

Training Course on SDG Implementation for Council of the City of Kuching South

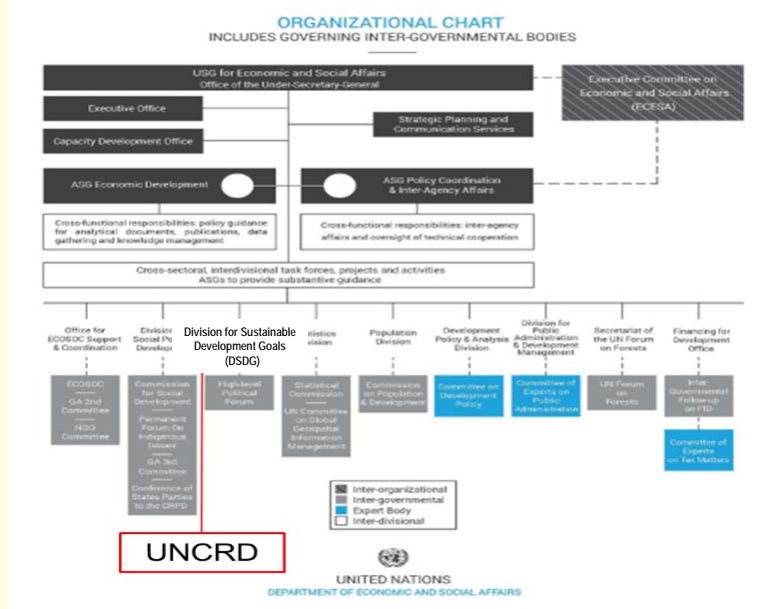
UNCRD and the Initiatives – EST, 3R and IPLA in the context of Sustainable Urban Development and SDG 11

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3 September 2018, Nagoya, Japan



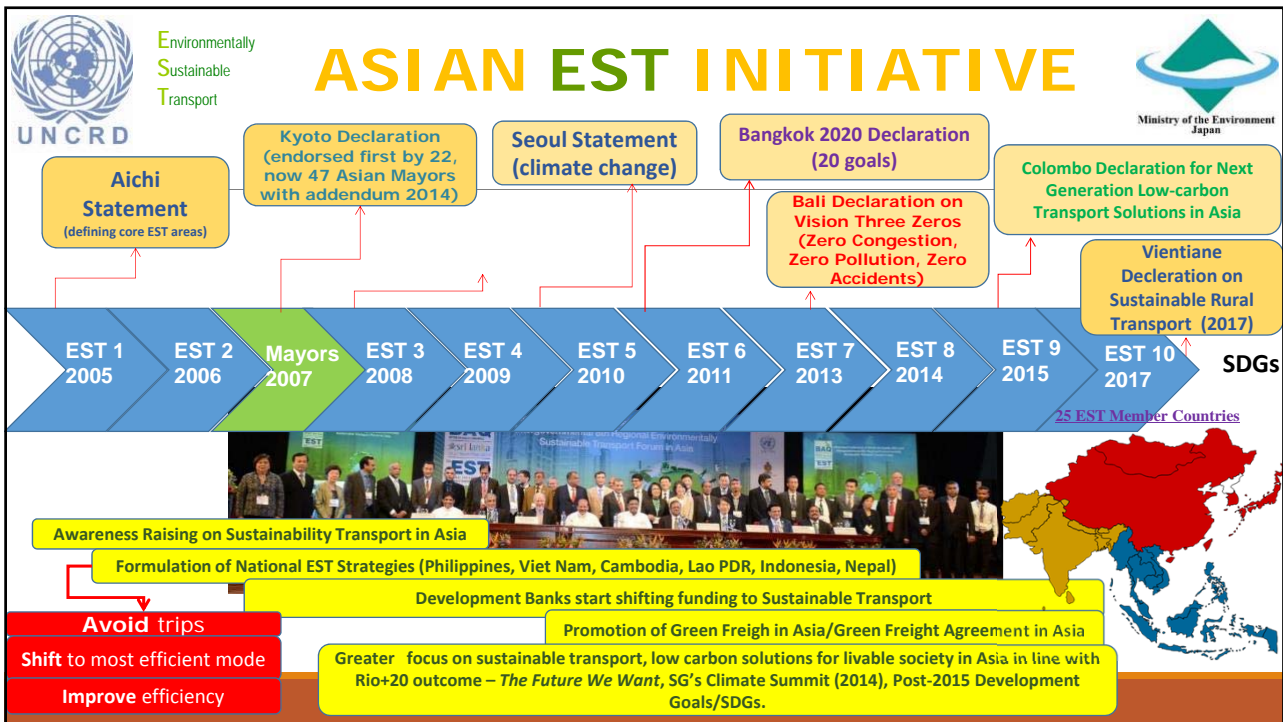
United Nations Centre for Regional Development



United Nations Centre for Regional Development







Bangkok 2020 Declaration

– Sustainable Transport Goals for 2010-2020 –

1. The 22 participating Asian countries of the 5th Regional EST Forum in August, Bangkok, Thailand, agreed on “**the Bangkok 2020 Declaration**”, which reflects a regional consensus as well as aims to influence the decisions of governments and transport stakeholders in the region over the next decade towards realization of safe, secure, affordable, efficient, and people- and environment-friendly transport in rapidly urbanizing Asia.
2. The 22 Asian countries of the 7th Regional EST Forum in Bali successfully adopted “**the Bali Declaration on Vision Three ZEROs for Next Generation Transport Systems: Zero Congestion, Zero Pollution, and Zero Accidents (3Zs)**” which is an addendum to the Bangkok 2020 Declaration (2010-2020).



5th Regional EST Forum in Asia, 23-25 August 2010, Bangkok, Thailand.

7th Regional EST Forum in Asia, 23-25 April 2013, Bali, Indonesia.

Integrated EST Strategy – Aichi Statement (2005)



11 SUSTAINABLE CITIES AND COMMUNITIES



Connection Between Transport and the SDGs

Sustainable transport and mobility are fundamental to progress in realizing the promise of the 2030 agenda for sustainable development and in achieving the 17 SDGs (Global Mobility Report, 2017). Sustainable transport has direct relevance to 7 SDGs (1, 3, 8, 9, 10, 11, 13)



SDG 11: Make cities and human settlements inclusive, safe, resilient and sustainable

SDG: 11.2. By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons. (Indicator: proportion of population that has convenient access to public transport, by sex, age and persons with disabilities)

SDG: 11.6. By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.


SDG: 11.7. By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities.

11.a. Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning.



Mobilizing sustainable transport for development – analysis and policy recommendations from the United Nations Secretary-General's high level advisory group on sustainable transport, Oct 2016

The Sustainable Mobility for All – key attributes..




The Sustainable Mobility for All (SuM4All) is a global multi-stakeholders partnership with a goal to make the mobility – equitable, efficient, safe and green (clean).

Universal Access – to ensure that everyone (the elderly, children, women, families and people with disability) has access to the transport needed, and “**no one is left behind**” to take advantage of social, economic and environmental benefits for current and future generations. Equity and inclusivity are the core of the global mobility objectives. **Universal access features directly SDG target 11.2.**


Safety – Improve the safety of mobility across all modes of transport by avoiding fatalities, injuries, and crashes from transport mishaps across all modes of transport, thus averting public health risks, and social and economic losses associated with unsafe mobility. **Road safety has direct implications to SDG target 11.2.**

GLOBAL OBJECTIVES




UNIVERSAL ACCESS

Ensure for all equitable access to economic and social opportunities by 2030




EFFICIENCY

Increase the efficiency of transport systems by 2030



SAFETY


Improve safety of mobility across transport modes



GREEN

Shift transport systems to low polluting (GHG/air/noise) and climate resilient path
(Source: Global Mobility Report, 2017).

Efficiency – This objective seeks to ensure that transport demand is met effectively, at the least possible cost. Since efficiency cuts across multiple aspects-the optimization of resources (i.e., energy, technology, space, institutions, and regulations) to generate an efficient transport system or network.



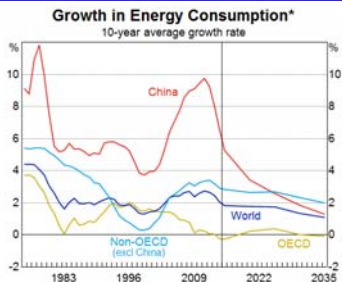
Source: New urban mobility concept, Greenpeace

Green Mobility – This objective aims to address climate change through mitigation and adaptation, and to reduce both air and noise pollution.

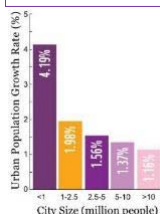
Key Issues and Major Challenges in the Sustainable Transport & Mobility

- ❑ Half of humanity – 3.5 billion people – lives in cities today. In 2016, an estimated 54.5 % of the world’s population lived in urban settlements.
- ❑ By 2030, urban areas are projected to 60 % globally. By 2050, 66% of the world’s population will be urban (UNDESA, 2014).
- ❑ Automobile sales are expected to increase from about 70 million a year in 2010 to 125 million by 2025, with more than half forecasted to be bought in cities. It is predicted that on the existing trajectory, today’s 1.2 billion strong global car fleet could double by 2030 (Dargay, et al, 2007).

- ❑ Asia is currently home to some 17 megacities, which is expected to grow to 22 by 2030. This rapid growth raises many urban challenges, such as traffic congestion, air pollution and road accidents and fatalities.
- ❑ 95 % of urban expansion in the next decades will take place in developing world.



* BP Projections from 2015 onwards under base case scenario
 Sources: BP Energy Outlook 2016; BP Statistical Review 2015; RBA




Source: WWF Living Planet Report 2012 / <http://www.businessinsider.com/small-cities-population-growth-by-2050> and

Rapid urbanization is exerting pressure on urban mobility and public transport system.


By 2050, the average time an urban dweller spends in traffic jams will be 106 hours per year, three times more than today.
(Source: The Future of Urban Mobility Report)

Mumbai, India




Source: <https://www.oneindia.com/feature/world-population-day-top-10-worlds-populated-cities-in-pics-1481206.html>


Urban Mobility Situation in Asia Cities



Urban mobility situation in Dhaka, Bangladesh
Source: <http://www.meritup.blogspot.jp>



Air pollution in Kathmandu, Nepal



Walking still a chore in Jakarta, Indonesia
Source: <https://walkabilityasia.org>


Traditional mobility solutions are not enough for future mobility situation. It needs significant improvements on overall policy, planning, infrastructures, technology, and financing.

Integrated transport system allow people to move easily from one point to another and address the last mile connectivity.


Vehicles and transport infrastructure should be the part of the intelligent network which helps to improve the safety, efficiency and the traffic flow of the city.

	Traditional mobility solutions	New mobility services
Individual-based mobility	Private car ownership	Car sharing: A peer-to-peer platform where individuals can rent out their private vehicles when they are not in use
	Taxi	E-hailing: Process of ordering a car or taxi via on-demand app. App matches rider with driver and handles payment
	Rental cars	Car sharing: On-demand short-term car rentals with the vehicle owned and managed by a fleet operator
Group-based mobility	Car pooling	Shared e-hailing: Allows riders going in the same direction to share the car, thereby splitting the fare and lowering the cost
	Public transit	On-demand private shuttles: App and technology enabled shuttle service. Cheaper than a taxi but more convenient than public transit
		Private buses: Shared and Wi-Fi-enabled commuter buses available to the public or to employees of select companies. Used to free riders from driving to work


Source: McKinsey analysis



Traffic congestion in Lahore, Pakistan
Source: <http://tribune.com.pk>




Air pollution problem in PR China
Source: <https://www.thebeijinger.com>



There were 4,80,652 road accidents in India in 2016, (source: Ministry of Road Transport, India)

Key issues and Challenges in the Sustainable Transport & Mobility cont....

- **Energy consumption:** world's cities occupy just 3 % of the Earth's land, but account for 60-80 % of energy consumption and 75 % of carbon emissions. Transport is responsible for 23% of energy-related greenhouse gas emissions, and its share is growing (World Energy Outlook, 2015).
- **Urban sprawl:** cost of environment degradation, largely driven by sprawling cities is enormous. A study conducted in 50 cities worldwide estimates that about 60% of growth in energy consumption is directly related to urban sprawl (Bourdric et al., 2012).
- **Natural Disasters:** The frequency and magnitude of natural disasters appear to be increasing worldwide. In 2016 alone, there were 327 disaster events globally, which resulted in economic losses of US\$175 billion, almost double the US\$94 billion in 2015. Asia was worst hit in terms of the number of disaster events (128), and accounting for almost 50 % of the world's economic losses i.e. US\$83 billion (source: Swiss Re, 2016).
- **Climate change & global warming:** ADB and UK Aid study shows that South Asia could lose about 1.8% of its annual GDP due to climate change impact by 2050, under the business-as usual scenario.
- **Managing increasing of global passenger and freight volumes:** By 2030, annual passenger traffic will exceed 80 trillion passenger-kilometers—a 50% increase; global freight volumes will grow by 70 % (Source: www.iea.org/about/faqs/transport/).
- **Mobility for all (no one is left behind):** There are now more than 1 billion persons with disabilities in the world, and most of them are isolated due to inadequate transport facilities (Global Mobility Report, 2017). The increase of aging of the urban population has significant transport implications for urban mobility, as their mobility patterns could differ than others. Similarly, the mobility of children, youth and women are different.



A flooded street caused by rains from Typhoon Nina in Quezon City, Philippines
Source: <http://newsinfo.inquirer.net>


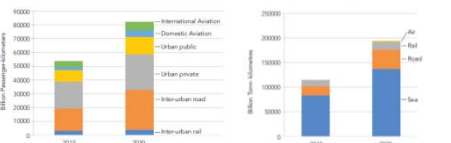


Diagram illustrating climate change impacts: Changing Rain and Snow Patterns, Higher Temperatures and More Heat Waves, Stronger Storms, Damaged Corals, Rising Sea Level, Warmer Oceans, Changes in Plant's Life Cycles, Changes in Animal Migration and Life Cycles, Domestic Aviation, Urban-private, International road, International rail, Less Snow and Ice, Thawing Permafrost, More Droughts and Wildfires.

Source: themadisonian.net



Passenger Transport Volumes (Business as Usual 2015-2030) and Freight Transport Volumes (Business as Usual 2015-2030) charts showing projected increases in billion passenger-kilometers and billion ton-kilometers respectively.

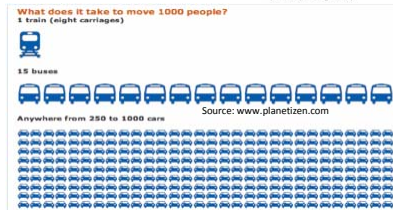
Source: www.iea.org/about/faqs/transport

How could the mobility in cities improve?

- **Sustainable Transportation** is the lifeline of any city, it plays an important role to improve the urban mobility, and significant positive impact on social, economic, and environmental aspects. Efficient urban mobility allows people and goods to move fast, reliable and affordable transport solutions.
- **Cities need safe, high-quality and effective public transport system** that can respond to the needs for increased mobility of businesses and peoples. All the transport system need to be integrated, combining cars, buses, tramways, railways metros, together with air and water transport system.
- **An inclusive, efficient, resilient, and people and-environment-friendly transport system** supports economic growth, human productivity and contribute for making cities and human settlements inclusive, safe, resilient and sustainable.
- **Urban transportation should provide flexibility, quality, efficiency, and affordability.** It is equally important to ensure maximum **harmonization, integration, simplicity, stability, acceptability, and attractiveness** of the public transport system.



Amount of space required to transport the same number of passengers by car, bus, or bicycle.
From info at www.facebook.com/urbanmobility - Photo by @urbanmobility.com



Urban Mobility -Best Practices

Cambodia's first accessible tuk tuk



Korea case: Safe sidewalk with protection fences, creating a safe walking environment for children.



Japan case: a person riding in the subway in a wheelchair.



- A city should provide equal opportunity for the mobility options for everyone, including those with a disability.
- A city should have continuous accessible paths of travel linking public transport, parking, retail, business, and entertainment areas.

Hong Kong Case: Inclusive cycling routes from Sha Tin to Tai Po



Shibuya Crossing, Tokyo, Japan



Accessible taxi available in Narita airport



Urban Mobility - Best Practices

The sustainable transport system provides increased mobility options for people and goods, and make cities inclusive, safe, resilient and sustainable that improves the quality of life of the citizen.

BEST PRACTICE — New York, USA

Within a short space of time New York City has done an impressive job of altering its infrastructure and ensuring that people are far more receptive to the idea of sustainable mobility. Testing pilot projects for a limited time proved to be a great success. Innovative approaches could be trialled before spending money on permanent alterations to the infrastructure. The pilot projects gave people an opportunity to test the full effects of the potential changes and to provide feedback based on their experiences. Before and after surveys on accident statistics, street scores, cycling, economic impact and behavioural aspects provided the proof needed to document the project's success, which in turn lent considerable political clout to the advocates of further changes.

CHOICE OF TRANSPORT MODE

FACTS

Area: 22.8 km²
 population: 612,000 (2010)
 19 million live in greater metropolitan area (sources: www.nyc.gov)

CITYWIDE

- 11.3% INCREASE in bike use in lower city (2008 - 2012)
- 2.4% LESS traffic volume (2008 - 2011)
- 30% FEWER fatal accidents citywide (2008 - 2010)
- 6.5% FEWER vehicles heading into downtown (2007 - 2012)
- 58% GREATER USE of bike lanes throughout the year (2008 - 2012)

Source: Sustainable Business Week 2012, New York City Dept. of the City Planner

Source: A New Urban Mobility

BEST PRACTICE — Copenhagen, Denmark

Copenhagen has been working for some time on creating a continuous network for green mobility. A well-defined web of interlinked cycle tracks and convenient, easily accessible pedestrian spaces has been integrated with local and regional public transport. This produces a coherent system of green mobility that prompts people to use their cars less and creates an attractive, inviting city centre that people are happy to visit and spend time in.

CHOICE OF TRANSPORT MODE

FACTS

Greater central city: 30.25 km²
 population: 299,000 (2012)
 98 inhabitants per hectare
 1.2 million live in the greater metropolitan area (www.dst.dk)

Proximity to public transport

Integrated public transport nodes

Short paths of travel

Diversified experiences

Good walking routes connect spaces

Efficient public transport

Source: A New Urban Mobility

Solving the transport & mobility challenge require innovative bold, coordinated actions from the public and private sectors by adopting/implementing -

- Intelligent policies, regulations, legislations and planning such as smart growth, transit oriented development, transport demand management, land-use and transport planning, among others.
- Using new cutting edge technology
- Smart, resilient and people friendly infrastructures and their regular maintenance
- Adopting safe, low carbon, affordable public transport options –including NMT, walking facilities with inter-modal and multi-modal mobility services
- Innovative funding and financing
- Improve institutional capacity
- Social equity and gender considerations
- Providing free space/open space in the city center
- Intra-agency coordination and cooperation
- Good governance
- Awareness raising, educate and campaigns
- Regional and global partnership

Shaping the system

- 🏠 Policies and regulations
- 🏠 Land use and urban design
- 👤 Consumer preferences and behaviors

Delivering mobility

- 🚗 Privately owned vehicles
- 🚶 Walking and bicycling
- 🚊 Public transit
- 📱 New mobility services

City baseline characteristics (eg, density, quality of public transit)

Enabler: Technology

Enabler: New business models

Enabler: Financing

Source: McKinsey analysis

Photo by stari4ek.

Social Equity & Gender Considerations

- women often carry out frequent and short trips during off-peak hours and off the main-routes for child care, household management activities, informal sector employment, etc.
- social safety and security of public transport for women given that women commuters are on rise due to increased women work force in many business and commercial sectors.
- trip making is deterred for the poor, particularly for women, children, and the elderly, due to their vulnerability as pedestrians to traffic accidents and to personal violence.
- for the physically impaired and the elderly, proper public transport accessibility is a critical consideration to prevent higher risk of social exclusion .



Key influencing factors for urban and transport infrastructure development in Asia and Africa in the face of climate change:

➢ rise in frequency and magnitude of natural disasters (flood, earthquake, cyclones, landslides, etc.) across the world;

➢ climate resiliency is not a major part of the current transport policy, planning and urban/transport infrastructure and services development resulting in unprecedented potential damages to both human life and economy during such extreme events;

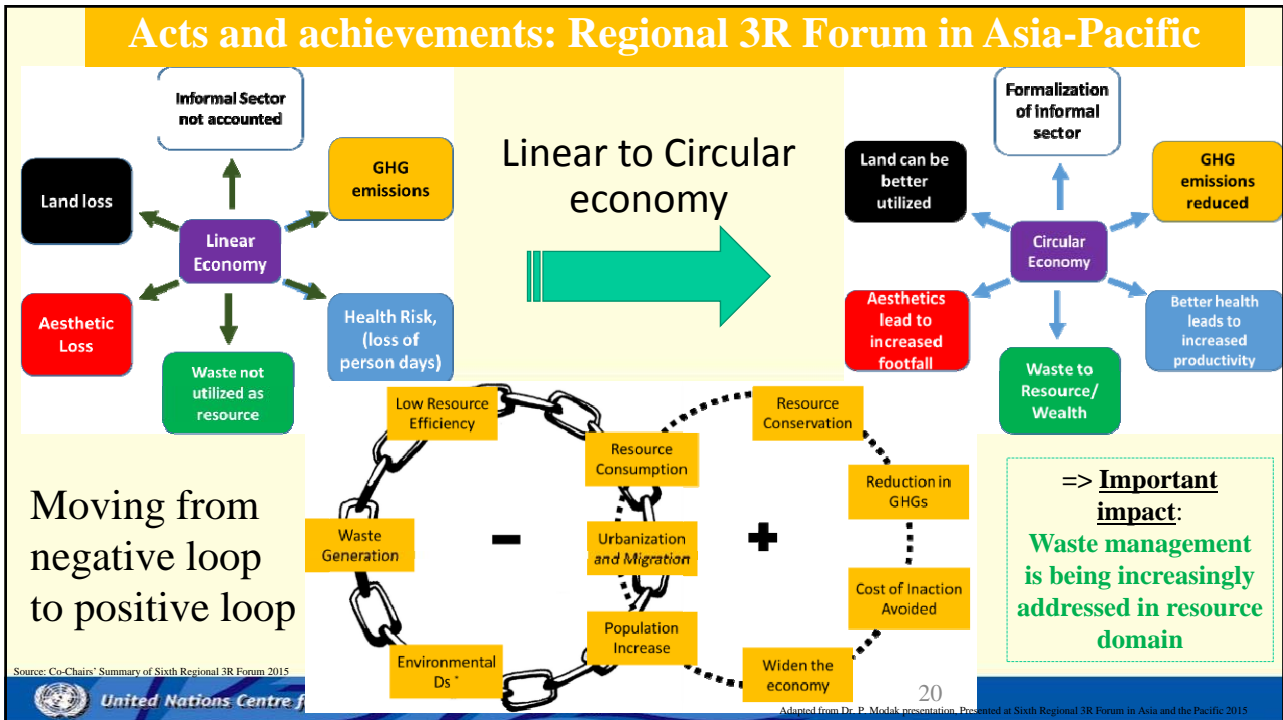
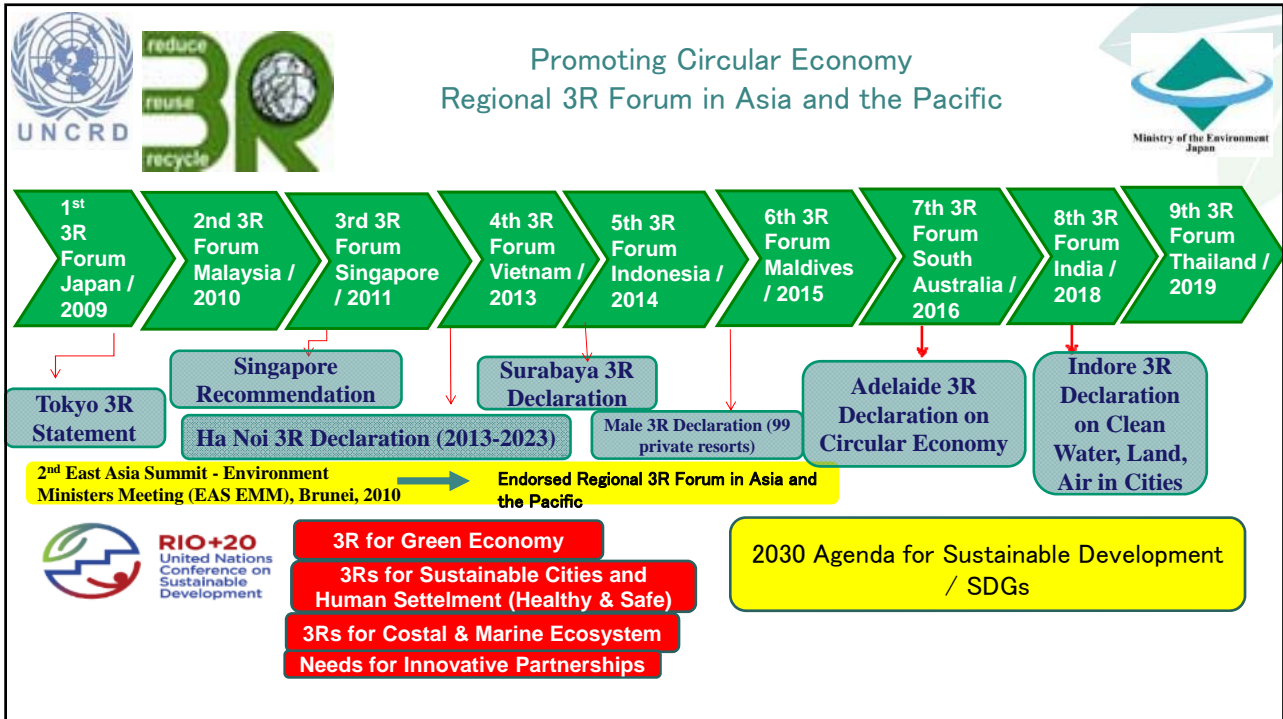
➢ urban/transport infrastructures in Asia and Africa are vulnerable to effects of climate change and these vulnerabilities should be addressed in the design, construction, and geometry of roads, railway tracks, and other transport infrastructure, including the drainage system of cities.

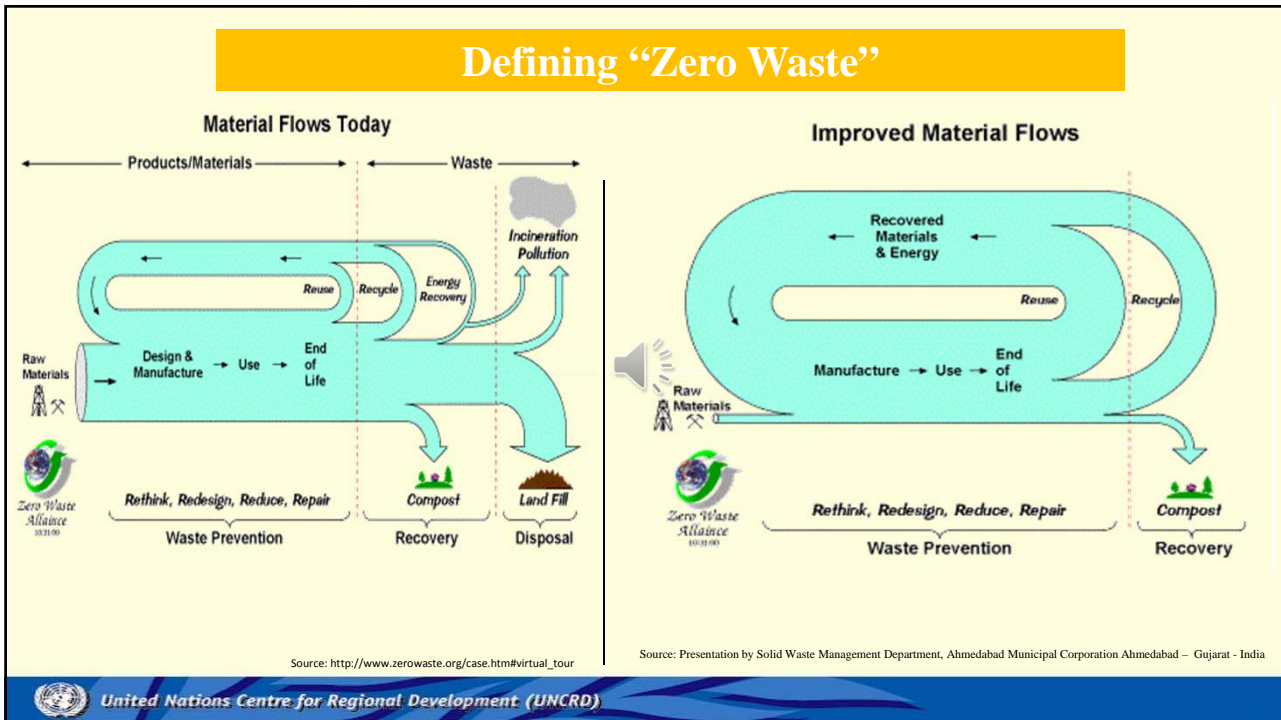
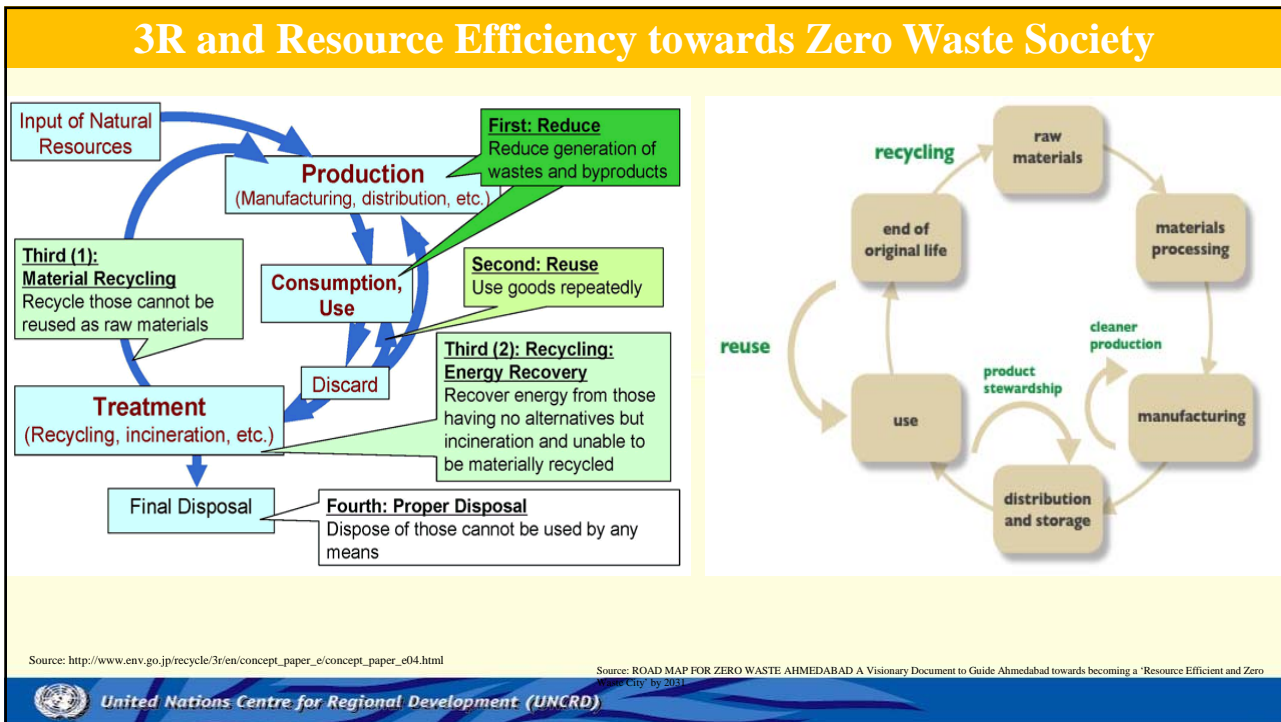


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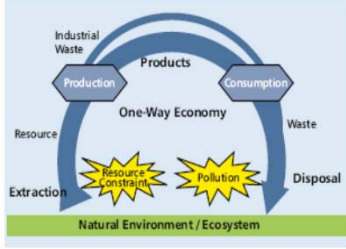
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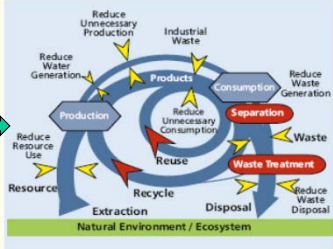


Linear or one-way/conventional to Closed loop economy

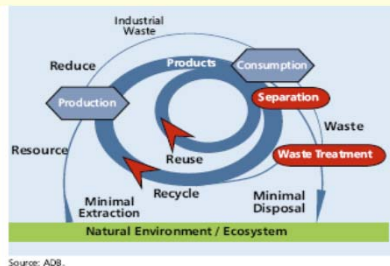
1. One-way/conventional Economy



2. More resource efficient economy



3. Closed Loop Economy



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.

=> *Absence of a science based policy for resource efficient economic development;*

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.

=> *science based policy for resource efficient economic development*

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.

=> *science based policy for resource efficient closed-loop economic development with a high level of cooperation between science-policy-business-community*

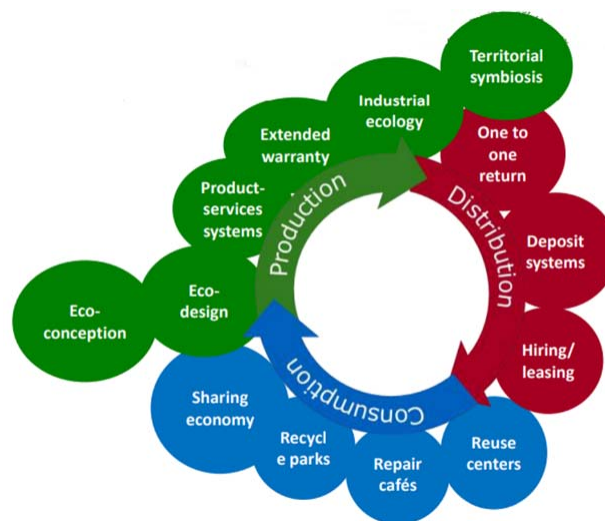
Source: Adapted from ADB, 2011



Circular Economy → Zero Waste ++

+ zero negative environmental impacts

+ new and clean environment



+ new business model

Implementation of circular economy in Asia-Pacific at different levels

Cities and Communities: closed loops in urban services, such as wastewater treatment, generating from waste;

Citizens can enhance their awareness of resource conservation and protect the environment, consume resources in a reasonable way and save resources.



Businesses: through resource efficient and cleaner production, effective adoption of sustainability standards in production to ensure product lifetime extension for example, and ensuring closed loop



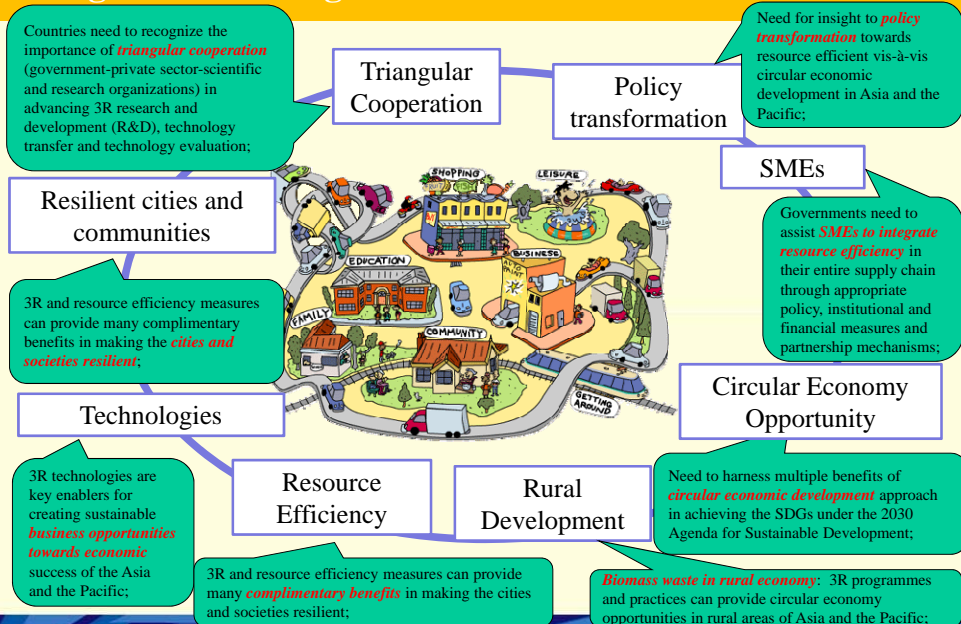
Industrial clusters: eco-industrial parks have adopted industrial symbiosis approaches through servicing multiple companies simultaneously with waste to resource facilities and more;

Recycle played a key role in advocating this policy change in

Households and consumers: behavioural changes ensuring greater household recycling and consumer purchases of certified

Adapted from: http://www.switch-idea.org/fileadmin/user_upload/CDREN_Fest_Singapore02.pdf

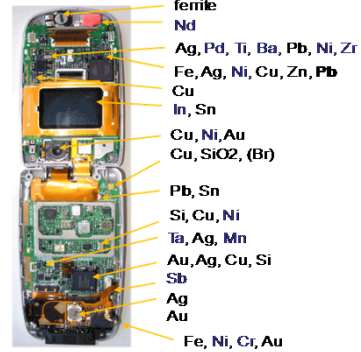
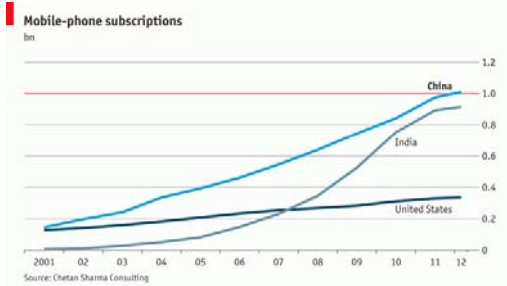
Key Findings of the 7th Regional 3R Forum in Asia and the Pacific 2016



Recovery of Precious metals from emerging e-Waste Streams

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/>

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

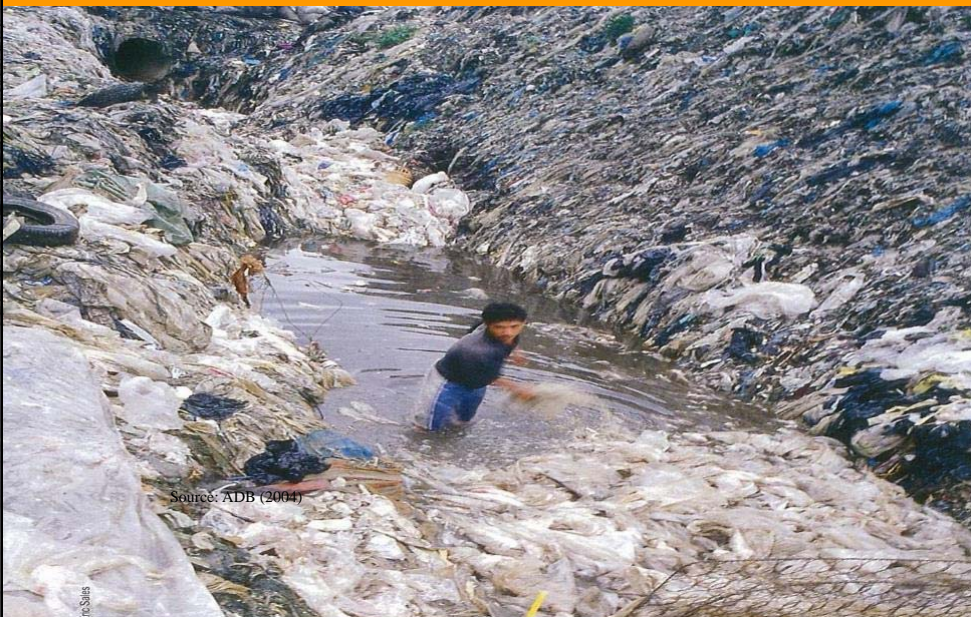


Many children waste pickers at the highly polluted dumping site...



Health risks of informal waste pickers: hospital waste (HIV), jagged metal (tetanus), smoke (PCBs), lead (neural damage), violence (knife cuts), adult behaviour (premature drinking), stress, skin, gastric, respiratory problems

Conventional waste management and the consequences

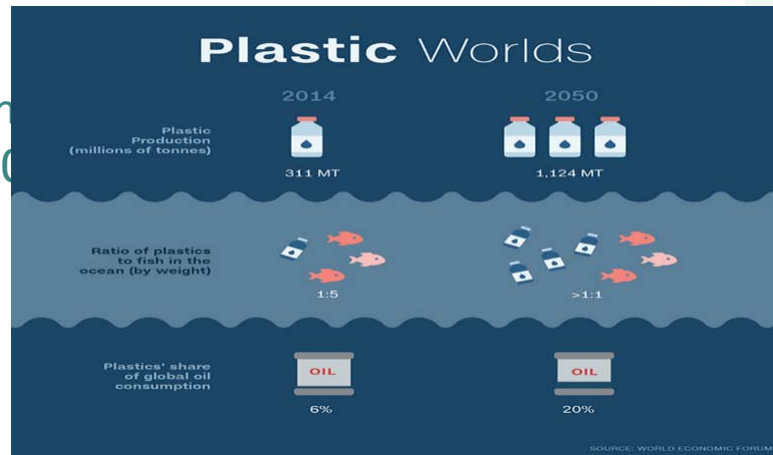


Highly contaminated leachate seeps untreated into groundwater, a source of drinking water....

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!

Global Challenge ~ Plastic waste

More plastic than fish
 in our oceans by 2050



By looking at plastic waste problem– Understand why Circular Economy is important?

Ellen MacArthur Foundation

Consequences of linear economy: Plastics issue – vast implications on coastal and marine environment



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© UNEP & Hartmut Schwartzbach



© Brehen/UNEP/Still Pictures
 Source: <http://surfingindia.net/>



© Still Pictures

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

- Plastics carry hazardous chemicals in marine environment (e.g., PCBs)
- More than 200 species of animals are known to have ingested plastic debris, including birds, fish, turtles and marine mammals.
- Transfer of chemicals from ingested plastics to biological tissue has been confirmed (bio-magnification).
- Micro-plastics (size < 5 mm) in coastal and marine environments is a critical problem, including bio-accumulation of hydrophobic persistent organic pollutants (POPs) like PCBs, DDTs, HCHs and others from the plastics through ingestion or food-chain (fish to fish and fish to people),

(Source: Prof. Hideshige Takada and 6th Regional 3R Forum in AP, 2015)

Consequences of linear economy: Plastics waste and resilience

Unclogging Jakarta's Waterways

- Estimated population of over 10 million people:
 - 20% of city's daily waste ends up in local rivers and canals
- City administration is dredging its 17 rivers and canals for the first time since 1970s due to waterways being 70% blocked, a central contributor to the city's chronic flooding problems



(Source: The New York Times, October 2016)

Consequences of linear economy: Waste and Freshwater Nexus in India



- ❑ 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



- ❑ 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....

Clean India Mission (Swachh Bharat Abhiyaan) and 100-smart cities programme by Prime Minister Narendra Modi offer tremendous business opportunities in waste sector for water security of India

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 limiting many business opportunities.
- Limited efforts on "upstream" resource management and waste reduction aspects

Source: Article: Make wealth from waste, Satwik Mudgal, New Delhi, Down to Earth Magazine (1-15 Nov. 2014)
 Source: ADB and IGS (2008) Source: <http://knowledge.allianz.com/environment/pollution/7511/saving-waste-the-lives-of-indias-rag-pickers> Source: <http://www.theguardian.com/environment/2012/aug/01/india-cities-drown-sewage-waste>

Success stories - Macro-economic/Development Policies Integrating Resource Efficiency and 3Rs

- **Japan:** •Basic Act for Establishing a Sound Material-Cycle Society (2000); Construction Recycling Act (2000); Food Recycling Act (2000); Revision of the Waste Management Act (2000); Act on Special Measures concerning Promotion of Proper Treatment of PCB Wastes (2001); Automobile Recycling Act (2002); Act on Special Measures concerning Removal of Environmental Problems Caused by Specified Industrial Wastes (2003); Revision of the Waste Management Act (2003 to 2006, 2010); Small Home Appliance Recycling Act (2013);
- **Republic of Korea:** New Waste Management Policy towards Resource Recirculation Society (Sep'2013);
- **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 (3% of India's total electricity demand from solar power projects by 2022); 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.
- **EU:** Waste Framework Directive (2008); waste management is a public health priority as well as an economic industry, e.g., in Germany



United Nations Centre for Regional Development (UNCRD)

Evolving 3R Trends and Development in Asia and the Pacific and their relevance in 2030 Agenda context

- Large **potential for resource efficiency and waste minimization** exists in many economic sectors of Asia-Pacific countries;
- Transformational policies and institutions** are key to create science-policy-business interface in support of circular economic development;
- Creating **wealth from waste** will become a **new business opportunity** as more and more countries become net importer of raw materials;
- Creation of sound markets for **environmental goods, services and jobs** will be key to drive circular economic opportunities; and
- Circular economic development will largely depend on crucial **3R infrastructures** such as **eco-industrial parks, science parks, resource recovery facilities and R&D oriented industrial infrastructures** established through dedicated investments and partnerships (e.g., PPPs).

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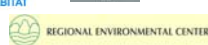
CONCLUSIONS & RECOMMENDATIONS: In order for countries to integrate circular economic approach in the overall policy, planning and development, including infrastructure development, there is a need to -

- a) progressively adopt and implement circular economy plans, a whole-of-value chain approach;
- b) promote 3R as an economic industry offers competitive solutions to many environmental issues and benefits to cities and communities provided 3Rs and resource efficiency are integrated into the macro-economic development policies (e.g., circular economic policy of China);
- c) promote eco-industrial parks and regional infrastructure to support resource optimization and efficiency in industries, SMEs;
- d) formulate and implement enabling policies to promote partnerships, investment atmosphere to expand markets for environmental goods;
- e) divert wastes from landfill to recycling and recovery facilities; end-of-pipe waste disposal is a sunk cost;
- f) drive a science, innovation and technology based culture in overall policy setting and development agendas;
- g) promote networks of innovation and national innovation centers for resource efficiency;
- h) promote government and international collaborative research projects in the areas of strengthening basic statistics, material flow and waste accounting and analysis, and material and waste footprint analysis and resource productivity analysis;
- i) promote research and development (R&D) oriented industrial structures to address resource efficiency related problems in industry sector, including SMEs;
- j) encourage industry-industry cooperation (so that by-products circulate fully in the local production system), green products and green consumerism, renewable energy programs;
- k) promote inter-municipal or city-city cooperation to integrate different production and consumption systems in the region so that resources or by-products circulate among the industries and urban systems within the same region;
- l) develop reuse and recycling infrastructure for environmentally-sound management of disaster wastes;
- m) promote both horizontal (among line Ministries and agencies such as – environment, industry, urban development, public works, agriculture, mining, tourism, etc.) and vertical cooperation (between cities and national governments for circular economic development policies and programmes to trickle down from central to local level as part of urban development strategy); and
- n) explore bilateral/multilateral cooperation for human resource development, financing, knowledge and technical know-how.



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International Partnership for Expanding Waste Management Services of Local Authorities (IPLA) - A SDGs Partnership- #SDGAction267





Principles of IPLA – a SDG partnership



- **Partnerships** offer alternatives in which governments and private companies assume co-responsibility and co-ownership for the delivery of solid waste management services. Waste disposal is expensive – financially and in lost resources (substantial inputs of labour, material, energy, land resources for land filling, etc.).
- **Partnerships** combine the advantages of the private sector (dynamism, access to financial resources and latest technologies, managerial efficiency, and entrepreneurial spirit, etc.) with social concerns and responsibility of the public sector (public health and better life, environmental awareness, local knowledge and job creation, etc.).
- **Partnerships** (PPP) are indispensable for creating and financing adaptation measures towards resilient cities which in turn are more attractive for private investments.
- **Partnerships** provide win-win solutions both for the public utilities and private sector—if duly supported by appropriate policy frameworks. Such partnerships could lead to savings in municipal budgets where waste management usually consumes a large portion. The private sector, on the other hand, may use this opportunity to convert waste into environmentally friendly products and energy that could also serve as income generating opportunities.



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