



***Environment in the Context of Integrated Regional
Development : Role of EST and 3Rs***

**UNCRD Expert Group Meeting on Integrated Regional Development
Planning**

**UNCRD, Nagoya
28-30 May 2013, Nagoya**

**CRC Mohanty,
Coordinator, Environment Unit, UNCRD**

Environment for Development

Environmental change affects human development options, with poor people being the most vulnerable.

Broadly, while addressing environment for development –

⇒ need to address environmental implications of the socio-economic development

⇒ socio-economic implications of the environmental degradation

Addressing environment for Integrated Regional Development (RD) –

=> encompass above two dimensions on the basis of sub-national, sub-region, inter-region, intra-region, specific geographic region (e.g., GMS), watershed (e.g., Ganges basin / Mekong River), political/financial blocks (e.g, ASEAN, SAARC), bridging regional disparities, multi-scalar planning, horizontal & vertical cooperation among actors/relevant stakeholders, integrated strategies across multi-sectors, etc.

Environment for Development

Between Stockholm Conference on the Human Environment-1972 and Rio+20:

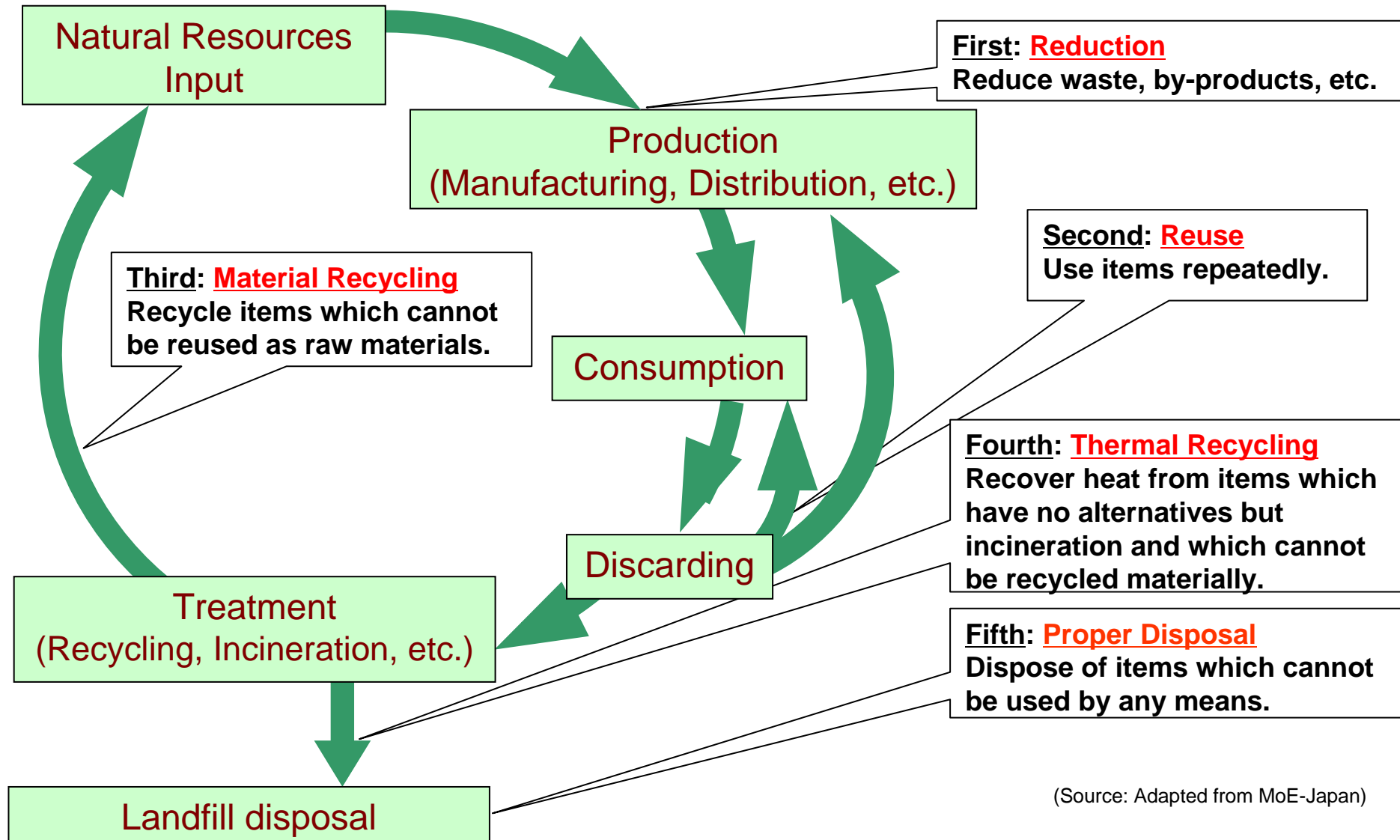
- growing scientific understanding, technological progress, filling in the knowledge gaps (e.g. impacts of globalization, modernizations and industrialization, international finance, climate mitigation and adaptation measures, CDM, TDM, resource efficiency, WtE, EfD, etc.)
- series of international conventions, treaties and MEAs covering issues as the trade in endangered species, the protection of the ozone layer, climate change, biodiversity loss, CCD, the banning of POPs, and Mercury Convention, etc.
- Multi-sectoral international development goals/plans/framework/processes - MDG, JPOI, Green Economy Initiative, Rio+20 Outcomes - The Future We Want, etc.
- **Progressive integration of environmental activities into the broader development framework and macro economic policies, e.g., Japan's Fundamental Law for Establishing a Sound Material Society (2003, 2008), Korea's Green Growth Strategy (2009-2050), Chinese Circular Economic Law (2008); closer cooperation among key Ministries and sectoral agencies – Environment, Finance, Planning, Industry, etc .**
- ascertaining the environmental impacts of proposed public spending, identifying sectoral and inter-sectoral environmental targets, promoting best practices, and monitoring long term achievements;

Environment for Development

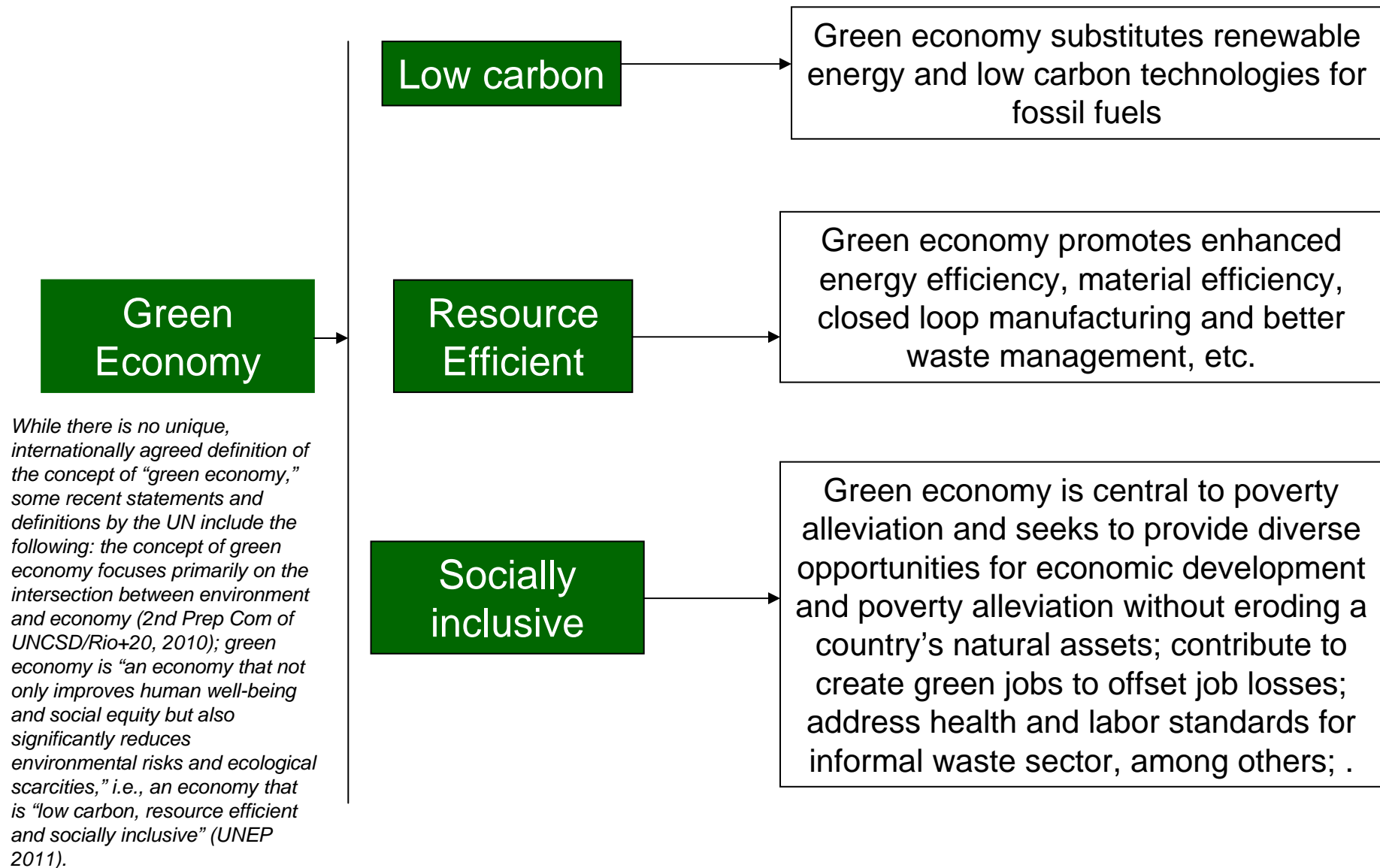
Some of the key messages of 4th Regional 3R Forum in Asia, 18-20 March 2013:

- Sustainable resource use will be instrumental for Asia to ensure socio-economic development in a world in which **resources are more constrained and the absorptive capacity of ecosystems is decreasing rapidly**
- The region is faced with a number of critical challenges when it comes to **integration of resource efficiency in overall policy, planning, and development.**
- Many countries have become **net importers of raw materials** (fossil fuel, metals, timber, and other natural resources), the rapidly increasing volume, **changing characteristics of urban and industrial waste**, rising population, increasing consumption and per capita waste generation have posed serious challenges for the sustainability of the region.
- Challenge for public policy to achieve a transition to a Green Economy enabled by resource efficiency and systems innovation
- Change will not occur spontaneously but will require well designed policies
- 3Rs, as recognized in CSD-18/19 and Rio+20, are powerful tools to enable **resource efficiency in regional development**
- 3Rs and resource efficiency measures provide **employment and green job opportunities**

3Rs offer an environmentally friendly alternatives for moving towards zero waste society and to deal with impact of growing wastes on human health, economy and natural ecosystem

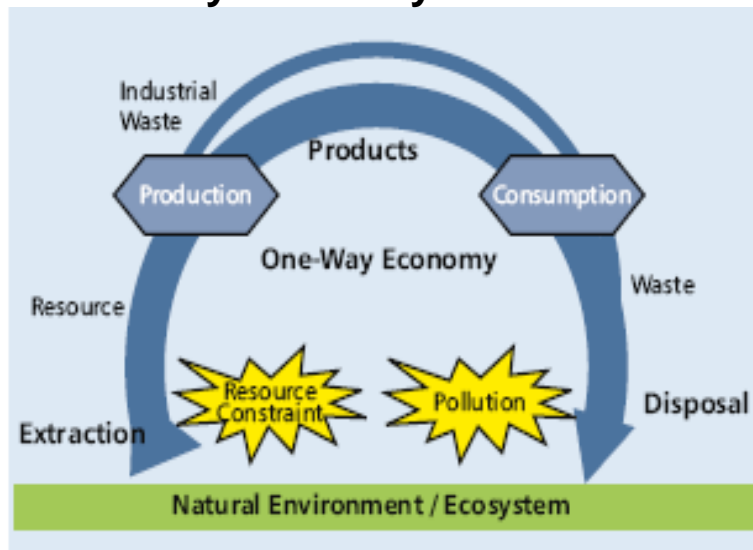


3Rs and Resource Efficiency in a Green Economy



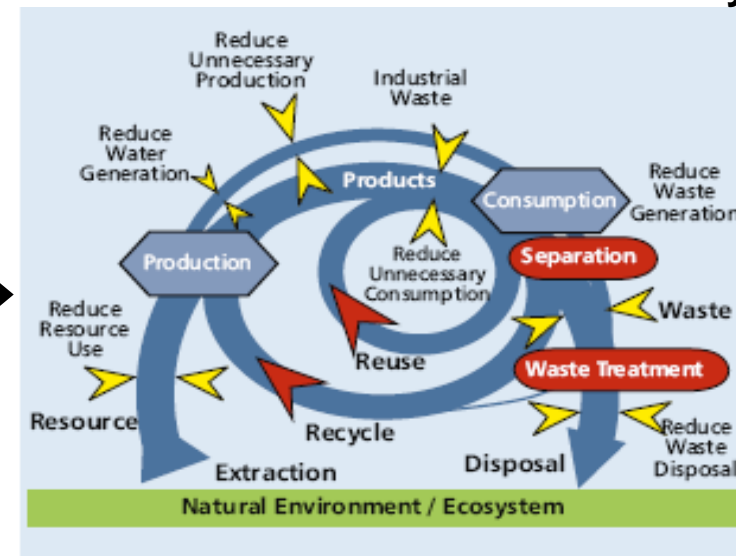
Why should 3Rs/resource efficiency be considered in IRDP?

1. One-way Economy



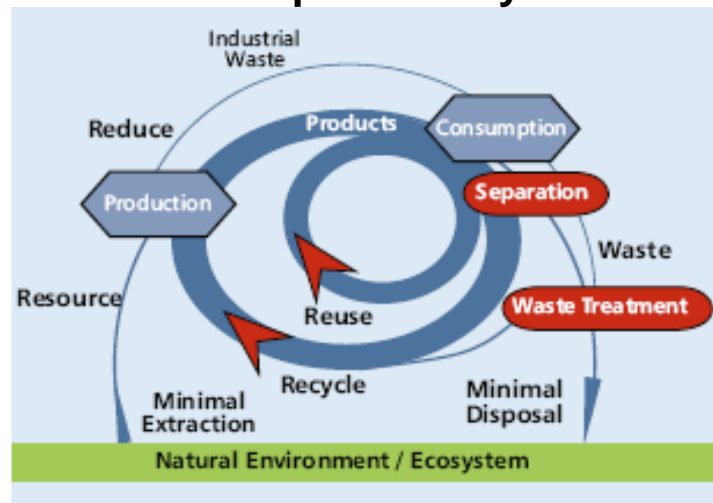
Source: ADB.

2. More resource efficient economy



Source: ADB.

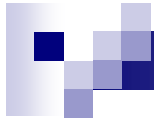
3. Closed Loop Economy



Source: ADB.

Resource efficiency => minimize per unit product or services

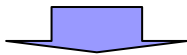
- Raw material input ↓
- Water input ↓
- Energy input ↓
- Emission, pollution, waste generation ↓



**Moving from Resource Efficient Economy
(2) towards Closed Loop Economy (3)**

Income level is a powerful driver of waste generation

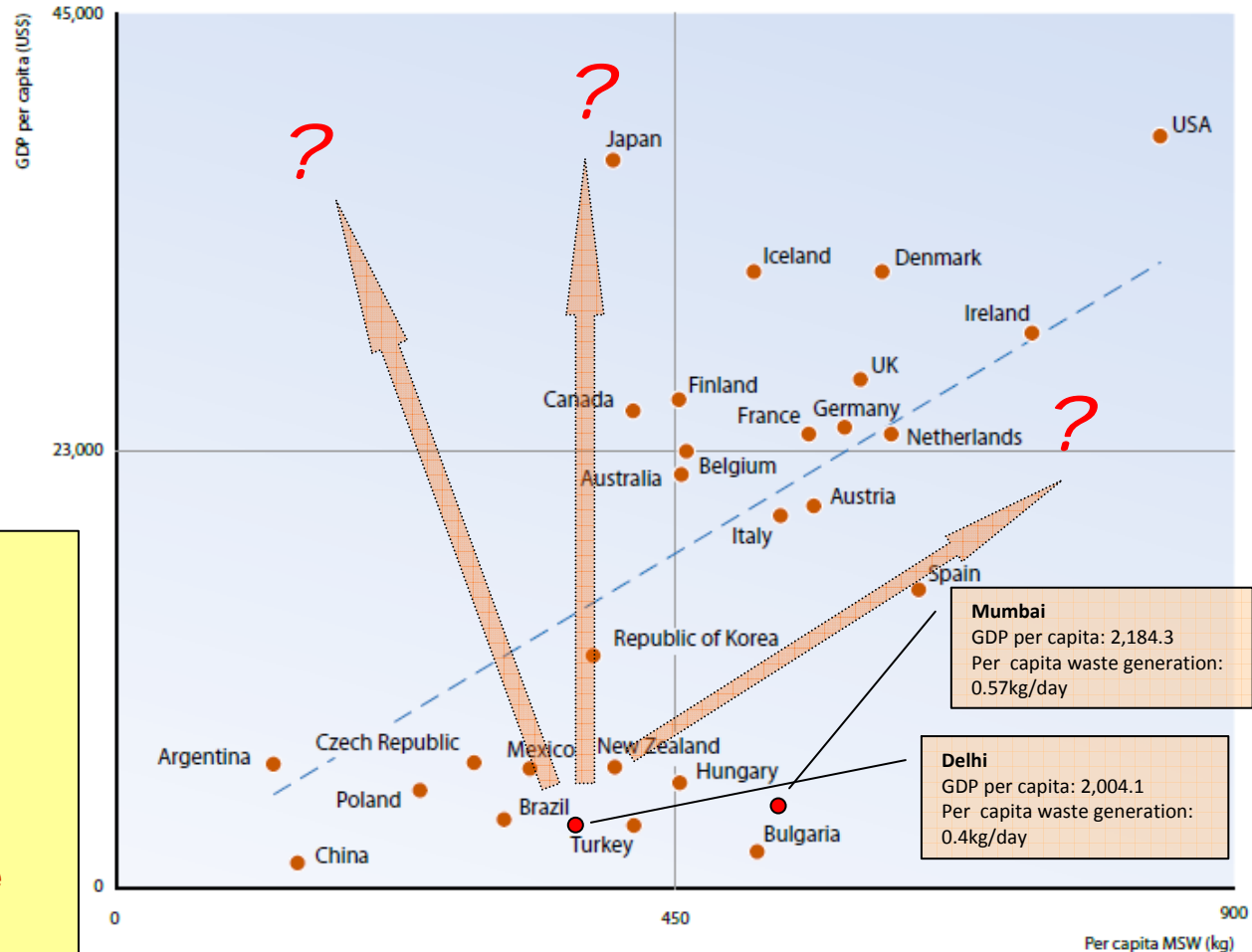
In high-income countries, per capita waste generation can be as high as 0.8kg per capita per day, whereas in the low-income countries the figure can be a quarter of this level, or around 0.2 kg per capita per day.



Question:

As the countries develop, do they have to follow the same wrong path?
– grow now and clean up later?

Can the countries develop while decoupling (or reducing) waste generation ~ towards resource efficient economy?

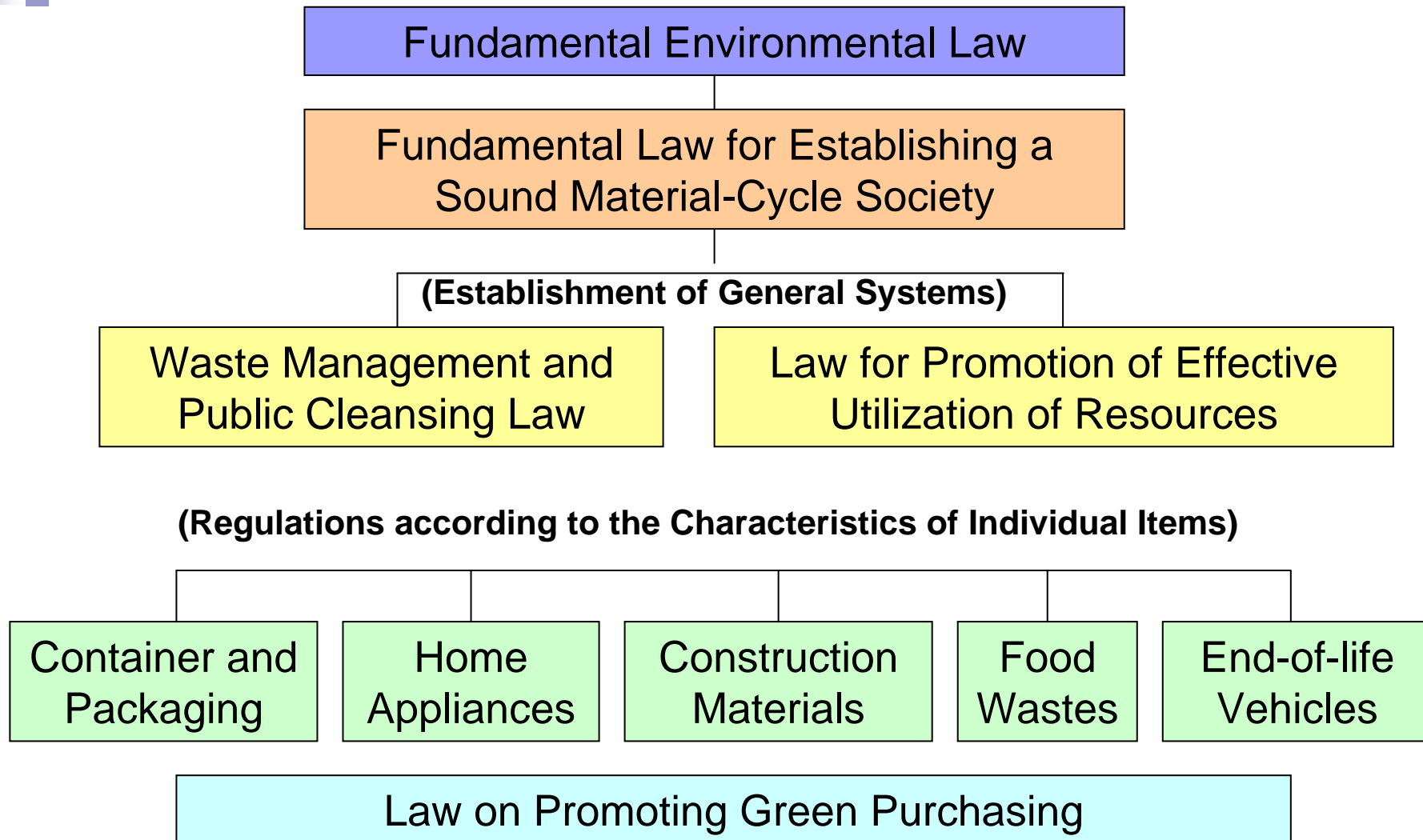


Correlation between MSW generation and GDP

Source: Adapted from UNEP, 2011, Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication.

(Data for Delhi and Mumbai: Siemens AG, 2011. Asian Green City Index-Assessing the environmental performance of Asia's major cities. http://www.siemens.com/entry/cc/features/greencityindex_international/all/de/pdf/report_asia.pdf)

Environment for Development - Legislative Framework to Establish a Sound Material-Cycle Society in Japan



[Targets of Fundamental Plan for 2000-2015:](#)

Resource productivity (GDP/direct material input): 60% improvement; Cyclical use rate (total used & recycled material input / material input): 40-50% improvement; amount of final disposal: 60% reduction (Source: MoE-J, 2008b)

Kitakyushu Eco-Town Project (Largest recycling society model in Japan)

The first “Eco-Town” project in Japan for building a recycling society has contributed to environmental preservation and industrial development.



Experimental study area



Comprehensive Environmental Complex;
Hibiki Recycling Park

Outline: Research facilities: 16; Business facilities: 29

Project achievement: Environmental preservation and economic development

Environment: Reduction of environmental load, resource saving and energy saving

Economic: Invested amount: approx. 66 billion yen (City: Nation, etc.: Private = 1:2:7)

No. of persons employed: approx. 1,300 (including part time workers)

Visitors for inspection: approx. 1 million (1998 – Oct. 2011)

Environment for Development – Republic of Korea's National Strategy for Green Growth (2009-2050)

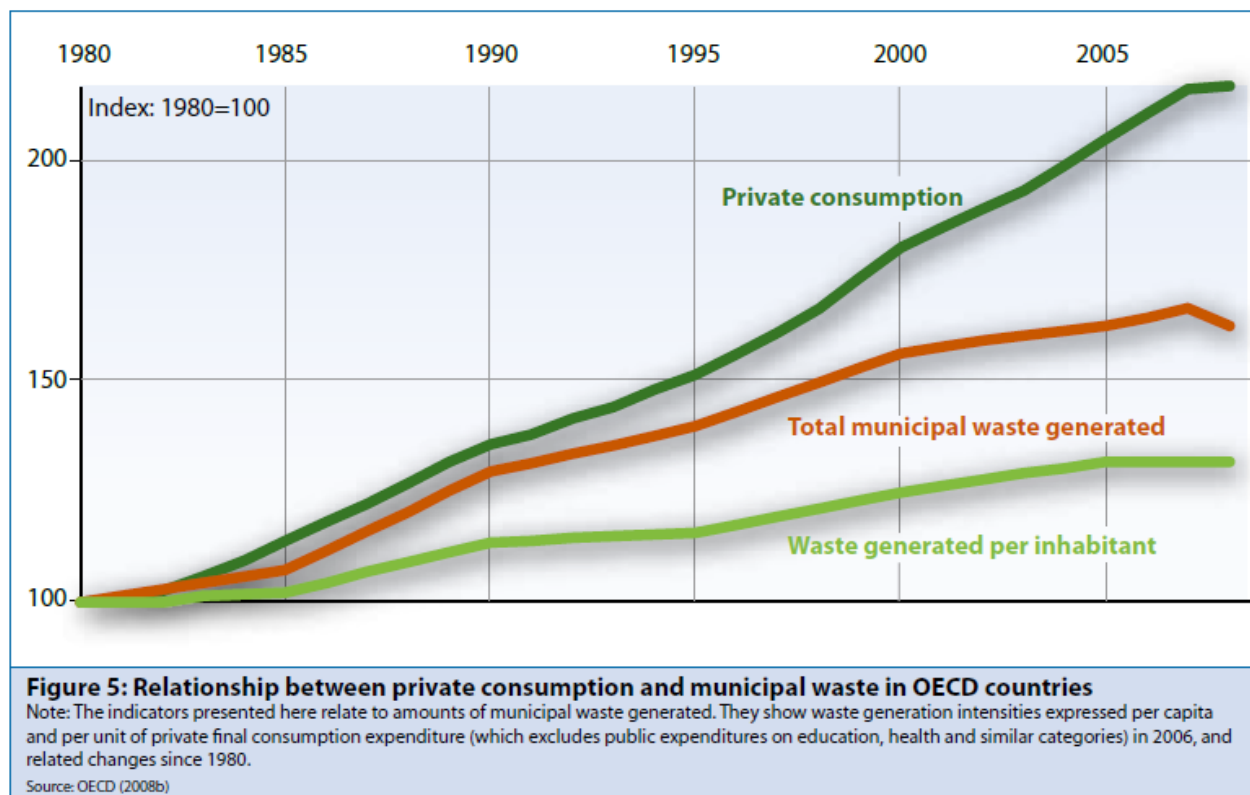
Framework Act on Low Carbon and Green Growth 2009:

- formulate & implement a National Green Growth Strategy
- establish a Green Growth Committee under the President's Office
- require measures to cultivate and support green economy & industries
- establish eco-friendly taxation and pricing system
- respond to climate change and develop Energy Basic Plan
- establish a cap and trade system for carbon emissions
- support companies to promote investments in green industries
- educate and support public activities for practicing a green life

Five Year plan for Green Growth (2009-2013): Investment of 2% of annual gross GDP to cover

- cleaner energy program, green building, green transportation

Relative decoupling has begun in OECD countries



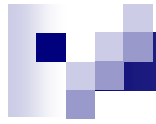
Source: UNEP, 2011, Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication.

What can the developing and emerging economies do to decouple waste generation from economic development?



KEY FACTORS

- **Political will/a vision towards zero waste**
- **Awareness/Change in lifestyles**



**From One Way Economy (1) ---->
Resource Efficient Economy (2)**

An alternative economic model that offers a long-term plan for transformation that seeks to integrate economic, environmental, and social objectives to achieve very high resource efficiency as a way of sustaining improvement in quality of life within natural and economic constraints. The basic approach is to integrate industrial firms, eco-industrial parks, regional infrastructure in a broad system to support resource optimization.

The Law Specifies responsibility for:

a) Government of all levels

- formulate the national and local plans
- support research, science, and technology development
- green consumption (green procurement)

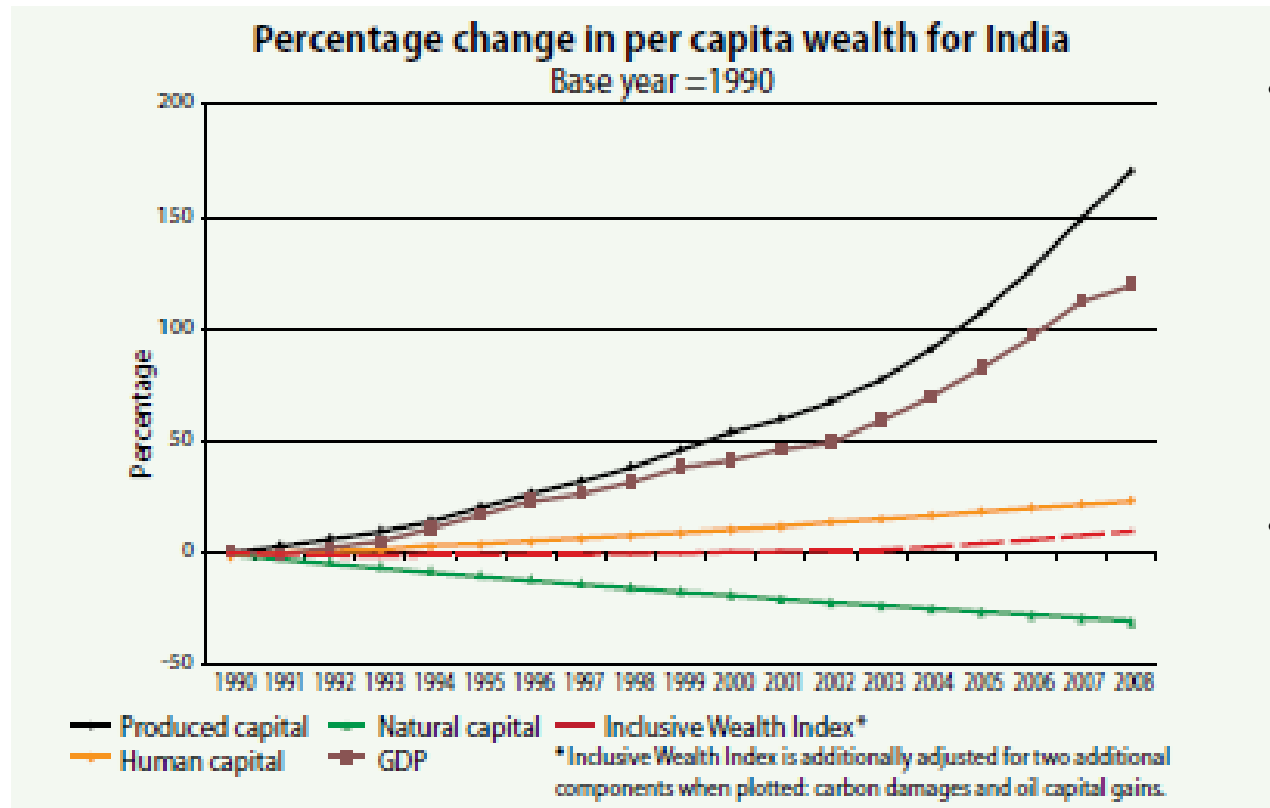
b) Industries and businesses

- establish sound management system & implement 3Rs
- industry associations to develop sectoral 3Rs guidelines

c) Consumers and citizens

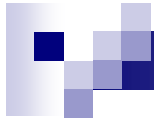
- resource conservation and sustainable consumption

Economic growth in India 1990-2008 ... at the sacrifice of natural capital



- GDP per capita grew by 120% between 1990 and 2008 in India, while the Inclusive Wealth Index increased by mere 9%.
- Natural capital (i.e., ecological assets) declined by 31% during the same period.

Note: Inclusive wealth consists of three main components: human, manufactured, and natural capital.



Implications of One Way Economy

- Pollution**
- Health**
- Resource Depletion**
- Poverty**

People living in a place 20 times above safe level of lead, arsenic, nitrogen.....



Matthew Westfall

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Source: ADB (2004)

Conventional waste management and the consequences



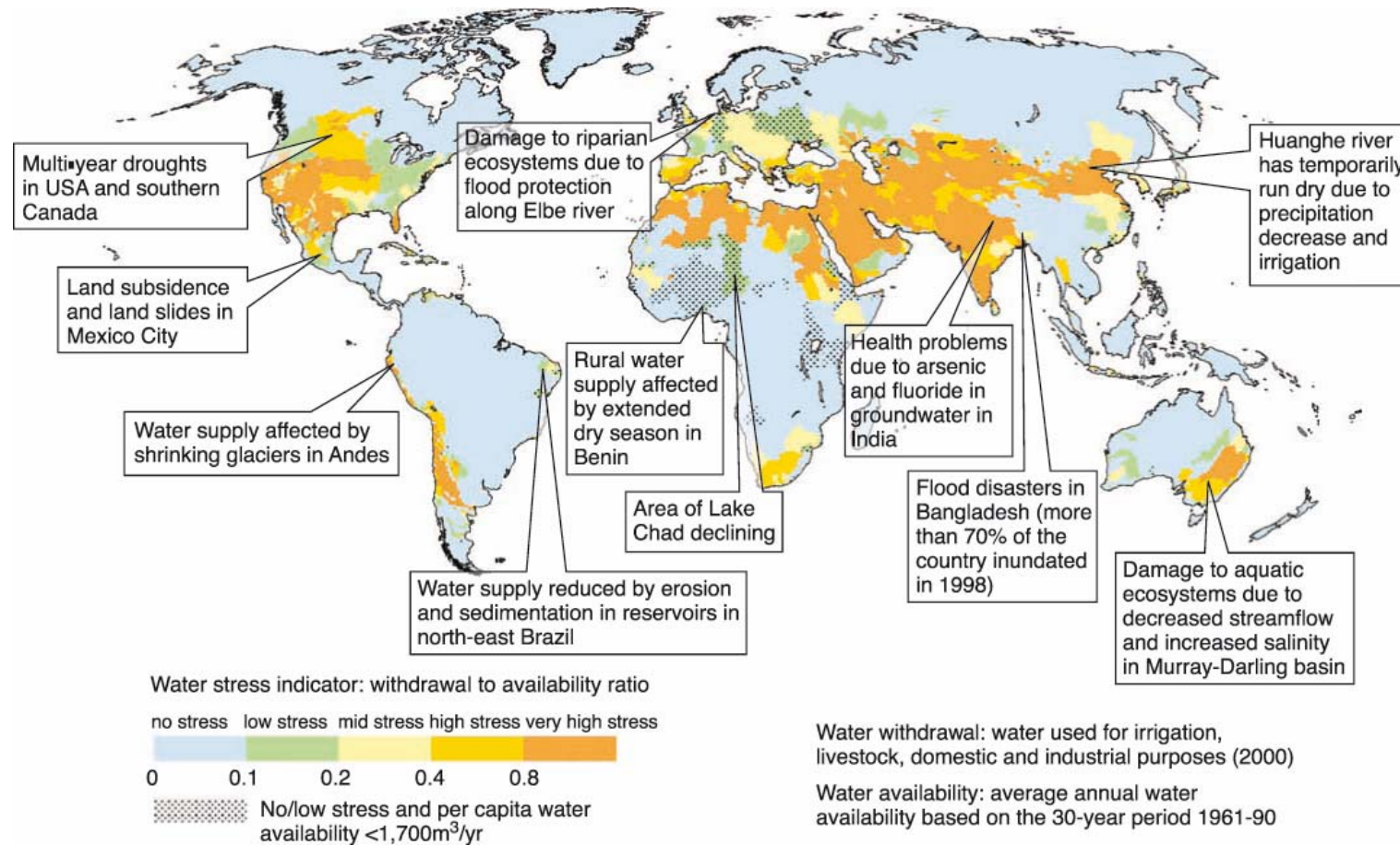
*Highly contaminated
leachate seeps
untreated into
groundwater,
a source of
drinking water....*

*Water availability is an
emerging issue in many
countries and some are
already heading towards
water stress, but water
quality deterioration
because of industrial
discharges and municipal
sewage, agrochemicals will
further accelerate the
issue!*

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.



Source: Water Stress Map generated by World Meteorological Organization 2008 based on data available at Alcamo *et al.* (2003)



Direct exposure of children to emission from open burning
Source: Annepu, 2011, *Sustainable Solid Waste Management in India*.



Source: <http://crunkish.com/top-10-pollution-causes/>



Source: <http://surfingindia.net/>



Source: <http://www.thehindu.com/news/cities/Delhi/article236710.ece>

Many serious issues associated with informal sector – child labour, health impacts...

Health risks for informal sector workers, local communities living near dumpsites, etc.

Informal waste pickers most often operate without any protective measures -

- hospital waste -> HIV
- jagged metal -> tetanus
- smoke (PCBs)
- lead -> neural damage
- violence (knife cuts)
- adult behaviour (premature drinking)
- stress
- skin, gastric, respiratory problems

Waste dumps potentially serve as breeding ground for Malaria, thus having implications in achieving MDGs.



Source: Adapted from ILO (2009), presented at the Inaugural Meeting of the Regional 3R Forum in Asia in November 2009 in Tokyo.

Plastics in Coastal and Marine Environment



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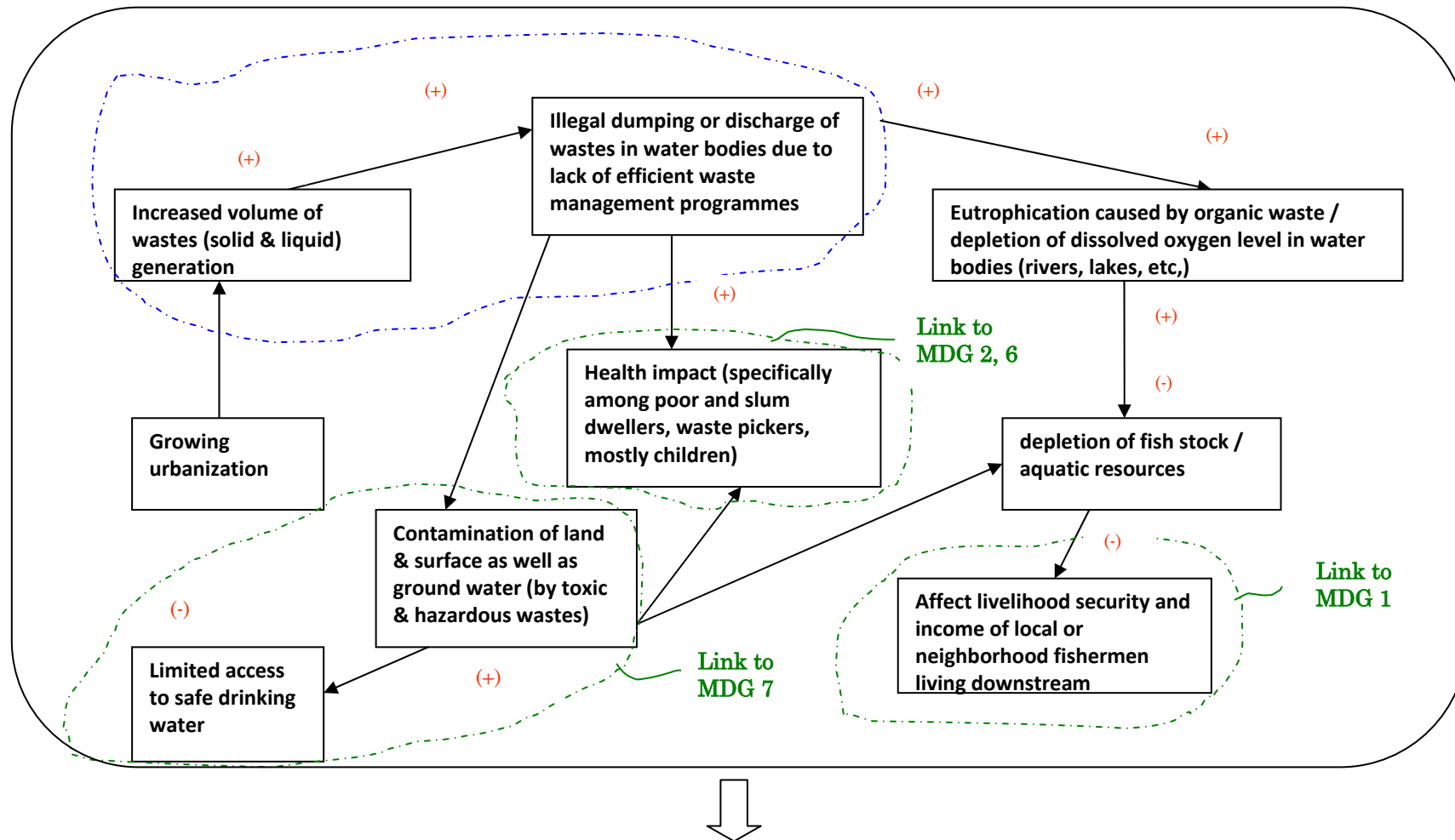
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Source of photos: UNEP,
<http://www.unep.org/regionalseas/marinelitter/publications/gallery/default.asp>

The way we manage wastes has implications on quality of life, health, local economy and natural ecosystem



implications on quality of life, health, and fresh water ecosystem



Integrated waste management and 3Rs actions or policies at national level have regional (development) implications (as top down) – e.g, effective waste management policies/regulations and 3R programmes at national or sub-national level will have direct impact on human health, land, water, aquatic resources, and livelihood security – vital elements of regional development. At the same time, awareness or responses at regional level will have implications at national level (as bottom up).

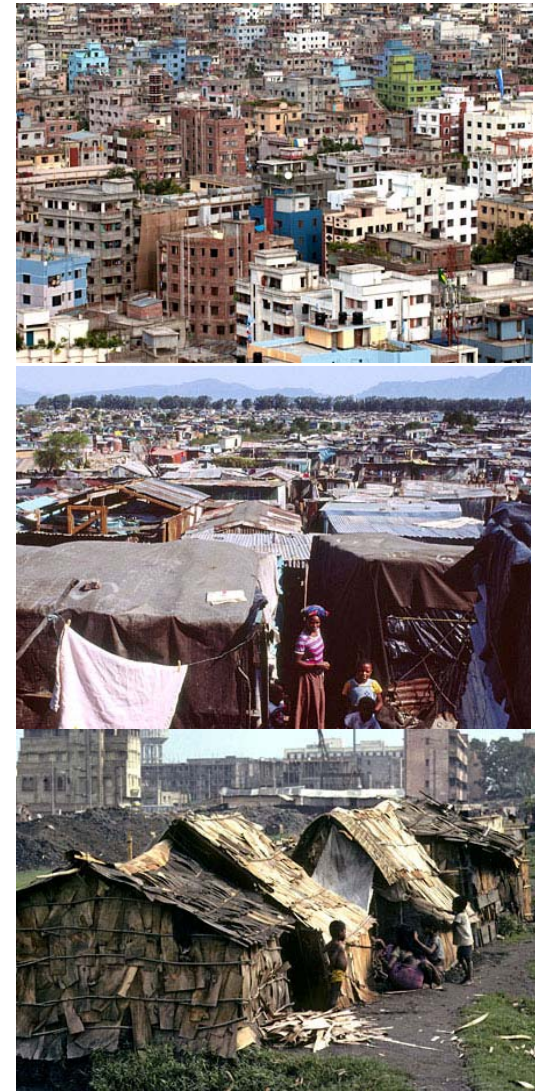
These issues will be further compounded by the growing urbanization....

Facts and figures

- ✓ Half of humanity – 3.5 billion people – live in cities today.
- ✓ By 2030, almost 60 per cent of the world's population will live in urban areas.
- ✓ 95 per cent of urban expansion in the next decades will take place in developing world.
- ✓ 828 million people live in slums today and the number keeps rising.
- ✓ The world's cities 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, and consume 70% of all resources.
- ✓ Rapid urbanization is exerting pressure on fresh water supplies, sewage, the living environment, and public health.

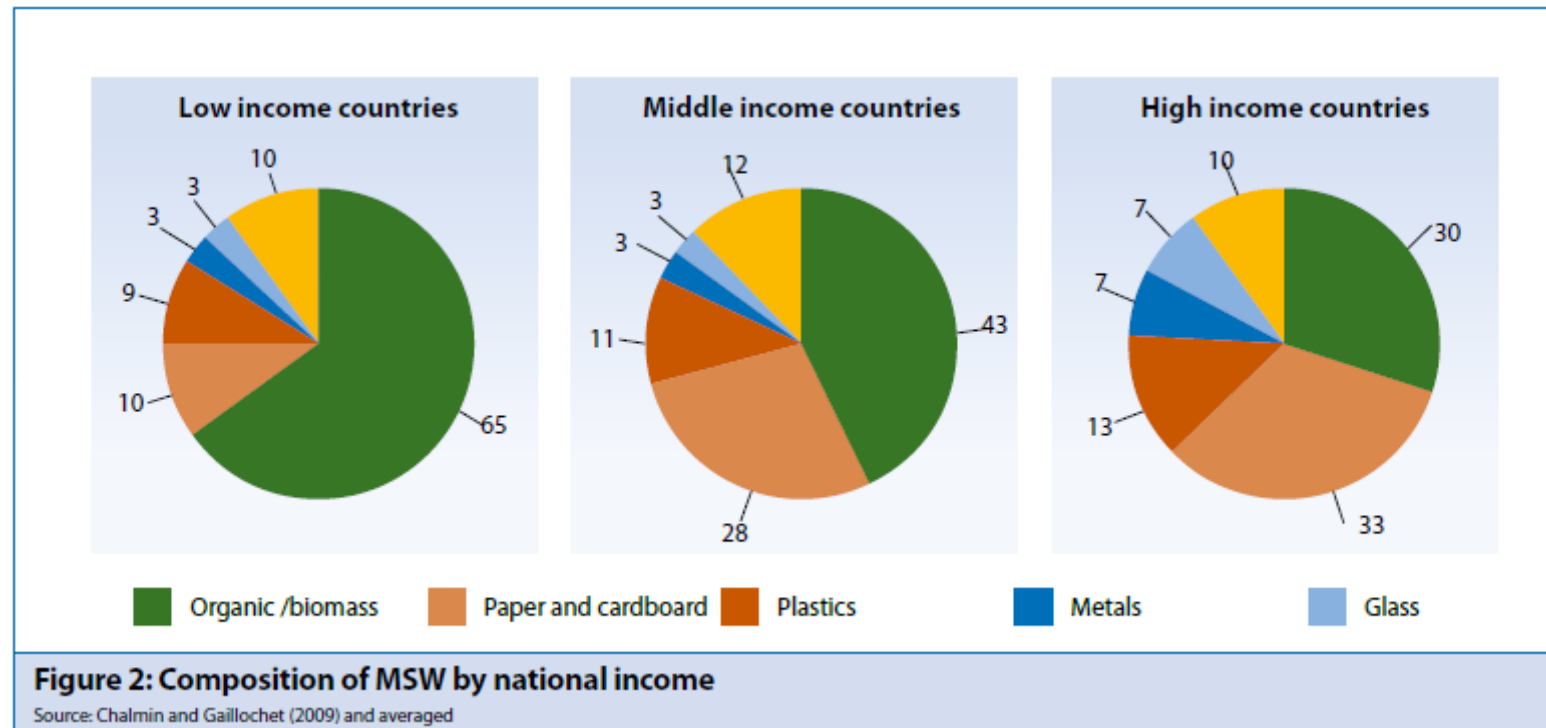
Source: United Nations 2012

<http://www.un.org/en/sustainablefuture/cities.shtml#overview>



Copyright (c) United Nations 2012

Composition of waste becomes more complicated as the economically & industrially grow, which is also compounding the issues ...

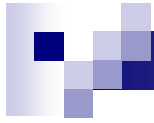


Source: UNEP, 2011, Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication.

- New emerging waste streams such as **e-waste, and industrial wastes (including hazardous waste construction and demolition waste, end-of-life vehicles, healthcare waste, etc.)** further compound the pressure to the local environment

Many critical roadblocks in developing countries..

- **competing priorities, in particular economic development.**
- **lack of capacity at local and national level.**
- **competing points of view in building consensus among stakeholders and absence of representatives from major sectors or groups (e.g., youth, women, the private sector, indigenous people, NGOs) on national multistakeholder bodies.**
- **confusion and lack of general awareness over various aspects of sustainability.**
- **lack of adequate institutional coordination (in particular among planning, finance and environmental institutions) and absence of integrated institutional framework**



Opportunities in 3Rs

Business opportunities on e-waste

- Global e-waste recovery market holds enormous revenue potential and is expected to reach **\$21 billion by 2020**, growing from **\$6.9 billion in 2009**. In China alone, the volume of e-waste is expected to reach 5.1 million metric tons in 2020, an increase of more than 150% from 2005. (GBI Research, 2010)
- The revenue generated from the e-waste management market is expected to **grow from \$9.15 billion in 2011 to \$20.25 billion in 2016** at a compound annual growth rate (CAGR) of 17.22% from 2011 to 2016. (marketsandmarkets.com, 2011)

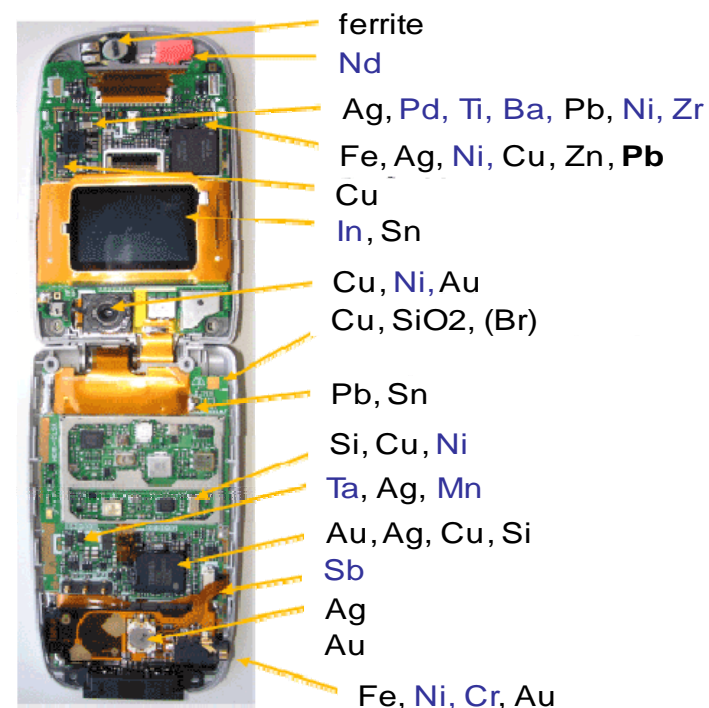
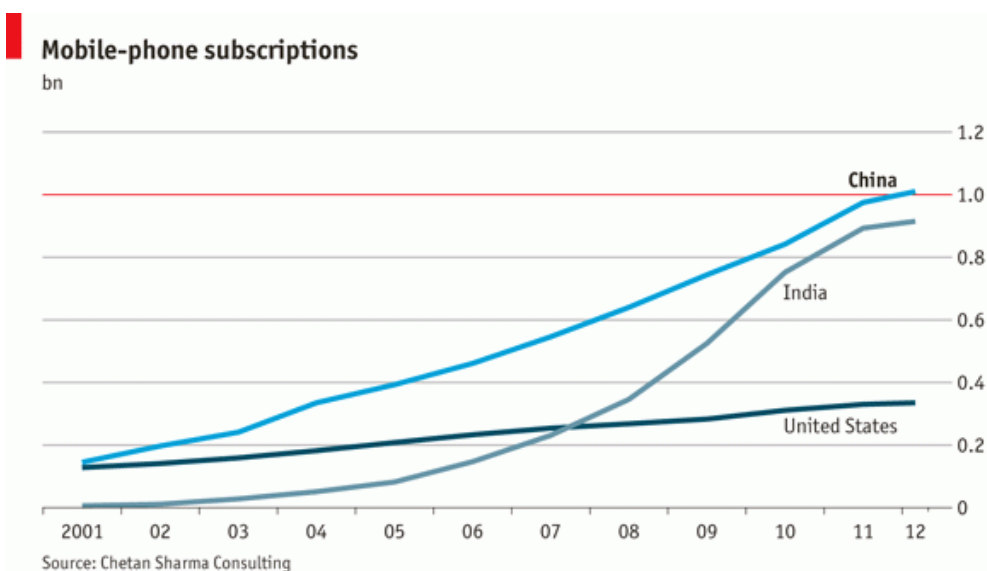


Pictures: (Top) <http://environmentalgeography.wordpress.com/2012/02/>
(Bottom) <http://www.wastemanagementrecycling.net/e-waste.html>

Precious metals left unutilized – mobile phones

Nokia Global Consumer Survey on Recycling (2008)*

- Overall, **74%** said they do not think about recycling their mobile phones.
- Half of those surveyed didn't know phones could be recycled.



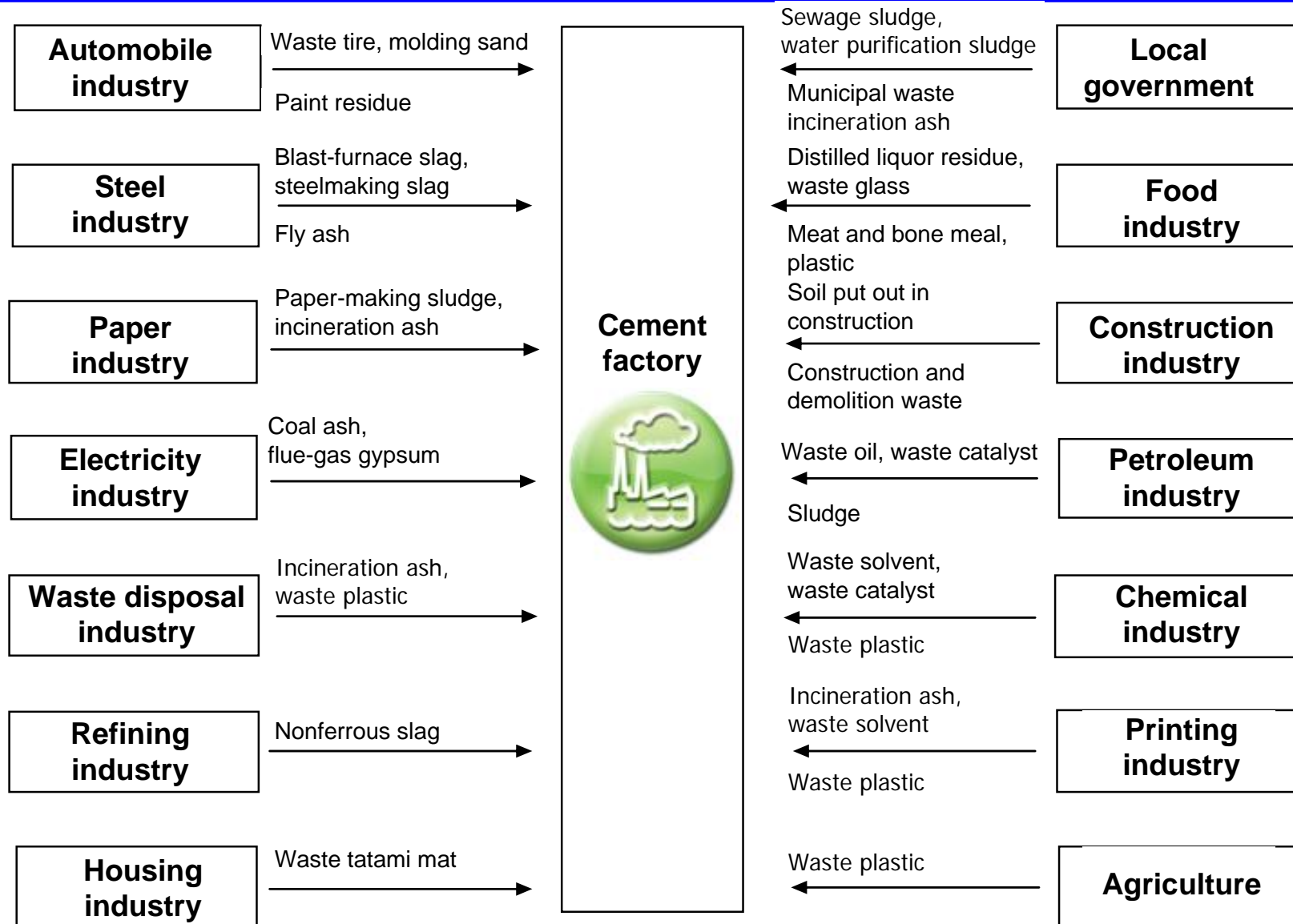
Source: <http://www.coden.jp/rare-metal/use.html>

For every 1 million cell phones recycled, we can recover 75 pounds (34kg) of gold, 772 pounds (350kg) of silver, 33 pounds (15kg) of palladium, and 35,274 pounds (16 ton) of copper.

http://www.epa.gov/agingepa/press/epanews/2010/2010_0401_3.htm

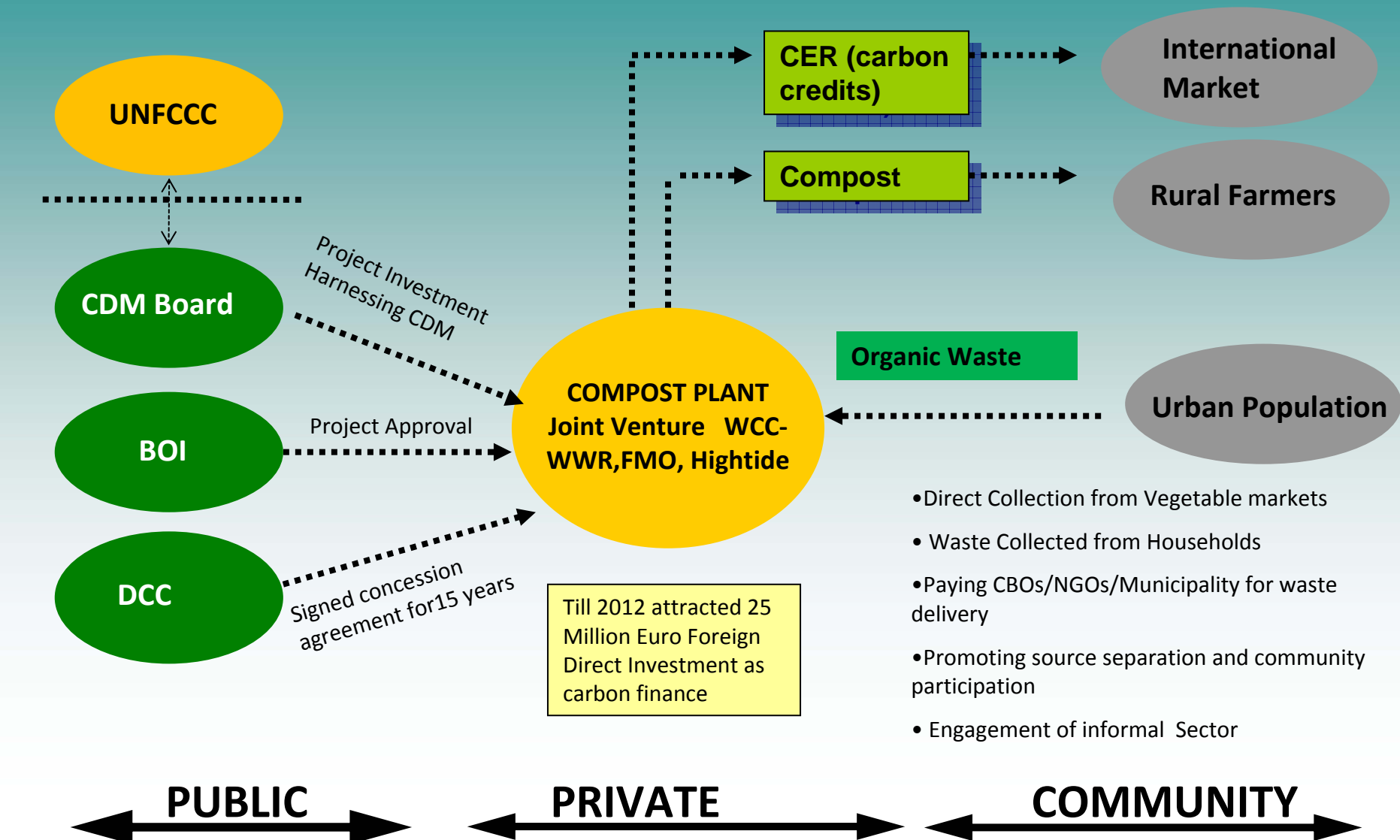
Source: <http://www.slideshare.net/nokiaconversations/nokia-recycling-survey-results-presentation>, <http://press.nokia.com/2008/07/08/global-consumer-survey-reveals-that-majority-of-old-mobile-phones-are-lying-in-drawers-at-home-and-not-being-recycled/>

Example of effective utilization of waste and byproduct leveraging a cement factory – calls for industrial symbiosis, city-city / regional cooperation



Source: Adapted from Sameshima (2009), presented at the Inaugural Meeting of the Regional 3R Forum in Asia in November 2009 in Tokyo.

Decentralized Community Based Composting in Bangladesh – An ideal model of multi-stakeholders partnership



BOI-Board of Investment; DCC-Dhaka City Corporation

**Major stakeholders who can play an important role
in integrating resource efficiency/3Rs - both vertical & horizontal cooperation**

<p>National Government</p>	<p>Develop policies, programs, and institutions, innovative financing for resource efficiency / 3R infrastructures (eco-towns, eco-industrial parks, R&D facilities (Environment, 3Rs, Nano-Technology, IT, Biotechnology) etc.), create conducive policy framework to encourage PPPs, capacity building programs/facilities for SMEs, awareness programme for citizens, green procurement, develop and institute EPR system, foster triangular cooperation (government-private/industry-R&D/Universities) for , circular economic approach, green growth, technology transfer, information clearing house, etc.</p>
<p>Local Government</p>	<p>Integrate resource efficiency in urban development policy and strategy (energy, transport, water, industry), innovative financing for resource efficient infrastructure (eco-towns, eco-industrial parks, R&D facilities, etc.), realize PPPs, awareness programs for citizens, green procurement</p>
<p>Private / Industry Sector</p>	<p>Develop strategies to commercialize 3Rs, Environmental performance reporting, R&D (3R technologies, green products, waste recycling, waste exchange, green purchasing, PPP, in-house capacity building programs, CSR,</p>
<p>Banks / Financial institutions</p>	<p>Investment/loan schemes for eco-town projects and green industries</p>
<p>Scientific and Research Institutions / Universities</p>	<p>Provide back up for science based policy making at government level, develop dedicated R&D projects on resource efficiency/3Rs in collaboration with government and business/industry sector, create human resources and experts in the field of resource efficiency/3Rs, look for international collaboration (University-University, University-Multi-national corporation), catalyst for decision makers, technology evaluation.</p>
<p>Citizens / NGOs</p>	<p>Promote green consumerism, community awareness raising on house-hold waste segregation and its contribution to resource efficiency/3Rs, knowledge dissemination</p> <p style="text-align: right;">(Source: C.R.C. Mohanty, 2012)</p>

Conclusion: (1) Pursuing resource efficiency will help countries..

- **Tackling local environmental problems** → in efficient use of resources lead to environmental burdens;
- **Addressing climate change** → resource efficiency is key strategy for low carbon path by reducing GHG emissions from energy generation and use, material extraction, processing, transportation, and waste disposal;
- **Ensuring energy security** → through energy efficiency measures, WtE;
- **Preserving natural capital and avoiding resource conflicts**
- **Improving economic competitiveness of firms and nations** → better respond to volatility of oil prices, metal prices, etc; improvement of production process brings financial benefits to the producer as well as improvement of product quality;
- **Minimizing disposal costs by minimizing wastes** → land fills and incinerators are very expensive methods; end-of-pipe disposal is a sunk cost with no financial return;
- **Developing new business opportunities** → resource recovery, recycling, WtE schemes can create green jobs; biotechnology, nanotechnology, renewable energy;
- **Pursuing social benefits** → environment industry as potential source of employment and long term natural asset protection; reducing environmental impacts from harmful wastes;



Opening of the Bike Ride 8 June 2012

THE SECRETARY-GENERAL

MESSAGE TO THE 7TH REGIONAL ENVIRONMENTALLY
SUSTAINABLE TRANSPORT FORUM IN ASIA
AND THE GLOBAL CONSULTATION
ON TRANSPORT IN THE POST-2015 DEVELOPMENT AGENDA

Bali, Indonesia, 23 April 2013

I send warm greetings to the participants in this important forum on sustainable transport. I extend sincere appreciation to the Governments of Indonesia and Japan for their initiative and generosity.

Transport is a key building block for sustainable development. Access to goods and services through efficient means of transport and connectivity is essential for poverty reduction. Ensuring better market access for rural communities through improved transport services enhances farmers' lives and sustainable livelihoods.

In both urban and rural areas, better planning for land-use and transport systems makes a great difference in facilitating access to jobs, goods and services for men and women alike. It also helps improve road safety and reduce traffic accidents and fatalities. On a global scale it is essential that we design and build transport infrastructure to make it safer and more environmentally friendly, and to minimize vulnerability to climate change and natural disasters.

I am therefore pleased that this forum will discuss next-generation transport systems for the 21st century. The significant financial commitments for sustainable transport made by multilateral development banks at last year's Rio+20 conference can help us to realize those aspirations.

I also welcome your ideas and suggestions as the United Nations seeks to define a transformative post-2015 development agenda. Global consultations are under way among Governments, civil society, the private sector and others, and I encourage you to make your voices heard.

I share your commitment to sustainable transport and look forward to the outcome of your deliberations. Please accept my best wishes for a productive forum.

Terima Kasih (*Thank you*)

Environment for Development - EST

Some of the key messages of 7th Regional EST Forum in Asia, 23-25 April 2013 which have implications on IRDP:

- Asian countries continue to face vast challenges in realizing **safe, secure, people and environment friendly, affordable, and climate resilient** transport systems. Rapid urbanization throughout the region further compounds these challenges.
- Transport infrastructure is vulnerable to extreme weather events associated with climate change as well as natural disasters. **Significant investment/financing requirement for resilient transport system.** Damage caused by 2011 flooding in Thailand amounted to US\$46.5 billion, while the recovery and reconstruction costs are expected to reach at least US\$50 billion according to the Government of Thailand and U.N
- Investments in people and **environmentally friendly transport system, including safe and dedicated walkways and bicycle lanes**, in Asia have not kept pace with the still growing needs for environmentally sustainable transport in the region.
- The Forum recognized the essential contribution of EST towards realizing not just the transport related objectives from The Future We Want but also other key thematic and cross cutting issues including but not limited to: **poverty alleviation, sustainable cities and human settlement, energy, food security and sustainable agriculture, as well as health and education.**
- Strengthening **rural-urban connectivity is key to overall economic development** in the countries. At the same time improved intercity connectivity is important to accommodate the rise in transport demand. These can help address the need to connect effectively, farm gate to consumer, manufacturer to customer, and personal mobility needs of people.
- Connectivity is not just about land transport but also about **shipping and the role of ports and ocean shipping**. Regional connectivity of **inter-island shipping needs** to be strengthened. **Inland and coastal waterways** have great potential to support more environmentally sustainable transport as does the greater use of rail transport with double tracking and electrification.
- **Full and seamless integration of public transport modes** (physical, information, network and fare integration) will be an essential characteristic of next generation transport systems. This can be achieved by forming **transit alliances between local government organisations and the private sector at provincial or regional level.**

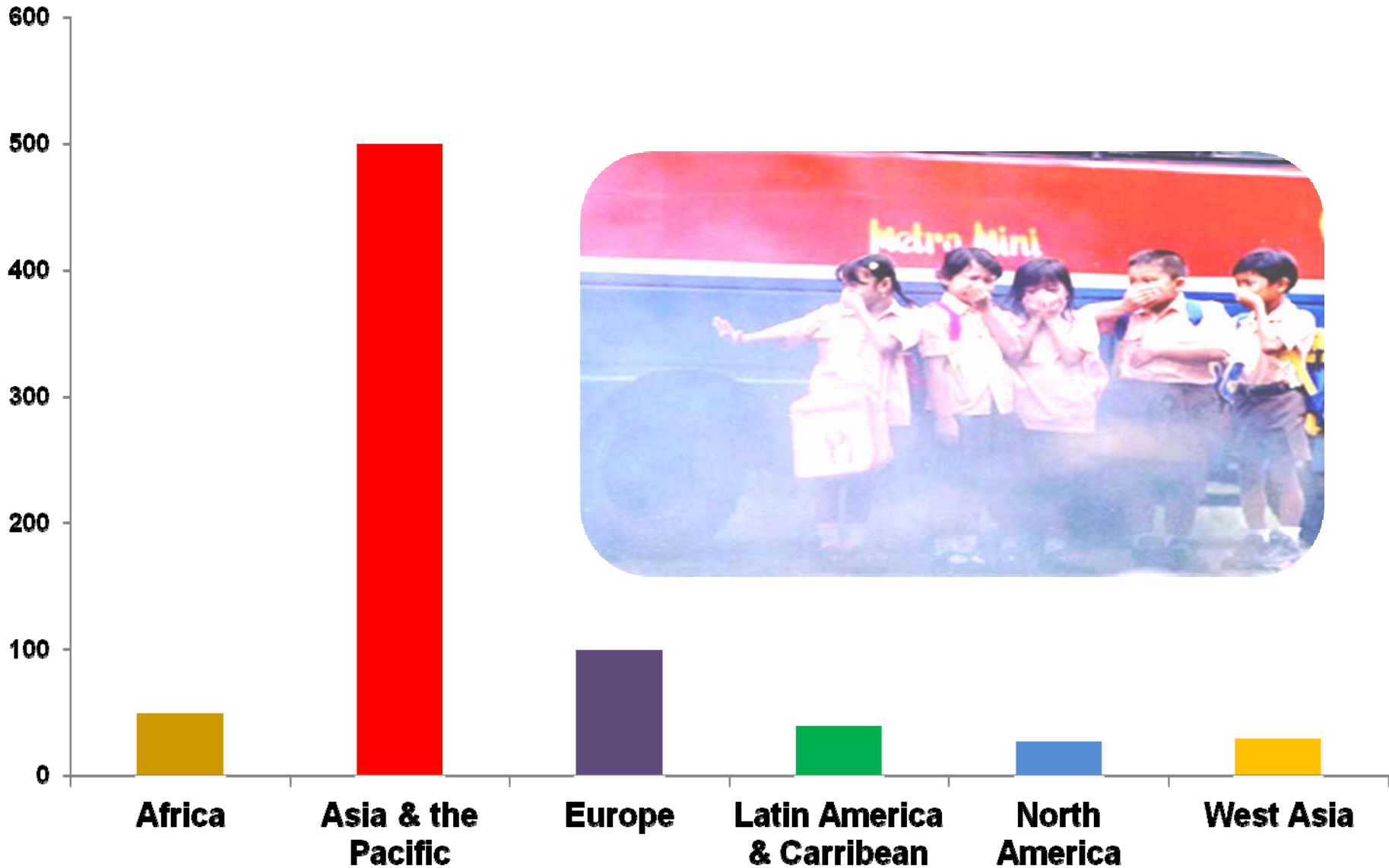
Environment for Development - EST

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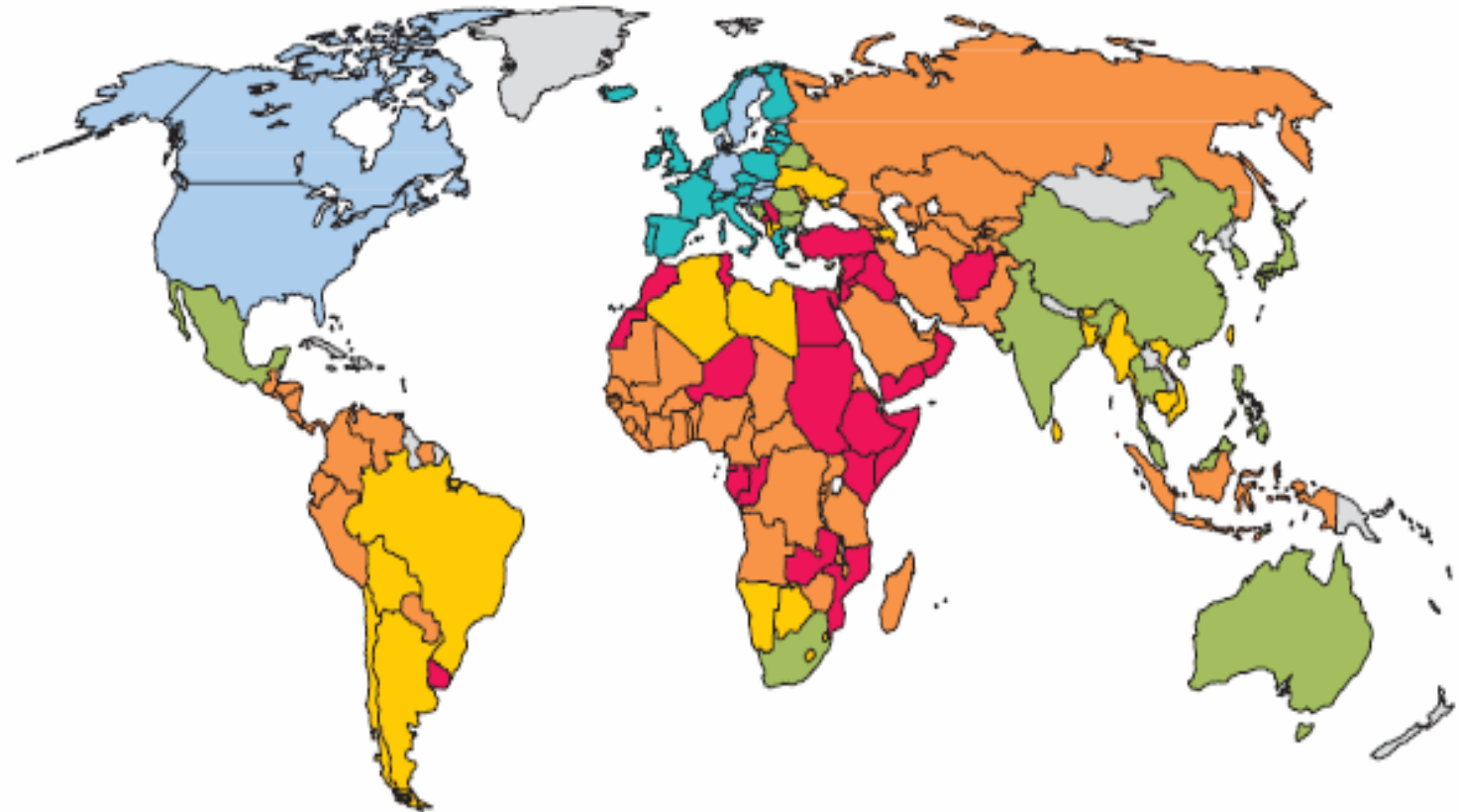
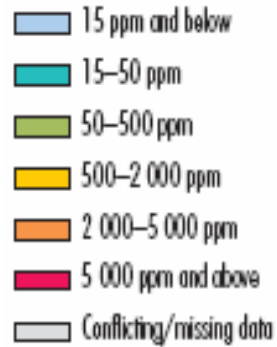
- **Green Freight is essential for Asian countries in the 21st century** to respond to high logistics costs, disproportionate environmental social impacts from freight movement and market pressures to improve efficiency. The Forum recommended the following core-elements to be considered as part of a possible **regional agreement**, but not limited to: (a) Green Freight Programs at the national or sub-regional level, (b) set of plans and policies for a socially inclusive green freight, (c) standard set of indicators for green freight, and (d) regional collaboration framework on green freight.
- **Railways play a key role to serve urban and economic development in Asian countries**, while at the same time offering opportunities to mitigate emissions, reduce traffic congestion, enhance traffic safety, and improve accessibility and connectivity.
- Many countries have a **huge infrastructure deficit at the current level of urbanization**. As the urban population doubles in the next 20 years the pressure to build infrastructure is huge. For instance, India has estimated the finance need to be \$70 billion in the next 5 years, \$450 billion over the next 20 years and the government is planning to support cities through the next round of the Jawaharlal Nehru Urban Renewal Mission (JnNURM) investments.
- **Intelligent Transportation Systems (ITS)** could significantly contribute to improved safety, higher efficiency, better service and reduced pollution and greenhouse gas emissions, thereby these can enable next-generation Vision Three Zero transport systems. They may also play a key role in integrating transport systems for **both passenger and freight, across modes and localities**.

Premature deaths due to PM₁₀ exposure > 0.5 million worldwide

Attributable deaths(1000 people)



Global Distribution of Sulphur level in Diesel Fuel (2007)



Notes: Sulphur levels are maximum allowable as of February 2007.

Source: UNEP 2007b

High sulphur levels in fuels → problems with small particulates; cardio and respiratory illness; carcinogenic

(Source: GEO-4, UNEP)

Growing BRT system worldwide as the most cost effective option

“ BRT provides a sophisticated metro-quality transit service at a cost that most cities, even developing cities, can afford ”

- GTZ BRT Sourcebook





Impact of Guangzhou BRT System

Main features:

- 29 stations and 23km dedicated busways
- free transfer in the same direction (smart card with discount)
- direct physical connections between BRT and metro stations
- integration between BRT and bicycle parking & bicycle sharing
- the world's longest BRT stations

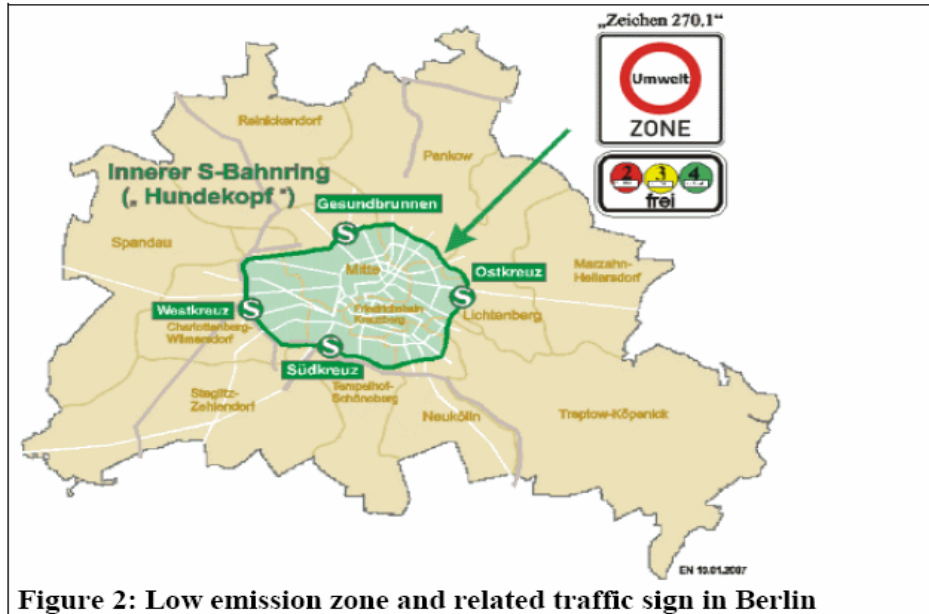
Impacts:

- saves commuting time (1 hour shorter in daily journey)
- daily passenger ridership : 800,000 boardings per day
- the cost of the BRT system infrastructure has been estimated to be equivalent to building around 800 meters of underground metro.

Learning Objectives:

- BRT is one of the most cost-effective transit systems for cities to provide fast, comfortable and high quality public transport service
- Integration with rail-based metro has proven to be an indispensable feature of the BRT and the mass transit network of the city

Berlin 'Umweltzone' Program



sticker:			
minimum criteria for Diesel vehicles	Euro 2, or Euro1 plus particle filter	Euro 3, or Euro 2 plus particle filter	Euro 4, Euro 3 plus particle filter
ban for Diesel veh. older than ...	1992	1996	2000
minimum criteria for petrol cars			Euro 1 plus catalytic converter

Figure 1: German vehicle labelling scheme

Main features:

- a special 88 km² environmental zone has been created to decrease the excessively high levels of PM₁₀ and NO₂
- only vehicles meeting certain exhaust gas standards are allowed into the zone.
- vehicles are categorized into four groups
- all registered vehicles receive a sticker certifying their emission level



Berlin 'Umweltzone' Program

Impacts:

- Net reduction of 24% of exhaust particulate emissions and 14% lower NOx emissions from Berlin's motor traffic
- impact on annual PM10 (fine particulates) pollution is about a 3% reduction
- SO2-concentrations have fallen to 5% of the levels 20 years ago
- Decrease of traffic by 4% inside the zone and 6% in surrounding areas
- 70% of high polluting passenger cars and more than 50% of old commercial vehicles have disappeared from the city center
- Reduction of 73% of "no sticker" (class 1) passenger cars and 53% of commercial vehicles when comparing 2006-2008. (Lutz, 2009; City of Berlin 2010).

Learning Objectives:

- LEZ must be properly planned and progressively implemented
 - LEZ can have specific and immediate benefits - air pollution, GHG emissions, traffic congestion, health
- Support from higher levels of government can be crucial
- Various components - Emission classes, issuance of stickers, Enforcement, LEZ area
 - Users perspective - may be willing to take part in the LEZ; need support from the government in retrofitting/acquiring vehicles

Transport Connectivity in Asia

- Two aspects of sustainability
 - Contribution of connectivity to sustainable development
 - Making transport connectivity sustainable
- Regional connectivity
 - Regional transport networks: Asian Highway, Trans-Asian railway, Logistics centres and dry ports
- Subregional and Inter-subregional connectivity
 - ASEAN, SAARC, GMS, ECO, CAREC, SASEC
 - ASEAN-China
 - ASEAN- South Asia
 - North East Asia - Central Asia
 - South Asia-China
- Intercity connectivity
 - Roads, rails, high speed rails
- Rural connectivity
 - Farm to market roads, rural roads

Intercity connectivity



- Intercity highways, expressways, railways
 - NHDP, China
- High speed rail gaining popularity
 - Thailand-intercity connectivity
 - China- connecting major cities – 9,300 km
 - Singapore- Malaysia
 - China-Lao PDR
 - Lao PDR-Viet Nam
- Nepal -East-west railway development plan
- India- Dedicated freight corridors
- Use of coastal shipping and inland waterways

Rural connectivity

- Rural roads
 - Contributes to employment generation, poverty reduction and sustainability,
 - Improve access to market, health services and education
- Mostly unpaved road
- Explore low cost pavement options
- Many rural roads - poorly engineered and maintained
- High operation and rehabilitation cost
- Policies for maintenance of roads and rural roads
- Involve communities



Many forms of barriers to cross-border transport

- Inconsistent and time consuming, costly border crossing formalities and procedures;
- Restriction/limitation on entry of vehicles;
- Transshipment needed at the border;
- Difficult and different process for transit traffic;
- Differential/reciprocal tariffs/charges;
- Incompatible working hours at borders;
- Coordination among various stake holders; and
- Excessive security checks

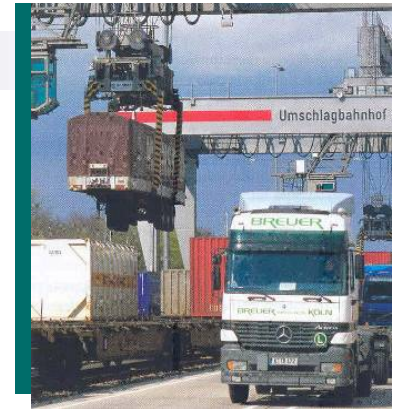




Resilient Transport Connectivity

- Frequent disasters, extreme climate events, sea level rise- Thailand Flood, Japan earthquake
- Damage to transport infrastructure and affect services
- Planning for resiliency of critical infrastructure
- Higher design standards and review of guidelines
 - Height of bridges, embankments, drains
 - Coastal transport infrastructure
 - Vulnerable location and high risk areas
- Life cycle costing
- Transport network redundancy- for disaster relief operation
- Reliance on one mode to the concept of multi-modal transport
- Network hierarchy- prioritization

Long haul intermodal transport



- Optimal use of road, rail, maritime transport, logistics centres and dry ports
- Integration of different modes
- Farm to market, manufacturing center connectivity
- Rail based intermodal transport can relieve road congestion
- Potential emissions reduction
 - Consolidation – reduce less than truck loads runs and reduce number of trucks
 - Improved logistics can reduce 10-20% emissions (OECD, 2010)
 - Consolidation and distribution centres in UK have combined 25.7% emissions reduction (Zanni and Bristow, 2009).
 - Replacement of trucks by freight train from port to dry port in Sweden led to 25% CO₂ emission reduction (Roso, 2007).
 - 43% of freight modal shift to railways, 30% less CO₂ emission (Laos-Thailand corridor)
- Regional economic development: industrial centres, free trade areas

Regional Collaboration on Green Freight

- Freight sector > 50% of road transport related GHG
- Common strategy: sustainable freight growth taking into account road safety, social impact, environment and public health, and working condition of drivers, etc.
- Harmonization of certain policies and standards (e.g, fuel economy standards) across Asian countries
- Economic development through reduced costs and level playing field for companies
- Collaboration on improved freight infrastructure that spans across borders: increased trade



THANK YOU