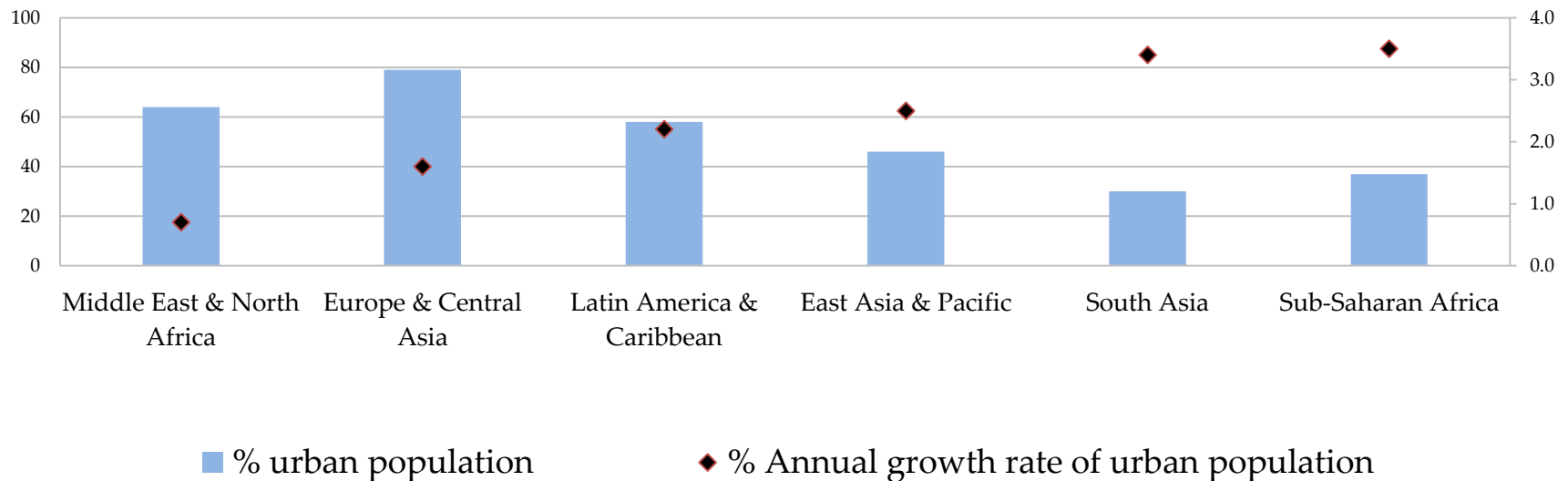
Where are the cities of the world?



LAMIC countries are varied

Low income		Lower middle income		Upper middle income		Total	
No of countries	No of cities	No of countries	No of cities	No of countries	No of cities	No of countries	No of cities
35	1757	56	5836	54	12392	145	19985

Urbanisation levels in LAMIC



PLACES

Spatial growth three times population growth

Accra, Ghana



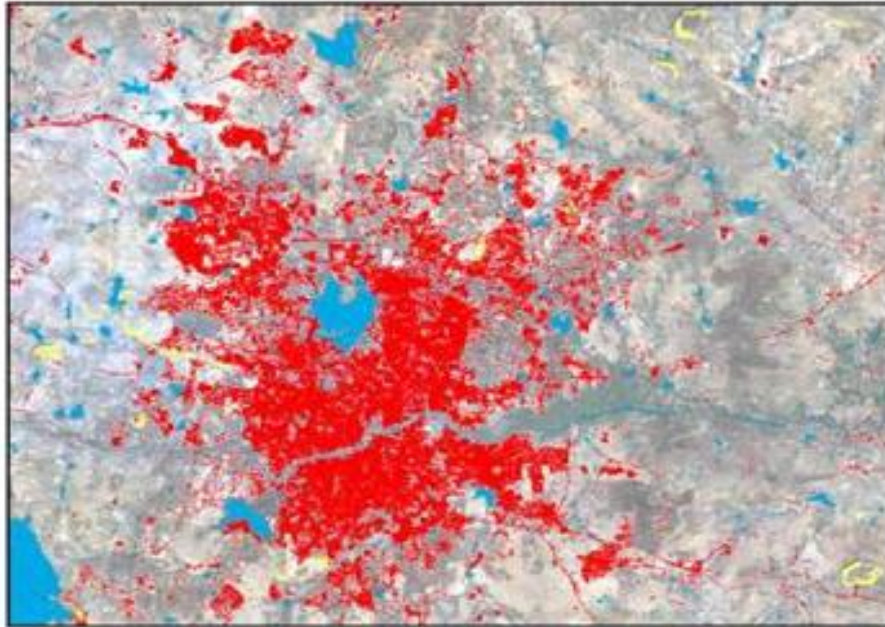
T₁: 6-Mar-85



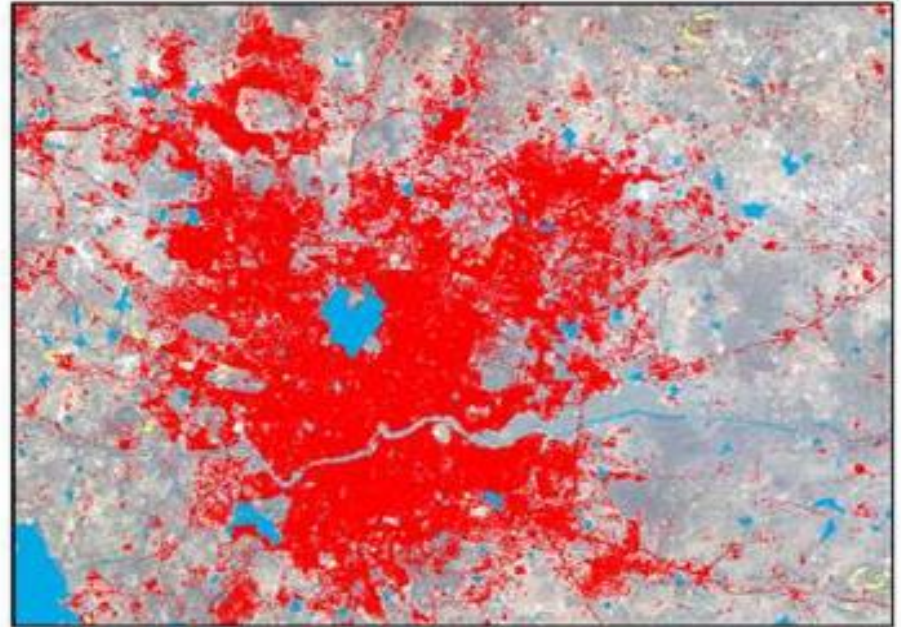
T₂: 4-Feb-00

With expanding cities, infrastructure costs rise

Hyderabad, India



T₁: 21-Nov-89



T₂: 29-Oct-01

0 4 8 12 16 km

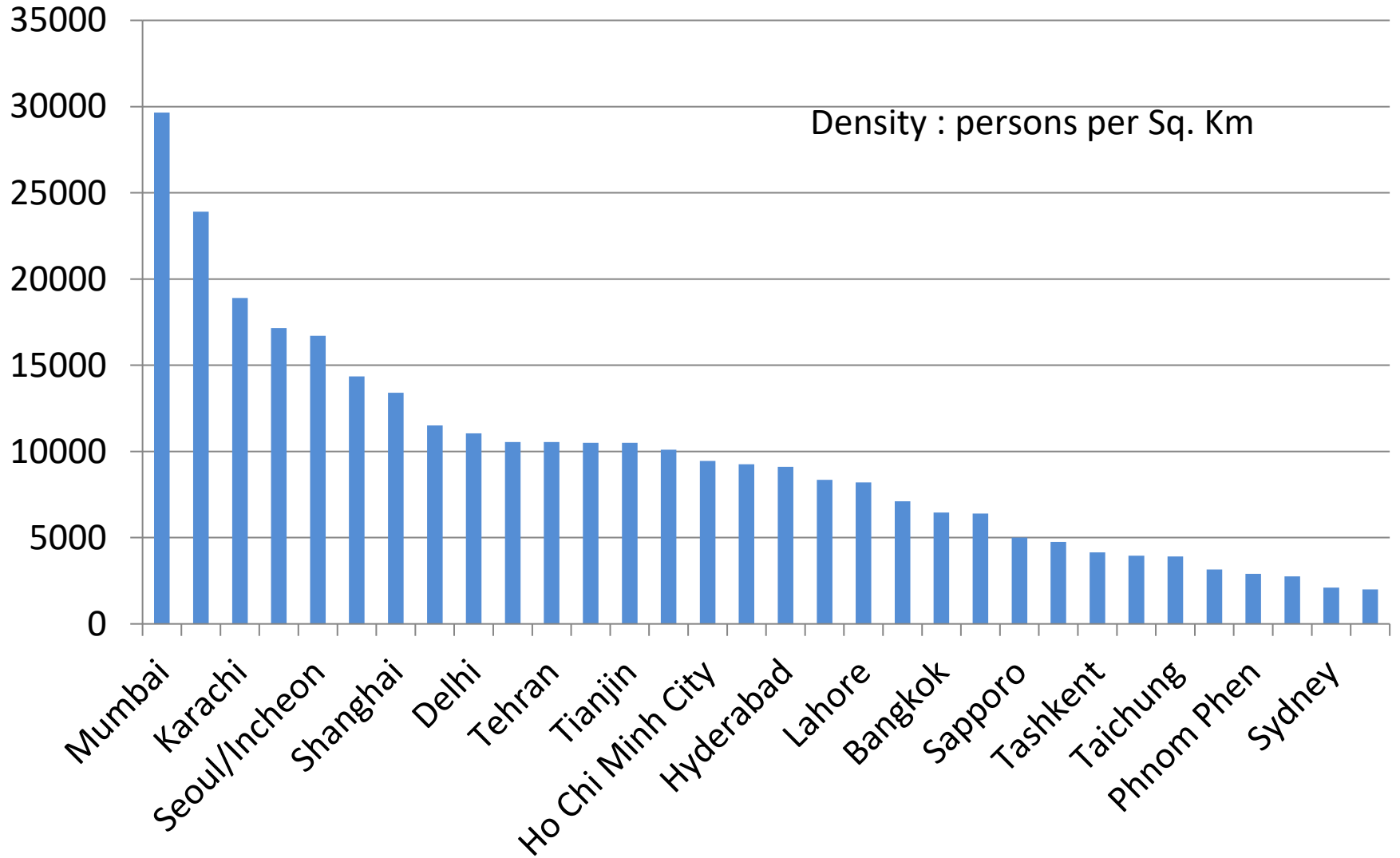


1:300,000



Measure	Annual		
	T ₁	T ₂	% Change
Population	4,887,789	5,707,677	1.31%
Built-Up Area (sq km)	166.96	301.89	5.09%
Average Density (persons / sq km)	29,275.98	18,906.43	-3.60%
Built-Up Area per Person (sq m)	34.16	52.89	3.73%
Average Slope of Built-Up Area (%)	2.82	3.12	0.84%
Maximum Slope of Built-Up Area (%)	14.43	17.16	1.46%
The Buildable Perimeter (%)	0.94	0.93	-0.04%
The Contiguity Index	0.75	0.88	1.36%
The Compactness Index	0.37	0.38	0.22%
Per Capita Gross Domestic Product	\$1,541.53	\$2,343.04	3.57%

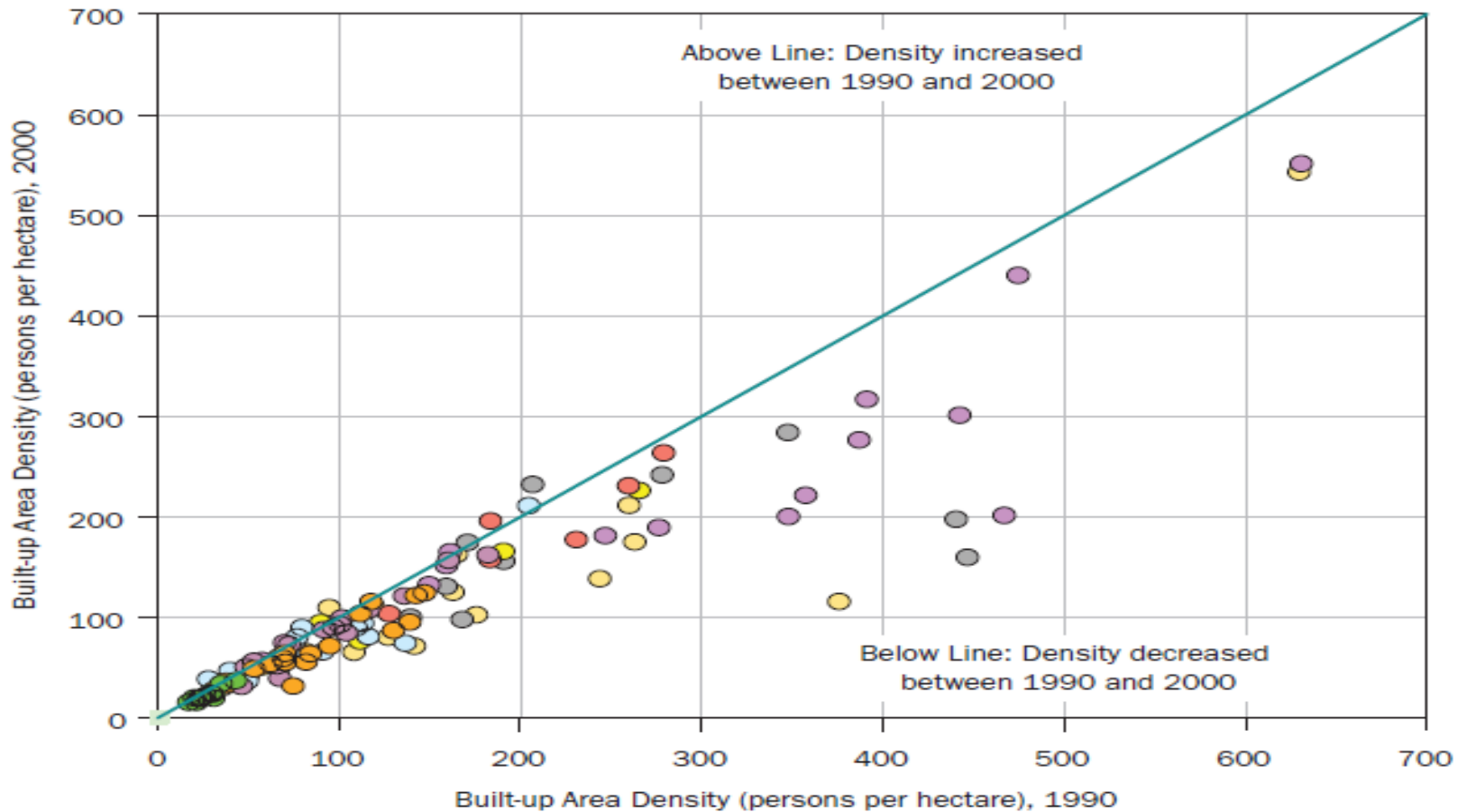
Cities have High Population Density



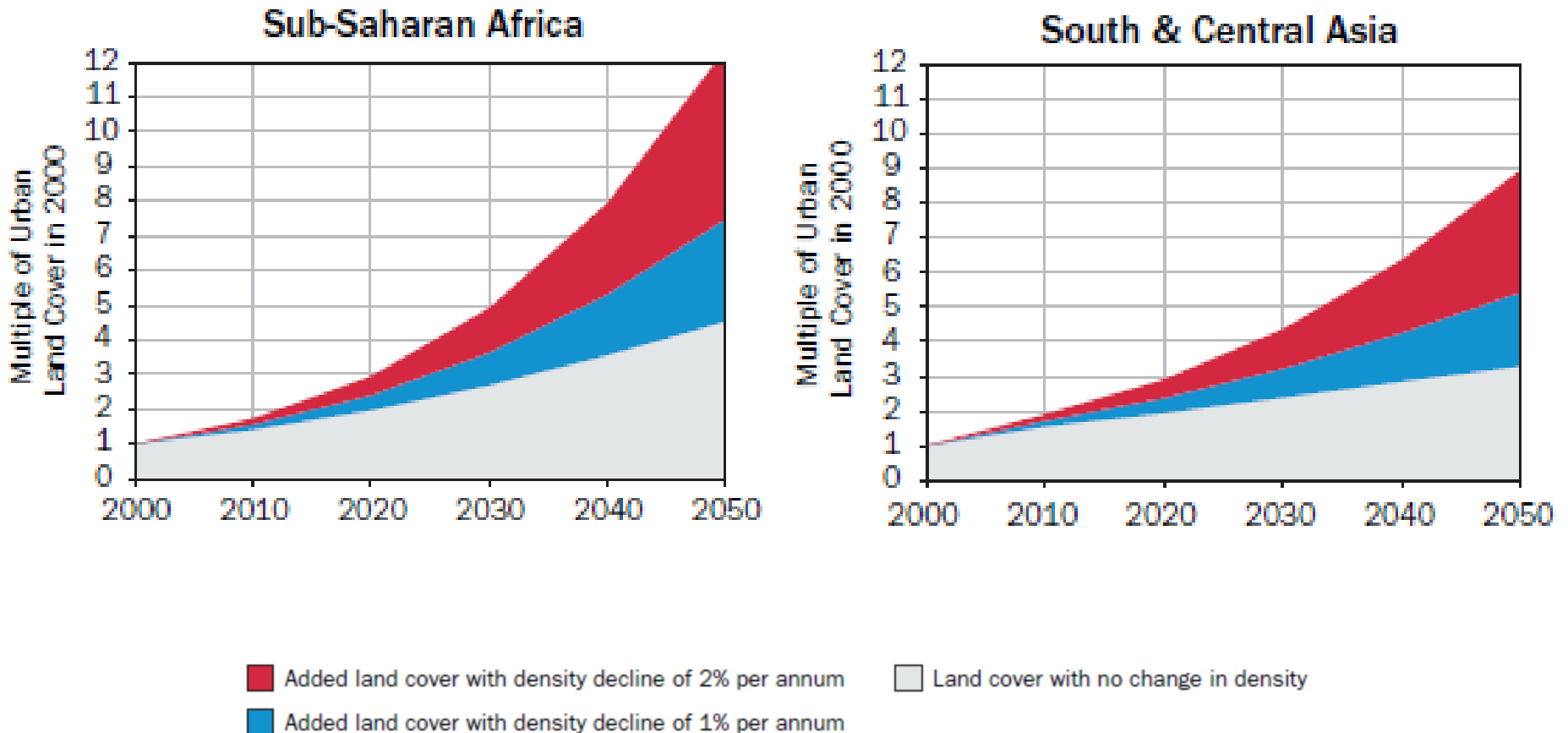
But the densities are declining

FIGURE 2.3

Density Decline in the Global Sample of 120 Cities, 1990–2000

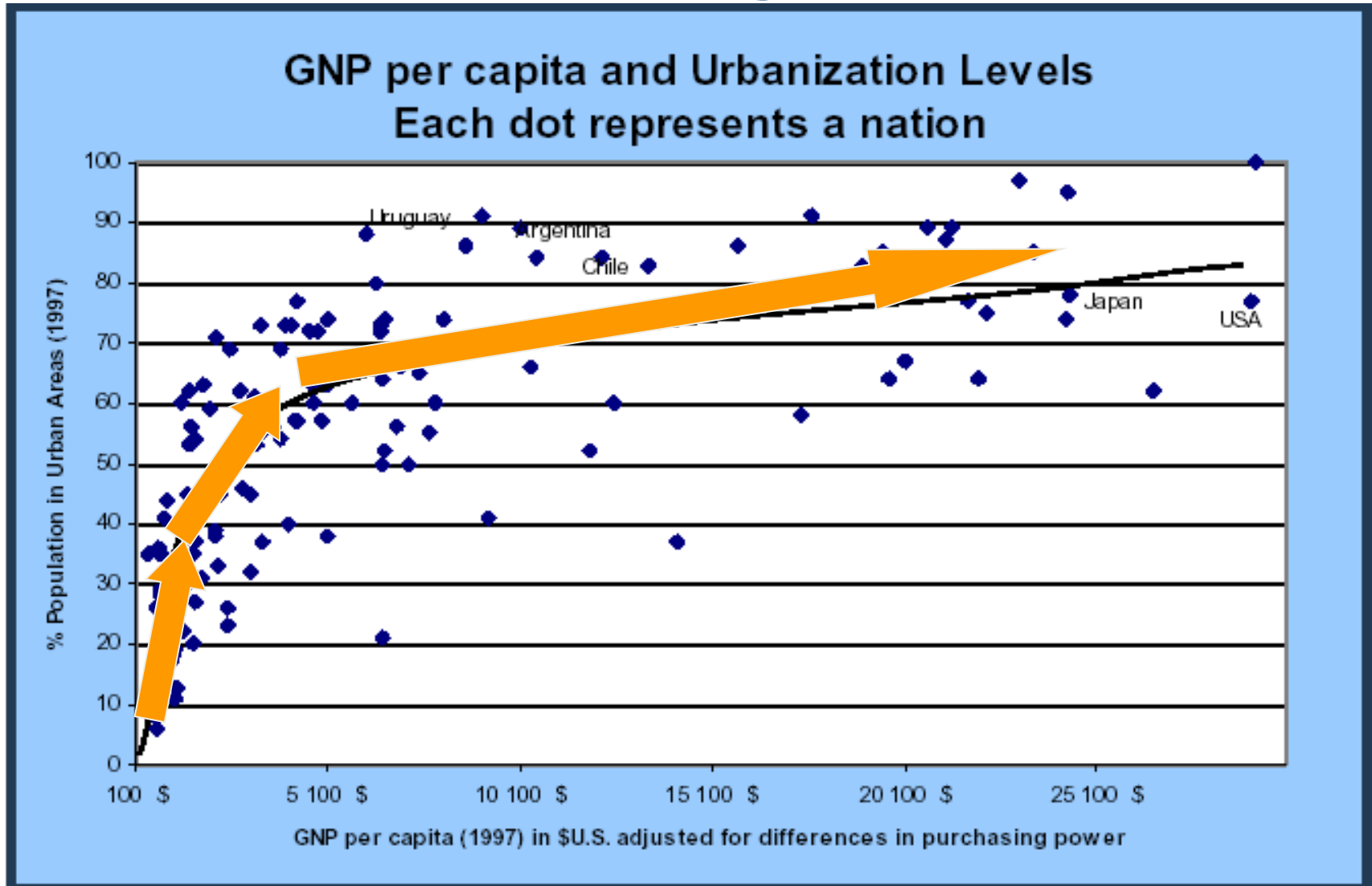


Large Urban land cover due to density declines



PROSPERITY

Urbanisation is the trigger for economic growth



Prosperous cities

The City 600 today ...*

1.5 billion

people live in these 600 cities—
22 percent of global population

\$30 trillion

of GDP in 2007—more than half of
global GDP

485 million

households, with average per capita GDP of

\$20,000

The top 100 cities generated

\$21 trillion

of GDP in 2007—38 percent
of the global total

... and tomorrow

2.0 billion

people will live in these 600 cities in 2025—
25 percent of the global population

\$64 trillion of GDP in 2025, nearly
60 percent of global GDP

735 million

households will live in these cities, with
average per capita GDP of

\$32,000

... of which

235 million

households in developing world
cities will have income above
\$20,000 per annum

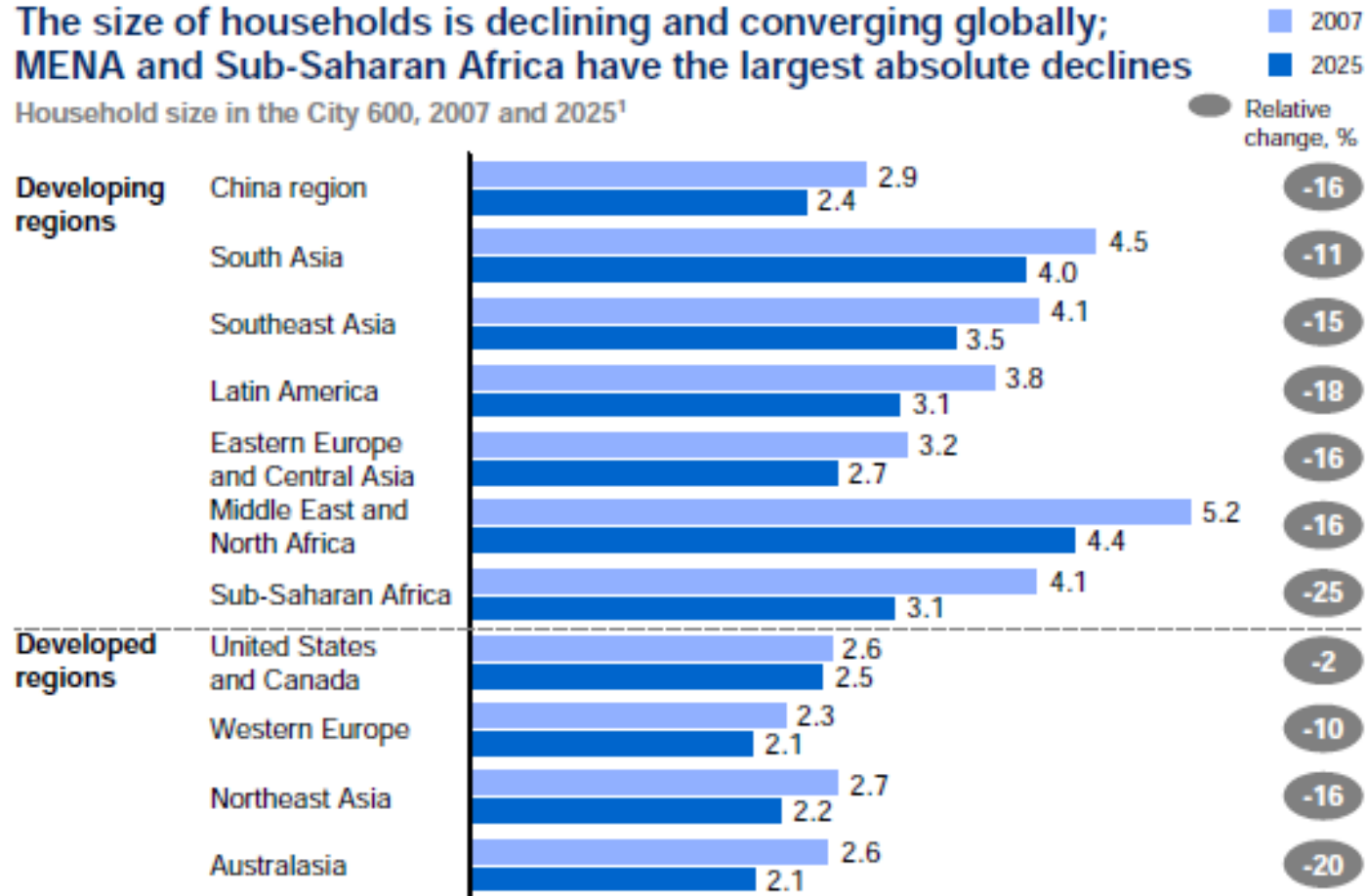
Declining Household Size :

More demand for Housing and related infrastructure

Exhibit 16

The size of households is declining and converging globally;
MENA and Sub-Saharan Africa have the largest absolute declines

Household size in the City 600, 2007 and 2025¹



¹ Household size calculated by taking the simple average of the household size of all cities within a region.

NOTE: Numbers may not sum due to rounding.

SOURCE: McKinsey Global Institute Cityscope 1.0

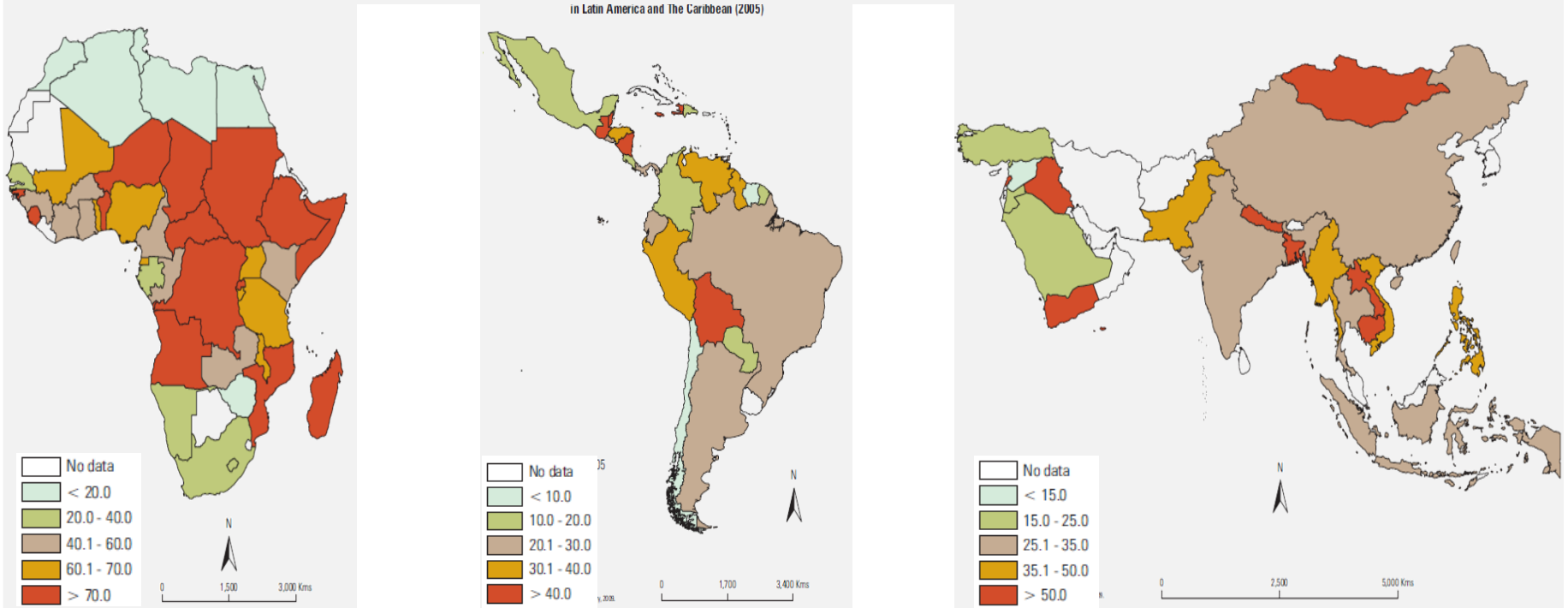
POVERTY

it is an unequal world



Poverty levels and slums in LAMIC

Slum proportion of select countries in Africa, Latin America and Asia



Source: UN-HABITAT, Global Urban Observatory, 2009

- Regions of ECA, LAC and MENA have between 14 to 20% of their urban population residing in slums
- Role of small service providers and affordability assume significance in this context

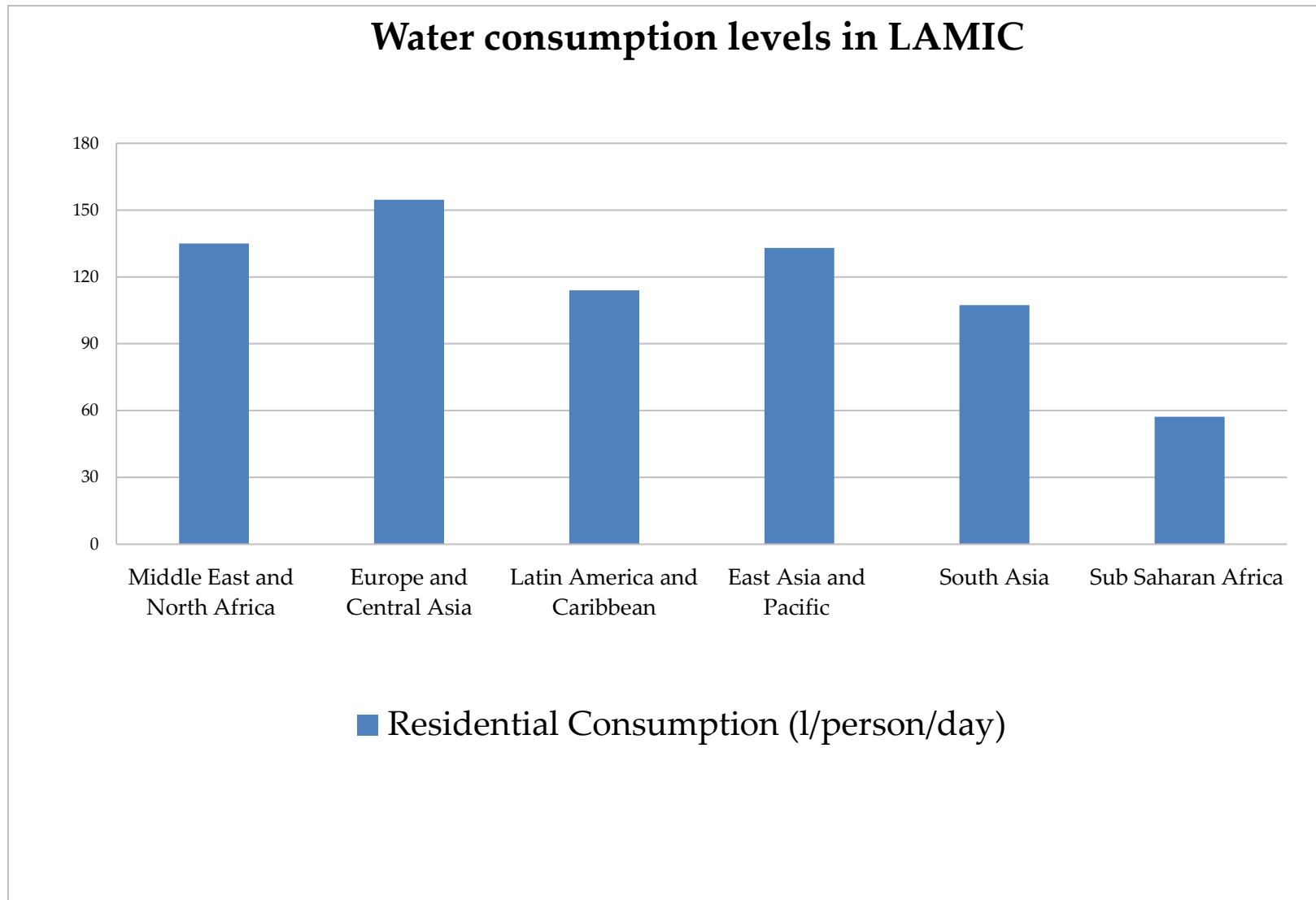
The poor are more vulnerable



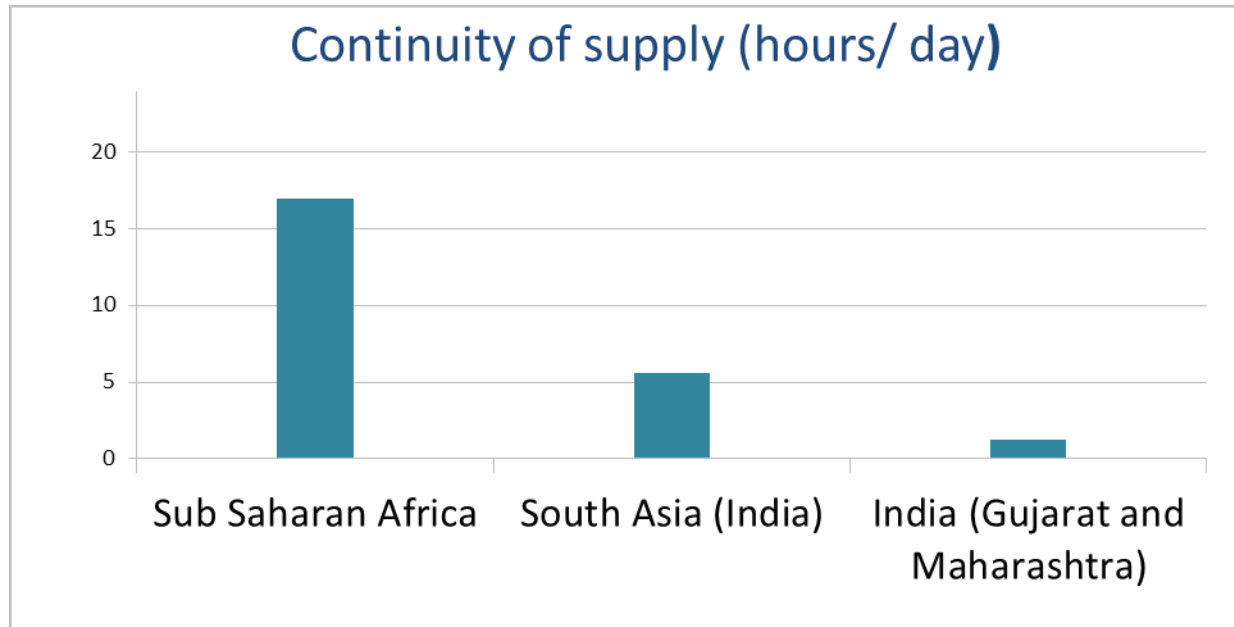
▲ Informal settlements on the bank of a canal in Manila, Philippines. ©Shadow216/Shutterstock



Critical areas of services in LAMIC: Service levels



Critical areas of services in LAMIC: Service levels



Days of Supply in a Month

No of days of water supply	No of cities			
	2009 - 10	2010 -11	2011 -12	2012-13
0 -7	8	8	5	4
7 - 15	13	13	14	25
15	46	45	46	37
15 - 30	7	7	6	4
30	91	92	95	97

NON WATER DAYS...

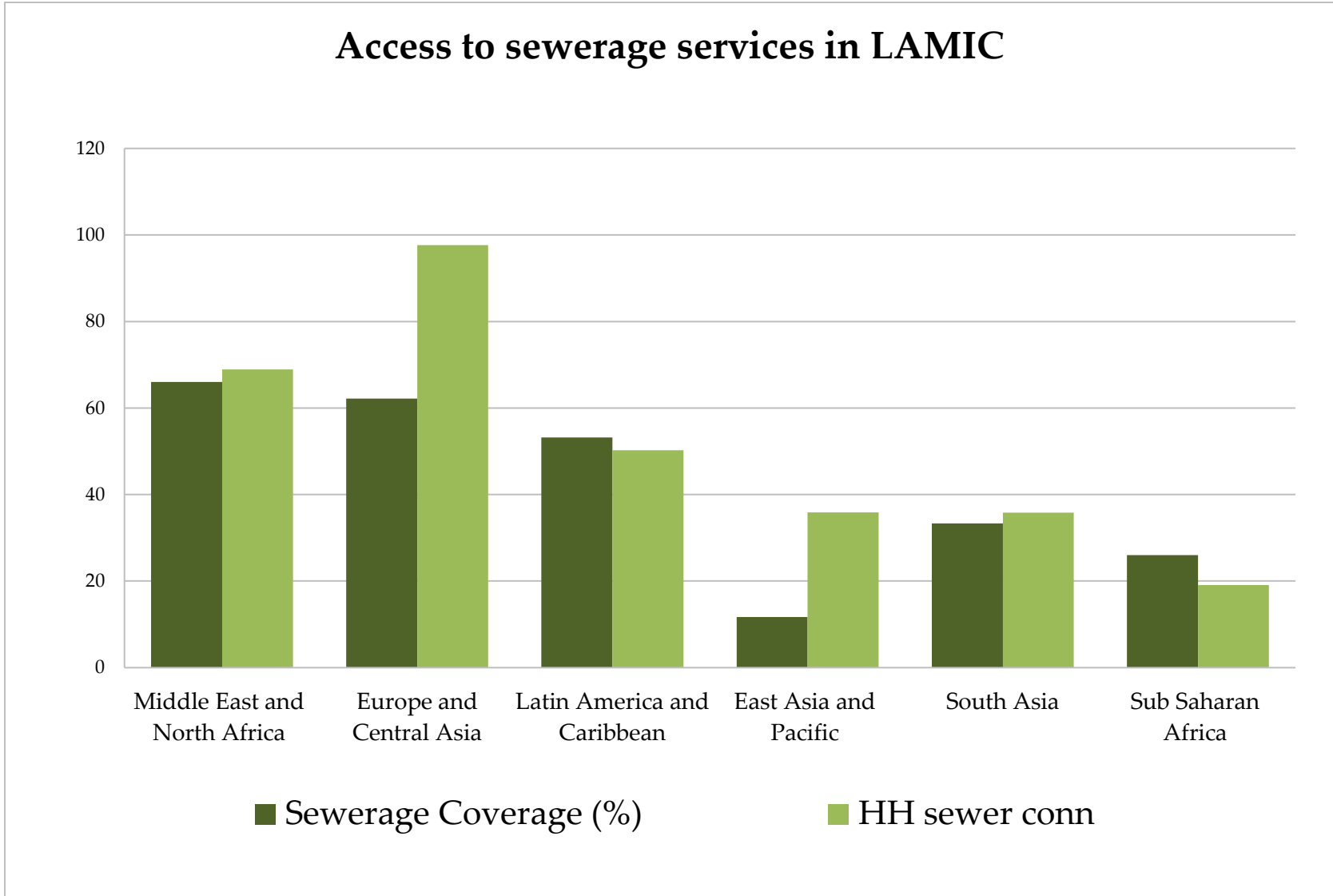


THE 'WATER DAY'

PERFORMANCE ASSESSMENT SYSTEMS- PARTNERS' MEET 2011



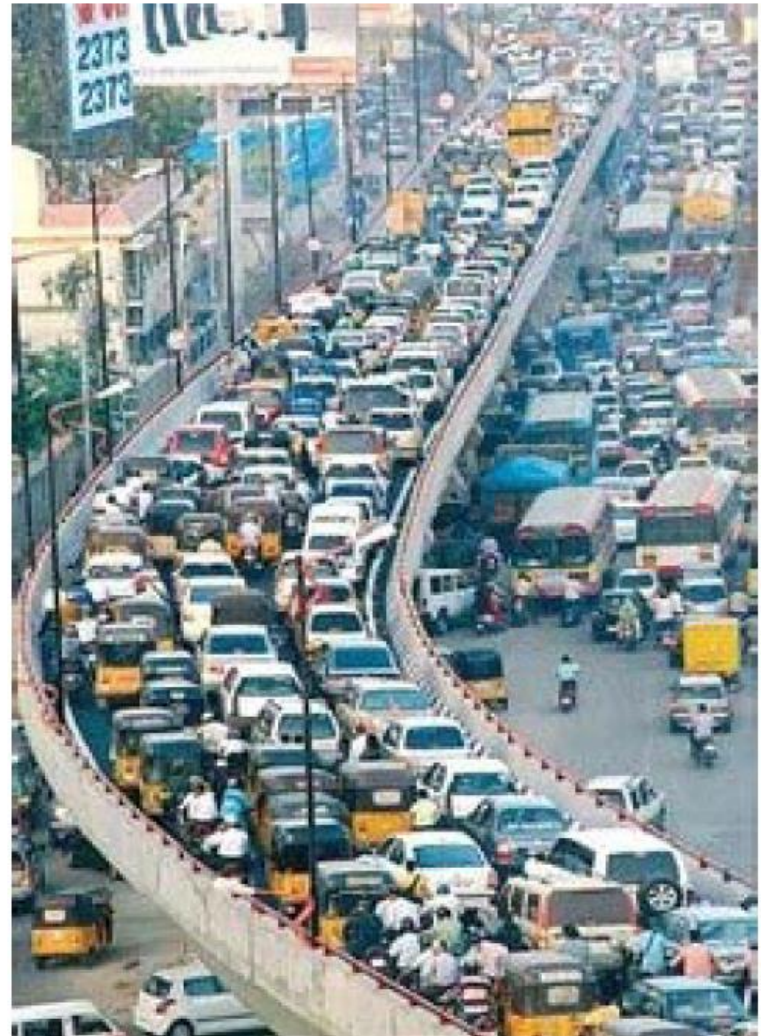
Critical areas of services in LAMIC: Sanitation coverage



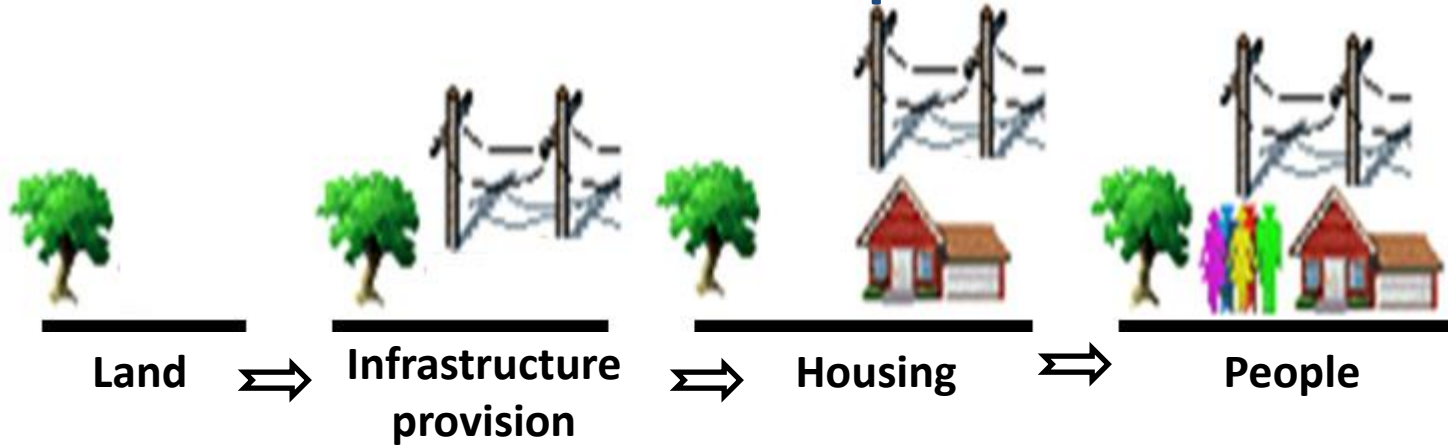
Urban Planning and Challenges of WATSAN

Urban planning dominated by transportation

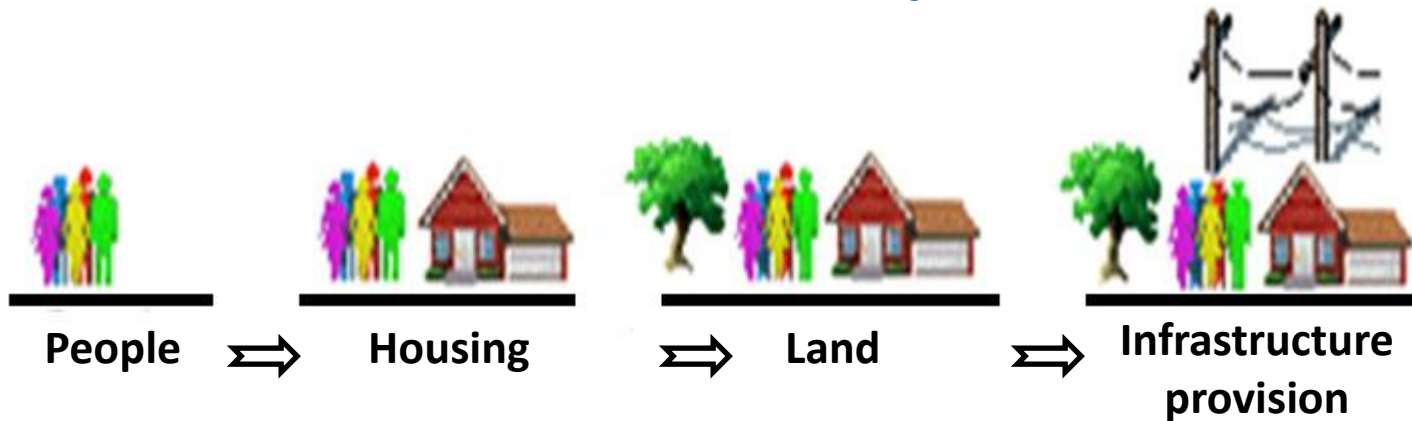
- Land use and transport planning is of paramount concern of planners
- Moving people is more important than serving people with basic services
- It is assumed that all infrastructure will follow roads
- But that is not always the best for water and sanitation systems



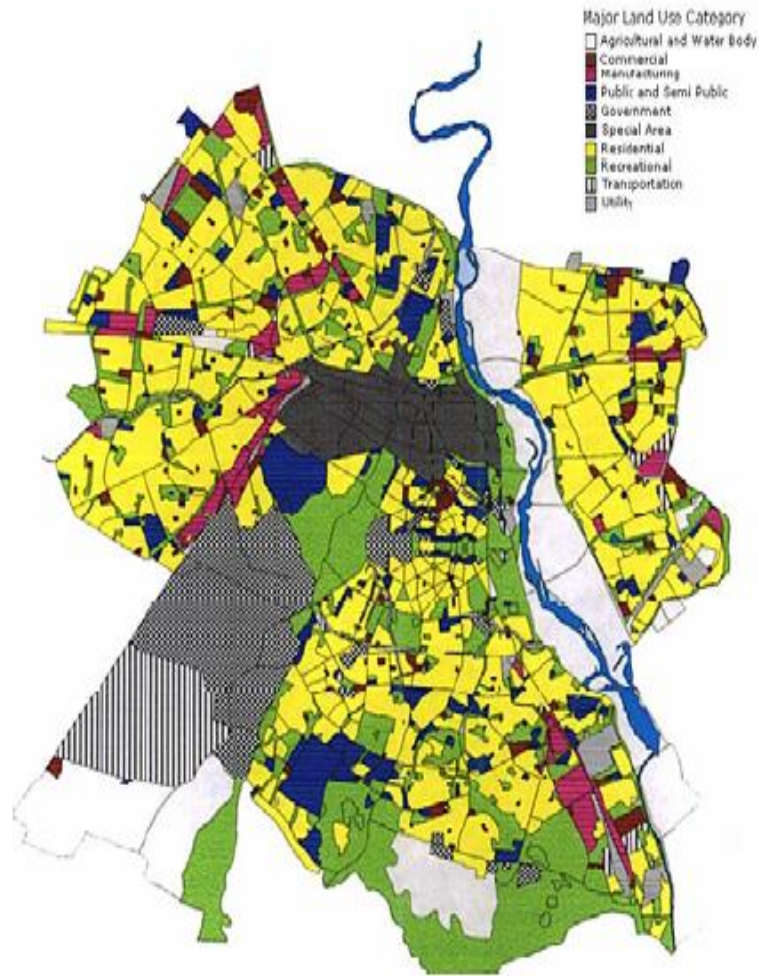
Formal Process of Urban Development



Informal Process of Urban Development



Planning and the Poor : Anti-Poor bias in Planning

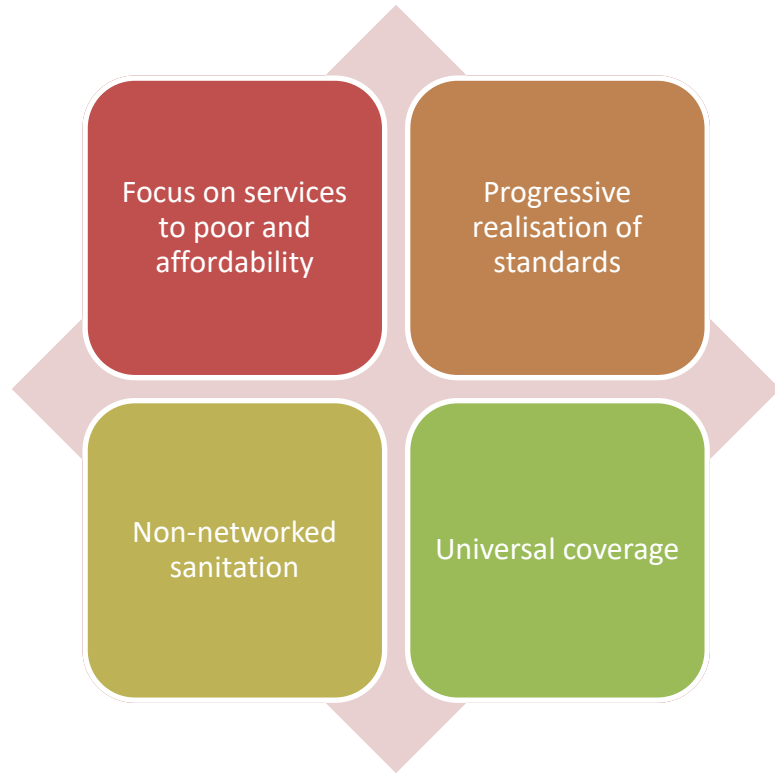


- Urban planning pre-occupied with land and its use
- Vision to make world-class cities only include the non-poor

Why do the poor have no place in our planning?

- Slums have 20-25% of population but use less than 3 percent of land
- The poor do not have title over land and hence are not a part of the planning process

Key focus areas – developed countries versus LAMIC



Themes adopted by major utilities in developed countries
Key focus areas in developing countries

- WATSAN provision in **developed countries** more focused towards
 - Water resources and quality
 - Financial management
 - Customer satisfaction
 - Sustainability

- In **developing countries'** context, focus would also need to include
 - progressive realization of improved standards
 - Universal coverage,,
 - Access to sanitation facilities and non-sewered contexts
 - Service delivery to urban poor and affordability

Informed decision making for planning and investment

- Aggregate statistics suggest good coverage of water and sanitation in urban areas
- BUT little is known about the **quality, level and financial sustainability of service**



**Need to move from laying pipes to
delivering water**

PAS

Performance Assessment System

Annual Service delivery

profile for **419**

Cities in **2** States

covering **32** Key indicators and

www.pas.org.in

90 local action indicators

Sectors : Water supply, Waste Water, Solid waste Management & Storm Water



Focus on **Measurement, Monitoring & Improvement**

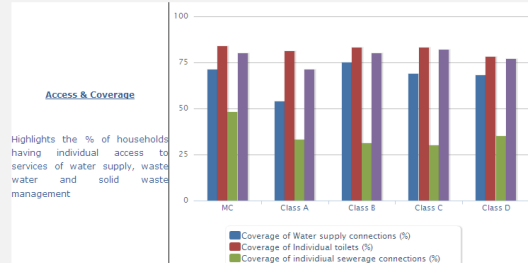
Online Monitoring



[Home](#)
[Performance Assessment](#)
[Resources](#)
[Important Links](#)
[About Us](#)
[News Scan](#)

[Framework](#)
[Toolkit](#)
[State Profile](#)
[Know Your City](#)

Access and Coverage



State profile of all SLBs

[Home](#)
[Performance Assessment](#)
[Resources](#)
[Important Links](#)
[About Us](#)
[News Scan](#)

[Reports & Papers](#)
[Presentations](#)
[Good Practices](#)
[Newsletter](#)

[Water](#)
[Sanitation & Waste Water Management](#)
[Solid Waste Management](#)
[Cross-Cutting Theme](#)

Resources > Good Practices

This section hosts 'Good Practices' related to the urban water and sanitation services. The good practices are categorized into four main areas namely, Water, Sanitation, Solid Waste Management and Cross-cutting Theme. Various 'Sub-themes' reflect different actions, which help to improve performance facets under which creditable work is being done and captured as good practices in the urban water and sanitation sector.

Documentation of good practices plays a critical role in the PAS Project, especially for the Performance Improvement component. The good practices featured here are based on the attempts of various Indian cities to improve services through appropriate reforms. These would be helpful for other similar cities in developing their own Performance Improvement Plans (PIPs) and in designing local actions.

Different aspects of good practices encompass improved coverage, efficiency and equity in service delivery, financial sustainability, implementation of reforms and adoption of innovative approaches. The examples of good practices include the ones developed under PAS Project by CIET University and its partners along with numerous other good practices documented by various external organizations.

Themes for Good Practices for Performance Improvement

Sr.No.	Major Themes	Sub-Themes	Description
1	Water	Additional and improved connections for slum and non-slum households	This includes examples of provision of additional connections in areas with a particular focus on slum households. It covers slum level structural infrastructures along with processes and policies for improved water services including additional connections and simplified processes for new connections.
		Regulating unauthorized connections (including lines, incentives, policy etc)	This covers efforts towards detection and regularization of illegal connections to reduce non-revenue water. Amenity schemes are also covered.
		Energy Cost Reduction	It has instances of cost reduction including energy audits, replacement/ refurbishment of pumping machinery, usage of off-peak hour, and relying on gravity based water feeding to treatment plants and reservoirs.
		24*7 Water Supply, Metering, water Audit and Non Revenue Water (NRW) Reduction	This features provision of 24*7 water supply through system enhancement, metering at bulk water production, distribution points and consumer connections and tariff based on consumption. Additionally, it covers establishment of District Metering Areas (DMAs), differential pricing, hydraulic modeling, water audits to estimate water balance and reduce NRW.
2	Sanitation and waste management	Additional and improved toilets, waste and water	This segment has good practices for provision of toilets, especially in slum households including examples of community involvement and efforts towards lower defecation free status. Other examples covered are safe disposal practices, providing additional sewerage connections and upgrading open drains to covered walkway drains, processes and policies for improved sanitation services, and simplified processes for new sewerage connections and toilets.

Background of Achalpur

Select State:

Select Year:

Select Indicator Group:

GENERAL INFORMATION

Class	Class A	No. of slum settlements	22
District	Amreli	Slum population	34,333
Area (sq.km.)	16.0	Slum households	11,837
Total city population	127,216	Total annual city capital receipts	32,162,790
Total households	26,751	Total annual city capital expenditure	31,456,128
Density (persons per sq.km.)	7,957	Total annual city revenue receipts	328,796,840
Total municipal staff	489	Total annual city revenue expenditure	348,931,176

WATER SUPPLY

Total water produced (MLD)	3.4
Ground water (MLD)	3.4
Surface water (MLD)	0.0
Average daily volume treated (MLD)	0.0
Installed storage capacity (MLD)	0.0
Total water connections (Nos.)	13,788
Water connections in slum (Nos.)	2,771
Area covered by network (sq.km.)	7.2
No. of days of supply in a month	30.0
Annual revenue receipts from water	18,921,254.0
Annual revenue expenditure on water	33,022,803.0
Annual capital expenditure on water	11,483,051.0

WASTE WATER

Area covered by waste water network (sq.km.)	0.0
Underground sewerage network (km)	0.0
Chlorination (km)	0.0
Open channels (km)	0.0
Total sewerage connections (Nos.)	0.0
Sewerage connections in slums (Nos.)	0.0
Installed STP treatment capacity (MLD)	0.0
Annual revenue receipts from WW	950,428.0

City Profile of Achalpur

Select State:

Select City:

Select Year:

Select Sector:

Access & Coverage

Highlights the % of households having individual access to services of water supply, waste water and solid waste management.

Coverage of WC connections:

Service Levels & Quality

Highlights the quantity of water supplied to city, community and quality of supply.

Per capita supply of water (lit):

Community of water supply (hour):

Quality of water supply (lit):

Financial Sustainability

Highlights the revenues accrued to expenses incurred in service operations.

Cost recovery (DAR) in US service (%):

Equity in Service Delivery

Highlights the variations in city level coverage as well as between poor and non-poor in the city.

Coverage of WC connections in Urban water supply (%):

Efficiency in Service Operations

Highlights extent of non-revenue water, functional, metering of water connections, and collector efficiency of charges.

Extent of non-revenue water (%):

Efficiency in metering of water connections (%):

Extent of functional metering of water connections (%):

Efficiency in collection of non-revenue charges (%):

Overview of all cities

City profile of all SLBs

Documentation of good practices

SANITATION IN SMALL TOWNS

Class: A, B, C, D, NP

State

(All)

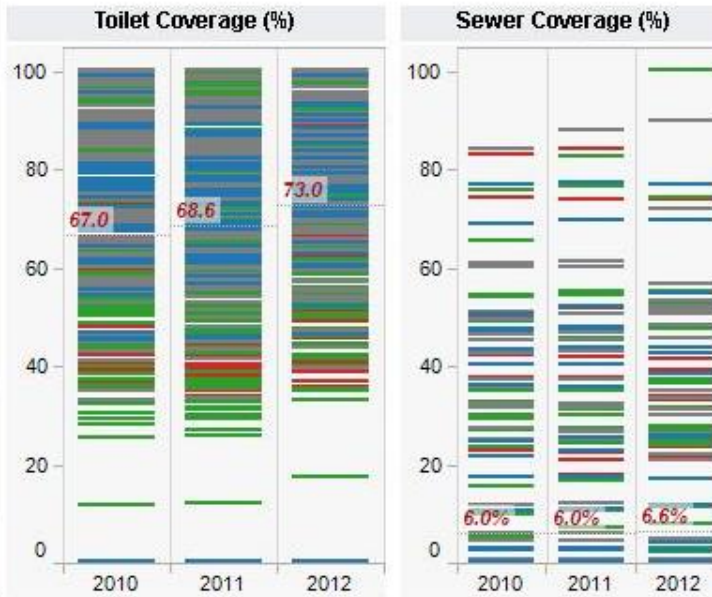
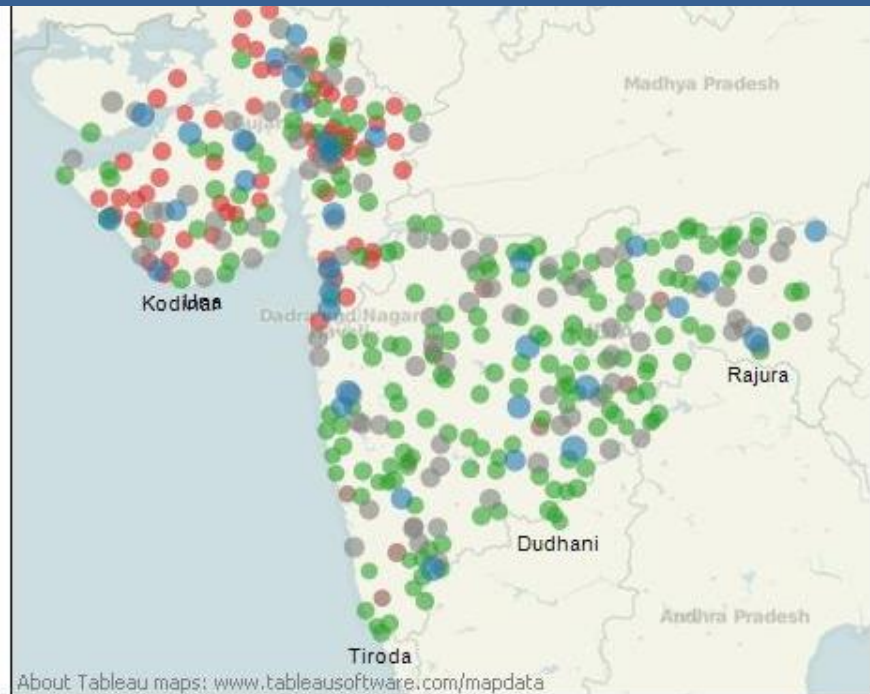
Key Wastewater Indicators

Legends

- A
 - B
 - C
 - D
 - NP
- Class Filter
- (All)
 - MC
 - A
 - B
 - C
 - D
 - NP

Population

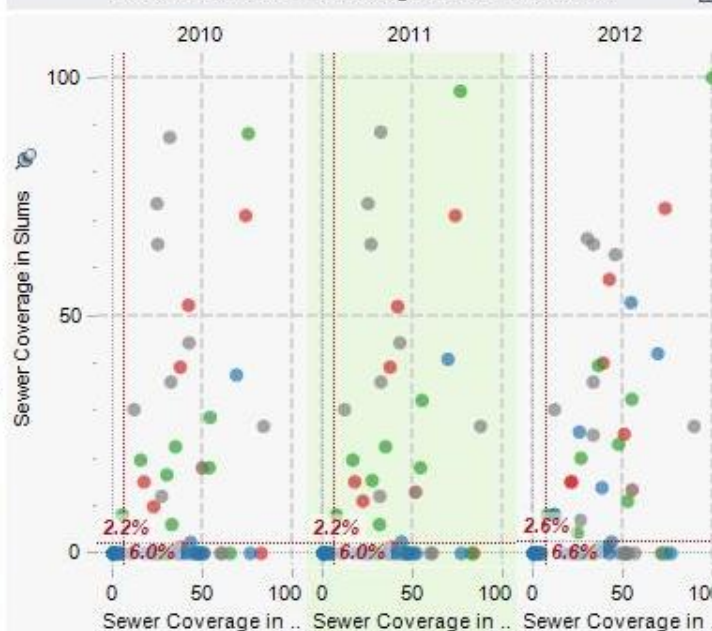
- ≤ 15,283
- 2,000,000
- 4,000,000
- 5,667,511



Toilet Coverage: Overall vs Slums



Sewer Connection Coverage: Overall vs Slums



Select ULB

- Achalpur
- Ahmadpur
- Akkalkot
- Akot
- Alandi
- Alibagh
- Amalner
- Ambad
- Ambajagai
- Ambarnath
- Amod
- Amreli
- Anand
- AnjangaonSurji
- Anjar
- Anklav
- Ankleshwar

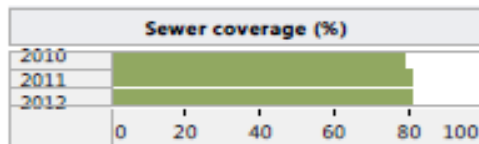
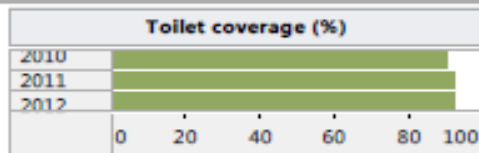
About Tableau maps: www.tableausoftware.com/mapdata

City level dashboard

Dashboard Showing Wastewater SLB Indicators for Aurangabad (Class: MC)

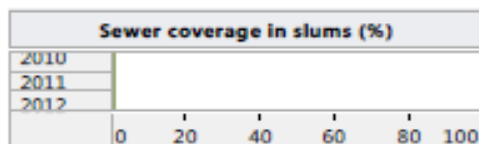
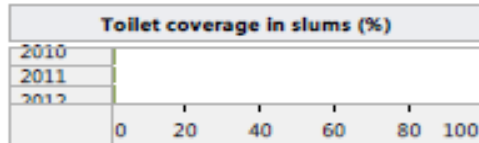
Access and Coverage

Highlights the % of HHs having access to services of waste water (sanitation and sewerage)



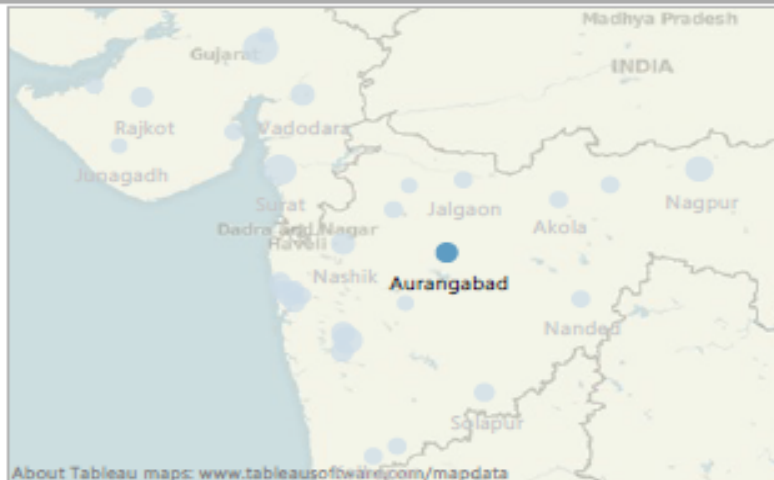
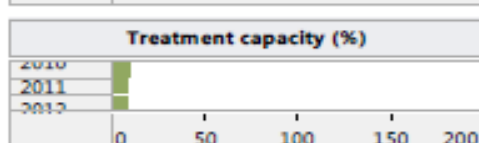
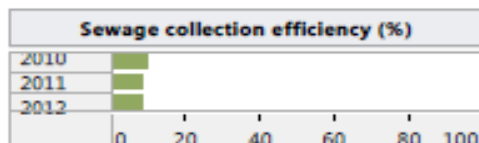
Equity in Service Delivery

Highlights the variations in city level coverage as well as between poor and non-poor HHs in the city



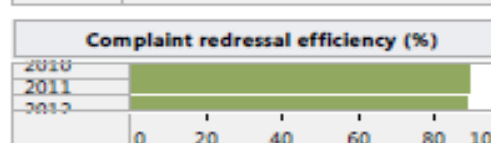
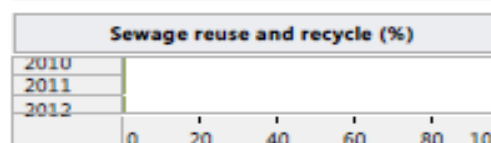
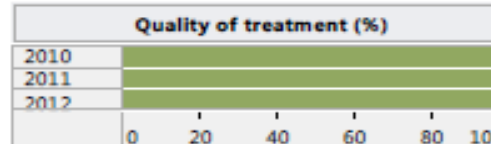
Service Levels and Quality

Highlights the quantity of WW collected and treatment capacity of Sewage Treatment Plant



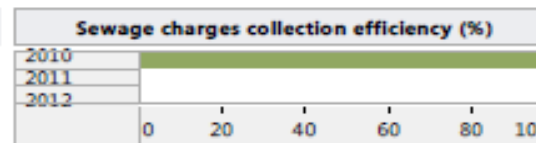
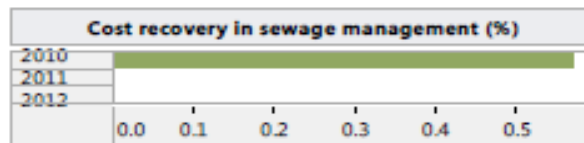
Efficiency in Service Operations

Highlights extent of WW treatment before disposal, reuse/ recycling of wastewater, and collection of sewerage related charges



Financial Sustainability

Highlights the revenues accrued to expenses incurred in service operations



Select ULB

- Ahmedabad
- Ahmednagar
- Akola
- Amravati
- Aurangabad
- Bhavnagar
- Bhiwandi
- Dhule
- Gandhinagar
- Jalgaon
- Jamnagar
- Junagadh
- KalyanDombivli
- Kolhapur
- Malegaon
- MiraBhayandar
- Nagpur
- Nanded
- Nashik
- Navi Mumbai
- Pimpri Chinchwad
- Pune
- Rajkot
- Sangli
- Solapur
- Surat
- Thane
- Ulhasnagar
- Vadodara
- Vasai Virar

State

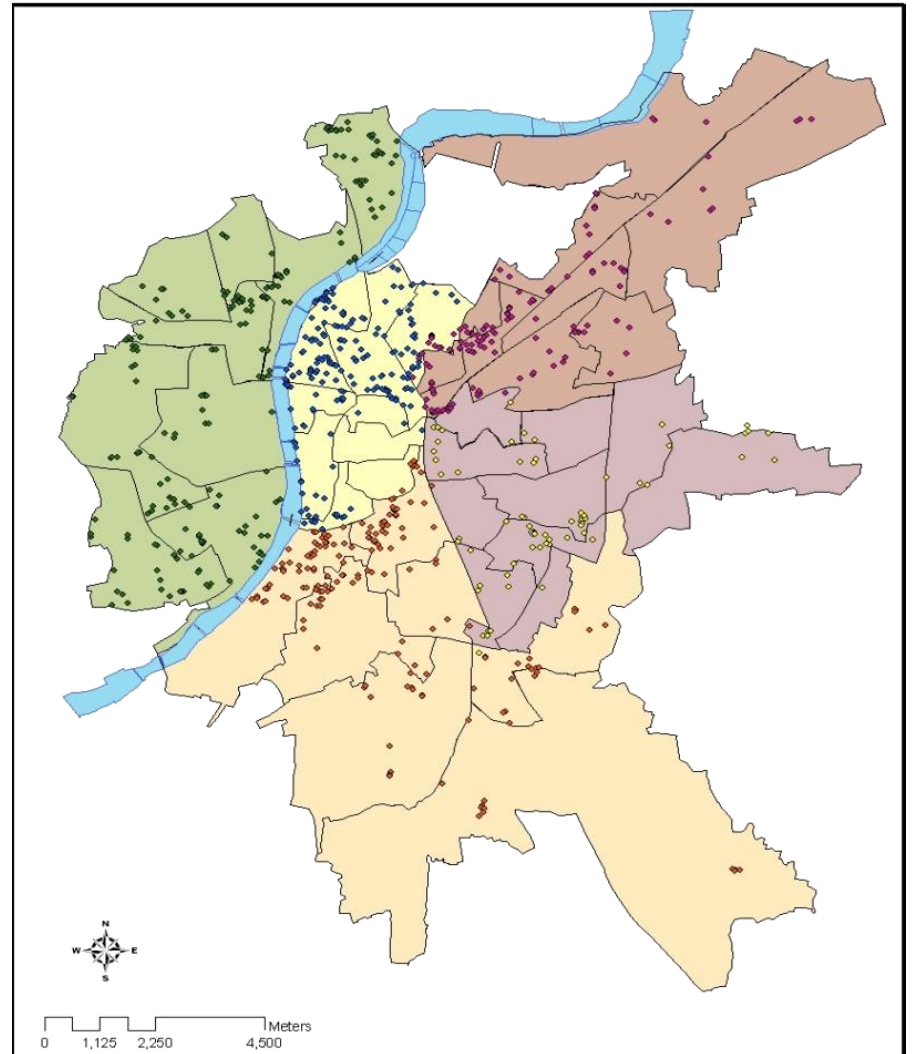


REACHING OUT TO THE POOR

Access to water and sanitation for the poor

Support to the Ahmedabad municipal Corporation for using improved slum information to achieve universalization of household level water and sanitation services

- Slum information system on a GIS platform
- Use of GIS tools to support decisions and strategy development
- Financial model to support policy choices on technology, cost sharing, implementation packaging by size and service levels



Ahmedabad – population 6.0 million; slum population approx. 1.2 million

Total Station Survey of all Slums



NOTES:-

- 01. ALL DIM & R. LIN. METER.
- 02. T.B.M. TAKEN ON MAIN ROAD I.S.R.L. 100.00 M

LEGEND AS PER TOTAL STATION SURVEY

	BUILDING		ELECTRIC POST
	MAN HOLE		LAMP POST
	WATERKUNDI/WATER TANK		HAND PUMP
	ELECTRIC BOX		TREE
	TELEPHONE BOX		TELEPHONE POST
	STONE		TUBE WELL
	WATER TAP		ROW STONE
	TEMPLE		HIGH TENSION TOWER

AREA :-

ASPER SITE
 TOTAL PLOT AREA.....
 BUILTUP AREA..... 37,448.00 SQ.MT

LEGEND

100	BUILDING NO
A	PURCHA BUILDING
B	KUCHA BUILDING
C	HUTE
G+1	FLOOR HEIGHT
R	BUILDING USE
PUB	PUBLIC USE
COM	COMM./SHOPS

AREA TABLE:-

SR. NO.	P.P. NO / BUIL. NO.	FINAL PLOT AREA	BUILD. CO. LR.	HOUSE NO. LR.
1	46	37,448.00 SQ.MT	199	842
2				

CLIENT:-

AHMEDABAD MUNICIPAL CORPORATION,
 AHMEDABAD

DATE:-

NOVE-08

TITLE:-

SURVEY PLAN
R.S. NO. 46, 47, 52 T.P.S. NO. 28

DRN.:-

ASHISH

PROJECT:-

SLUM NETWORKING PROJECT

CHECKED:-

MOHAM. BHA

SURVEY & PREPARED BY:-

RAJ SURVEY CONSULTANT,
 98251-26660, 98250-13668 AHMEDABAD.

APPROVED:-

DRG SHEET NO:-

156 YOGESWARNAGAR / WEST / VASNA

SCALE:-

1CM = 2.0 MT

Demonstration: GIS Based MIS for Slums: Jadiba Nagar

AHMEDABAD MUNICIPAL CORPORATION



Map Browser Analysis About Us Exit



Name of Zone
WEST

Name of Wards
VASNA

Name of Slums
JADIBA NAGAR

No. of Huts : 146



SLUM : JADIBA NAGAR

Huts having Individual Sewer Connection



Web enabled GIS based module linked with intranet

Source: Preliminary Survey Result of Biometric & Total Station Survey, AMC, 2010



Thank You....

www.pas.org.in

dineshmehta@cept.ac.in