

# 3Rs and Resource Efficiency for Realizing Smart Cities in South Asia.

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***United Nations Centre for Regional Development***

# Some Common Characteristics of Smart or Next Generation Cities...

- ✓ Safe, resilient, inclusive, and sustainable
- ✓ Smart mobility / efficient public transportation system and better integration with land use planning for mixed-use development
- ✓ Healthy living environment (clean air, clean water, clean land)
- ✓ Smart growth / resource efficient economy and society
- ✓ Low carbon development path
- ✓ Waste (to resource) as an economic industry
- ✓ Waste management as a top public health priority
- ✓ Strong partnership based approach (PPP, triangular cooperation – Govt, Scientific & Research, private)
- ✓ Empowered (to better adapt modern technologies, better address climate-sustainability nexus, better address freshwater-waste nexus, complex human-material dynamics, among others)
- ✓ Green jobs and employment
- ✓ Good governance & smart institutions
- ✓ Strong leadership



Photo source: smartcityexpo.com

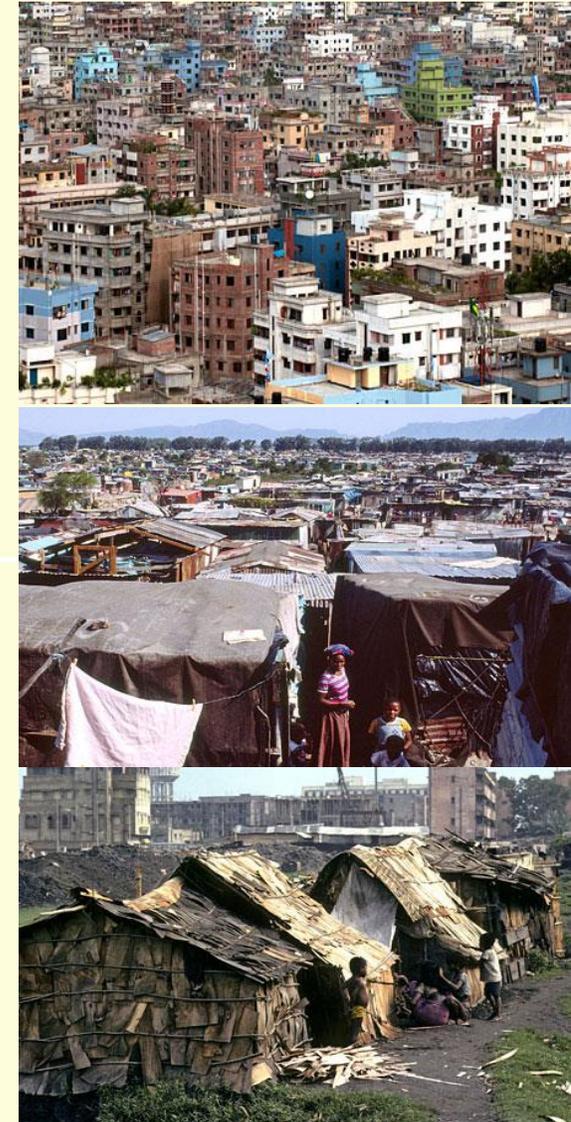


# Shared issues & challenges - urbanization trend and its impacts

## Facts and figures

- ✓ Today > 50% of the world population already live in cities & urban areas; expected to be > 70% by 2050, with almost all the growth occurring in the developing world.
- ✓ 95 per cent of urban expansion in the next four decades will take place in developing world, with Asia and African alone contributing > 86%.
- ✓ Over next four decades, Africa's urban population will soar from 414 million to over 1.2 billion & Asia from 1.9 billion to 3.3 billion
- ✓ Over the next four decades, India will add another 497 million to its urban population, China – 341 million, Nigeria – 200 million, the US – 103 million, and Indonesia – 92 million
- ✓ 828 million people live in slums today and the number keeps rising.
- ✓ **The world's cities being engines of economic growth occupy just 2 per cent of the Earth's land, but account for 60-80 per cent of energy consumption, 75 per cent of carbon emissions, approximately 70% of global GDP, & consume 70% of all resources, generate 1.3 billion tons of solid waste per year (expected to be doubled by 2025).**
- ✓ **New emerging waste streams –e-waste, chemicals/industrial/hazardous, plastics in marine**
- ✓ Rapid urbanization coupled with unsustainable consumption and production are exerting tremendous pressure on fresh water supplies, sewage, the living environment, public health, and overall supply vs demand.

Source: UN DESA, 2011 & United Nations, 2012  
<http://www.un.org/en/sustainablefuture/cities.shtml#overview>

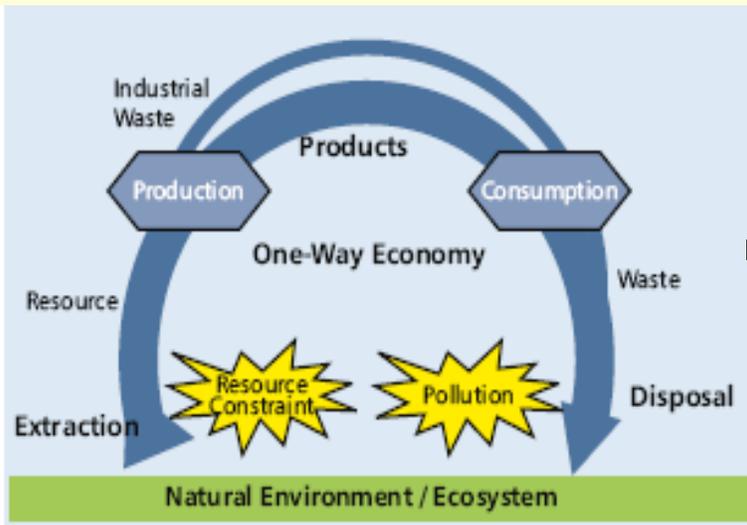


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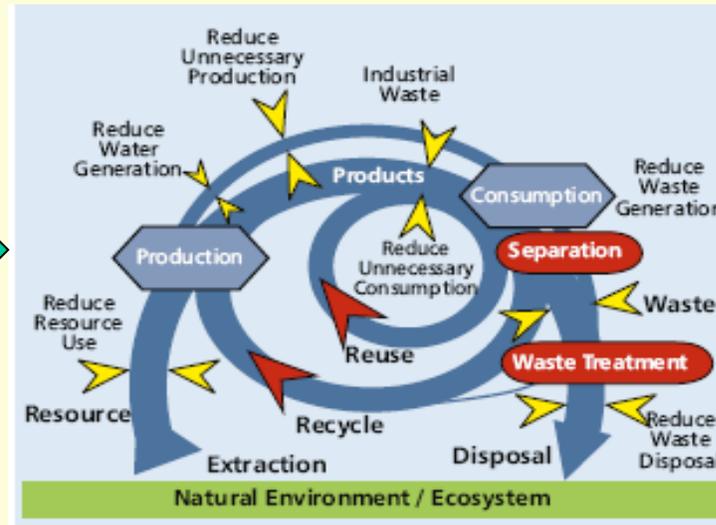
# Where should countries/cities be heading to? A root cause to many of the today's urban problems is lack of integration of resource efficiency and 3Rs in overall policy, planning & development...

## 1. One-way/conventional Economy



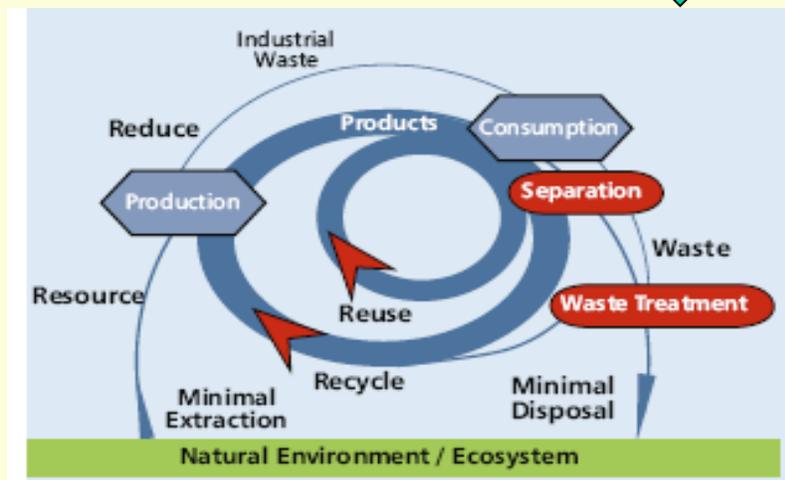
Source: ADB.

## 2. More resource efficient economy



Source: ADB.

## 3. Closed Loop Economy



Source: ADB.

1. **one way economy** -> a little effort is made to reduce the amount of materials consumed in production and hence the wastes are produced. Also little effort is made to reuse or recycle those wastes which mainly go for landfill.
2. **greater resource efficiency** -> by reducing consumption and waste of materials, and by reusing and recycling waste/byproducts minimize (per unit of product or services) – quantity of input raw material/energy /water as well as pollution /emission/environmental impact of the residual materials flow that flow to disposal sites.
3. **closed-loop economy** -> nearly all waste/outputs either become inputs to other manufacturing processes or are returned to natural systems as benign emissions rather than as pollutants, e.g, a closed-cycle processing plant takes in freshwater and does not discharge any liquid effluents. Rather, the water is constantly recycled and possibly utilized in the final product itself.



# Macro-Economic/Development Policies Integrating Resource Efficiency and 3Rs

- **Japan**: Fundamental Law for Establishing a Sound Material Cycle Society (2001); New Growth Strategy (2010) which places green innovations as top of seven strategic areas; Finance initiatives to build a Low Carbon Society (providing grants, investments, financing, interest subsidies for – (i) promotion of Green Buildings, (ii) development of Low Carbon Cities, (iii) bilateral offset Credit Mechanism, and (iv) enhancement, commercialization, and R&D of Low Carbon Technologies;
- **Republic of Korea**: National Strategy and Five Year Plan for Low Carbon and Green growth (2008); Framework Act and Presidential Decree on Low Carbon, Green Growth; Green New Deal policy – 2% of GDP investments in Green Growth (2009); Resource Recirculation Policy;
- **PR China**: Circular Economic Law (2009) led by NDRC-China; Long Term Renewable Energy Development Plan (2007); Chinese Circular Economic Law offers a long term plan for transformation that seeks to integrate economic, environmental, and social strategies to achieve high resource efficiency as the way of sustaining improvement in quality of life within natural and economic constraints; circular economy is now a trillion dollar opportunity
- **India**: National Solar Mission; National Mission on Enhanced Energy Efficiency;
- **Malaysia**: National Green Technology Policy (2009); Green Building Index (2009); National Renewable Energy Policy and Action Plan (2010);
- **Singapore**: Green Mark Incentive Scheme for buildings (2005); Water Efficiency Fund (2008);
- **Thailand**: Alternative Energy Development Plan and Target (2008); Thailand Climate Change Master Plan (2012–2050), etc.



Consequence of one way economy - People living in a place 20 times above safe level of lead, arsenic, nitrogen.....



Matthew Westral

# Waste-Freshwater Nexus in India – many lifeline rivers are highly degraded...



❑ The Energy and Resources Institute in New Delhi has estimated that **by 2047**, waste generation in India's cities will increase **five-fold to touch 260 million tones per year**.

❑ The CSE survey, released earlier this year, shows that **70-80 percent** of India's wastewater was ending up in its rivers and lakes. **"We are drowning in our excreta,"** Sunita Narain, Director of CSE.



## 3R Developments in Asia: Informal Resource recovery and recycling



***Swachh Bharat Abhiyaan*** by Prime Minister Narendra Modi: Will citizen do their bit to keep their city clean?

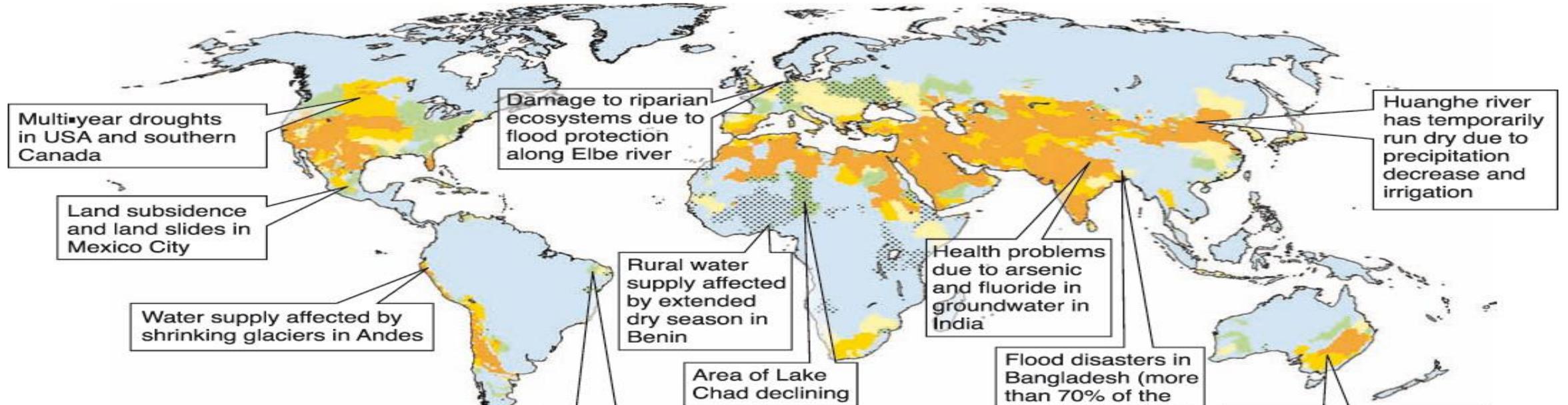
- ❑ Nearly **80 percent** of the river's pollution is the result of raw sewage. The river receives **more than three billion liters of waste per day**.
- ❑ **Highly contaminated** leachate seeps untreated into groundwater, a source of drinking water....

## *Need for change and attitudes to view "Waste" as "Resource"*

- Link between "waste" and "resource" is not well understood /waste is traditionally thought of having no value.
- Too much emphasis on "downstream" waste management.
- Limited efforts on "upstream" resource management and waste reduction aspects

# Selected World Trends on Human activities - Degradation of water resources

By the year 2025, as much as two-thirds of the world population may be subject to moderate to high water stress.



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[https://www.yunbaogao.cn/report/index/report?reportId=5\\_4759](https://www.yunbaogao.cn/report/index/report?reportId=5_4759)

