
Dr. Prasad Modak, Executive President
Environmental Management Centre, India
Presentation in brief

1. Challenges – APAC and SIDS
2. Why 3R?
3. The Response
4. 3R Forum and Way Ahead
1. APAC and SIDS
UNEPI (2015), Indicators for a Resource Efficient and Green Asia and the Pacific - Measuring progress of sustainable consumption and production, green economy and resource efficiency policies in the Asia-Pacific region.
Urbanization trends

PR China, India, Maldives are going through rapid urbanization

Nations prosper, lifestyles change and consumption increases
Resource extraction

Material consumption for APAC - 5.7 to 37 billion tonnes per year between 1970 and 2010

SERI Global Material Flow Database
Tourist receipts represent more than 30% of SIDS’ total exports.
Waste Streams - Risks and Volumes
Technology and Policy Maturity
In Asia 50–70% of revenues are spent on waste management and the cost of inaction eats away 5% of the GDP.

Cost of inaction

Impacts on human health and the ecosystems can be avoided if waste is perceived as a resource and 3Rs are introduced.
Challenges

- Resource scarcity
- Land paucity
- Population rise
- Threatened biodiversity
- Natural disasters
- Climate change
- High dependence on Fossil Fuels
2. Why 3R?

Rethinking
Innovating
Looking for alternate solutions
3Rs in Global Economy & Sustainability

- Resource
- Extract
- Transport
- Process
- Livelihoods & Economy
- Vulnerability & Inequity
- Adverse Impacts Health & Ecosystems
- Threat to Resource Security
- Reduce
- Reuse
- Recycle
- Deplete
- Degrade
- Availability
- Uncertainty
- Quality
- Economy & Sustainability
Moving from Negative Loop to Positive

* Depletion, Degradation, Deterioration, Deforestation, Desertification

Moving from Negative Loop to Positive
Linear to Circular Economy
Investment of only 2% of global GDP required in greening certain central sectors of the economy.

Ripple effect of 3R

Image depicts a petri dish

High level policy goals SDGs
Green Economy
SMC, circular economy
3R
Multiple Dimensions, Perspectives & Eco-system of Stakeholders
3R across value chain

More awareness and action needed on Reduce
Priority

Reduce
Reuse
Recycle

Adoption
Long Term
Reduce
Reuse
Recycle
3. The Response

Response to challenges faced
13 of the 17 goals refer to the need to sustainably manage natural resources.

UNEP (2015), Indicators for a Resource Efficient and Green Asia and the Pacific - Measuring progress of sustainable consumption and production, green economy and resource efficiency policies in the Asia-Pacific region.
Can we tame our consumption and urbanization?
# Sustainable Consumption & Production

## Economic Instruments
- Environmental taxes
- Fees and user charges
- Certificate trading
- Environmental financing
- Green public procurement
- Subsidies

## Regulatory Instruments
- Norms and standards
- Environmental liability
- Environmental control and enforcement

## Informational Instruments
- Eco-labelling
- Sustainability reporting
- Information Centres
- Consumer advice services
- Environmental quality targets and monitoring

## Cooperation Instruments
- Technology transfer
- Voluntary agreements

Sustainable Tourism

Contribution of 3R and Resource Efficiency towards Sustainable Tourism Development in SIDS

- Ecotourism affords a renewed hope for these destinations
- Re-branding of a destination for ecotourism
### Material Flow Indicators
- Resource productivity
- Cyclic use rate
- Final disposal amount

### Supplementary Material Flow Indicators
- Resource productivity excluding earth and rock resources input

### Indicators to monitor changes
- Resource productivity of fossil resources
- Biomass resources input rate
- Total Material Requirement (TMR) including hidden flows

### Indicators based on international resource cycles
- Resource productivity by industry area

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**Indicators and Quantitative Targets**

**Establishment of an SMC Society, JAPAN**

Integrated business models

Planning, Space, Concessions, Incentives, Institutional support

Government/ULBs  Industry  Informal sector

Microenterprises, Cooperatives, and Public-private Partnerships
Informal sector economics

Economic impacts

Mumbai
30,000+
$650 million–1 billion a year

Buenos Aires
40,000+
$178 million a year

Jakarta
37,000
$50 million a year
Wongpanit Business Model, Thailand

1. Cooperating with local governments in promoting recyclable waste separation at source for sale

2. Providing capacity building services to various stakeholders: residents, communities, governments, investors

3. Extension and scaling up the business through a franchise system that can distribute income for wider stakeholders under the concept of a ‘win-win business model’

## Partnerships in Waste to Resource Management

<table>
<thead>
<tr>
<th>APAC</th>
<th>Global</th>
</tr>
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<tbody>
<tr>
<td>• Aloha+ Challenge: A Culture of Sustainability – He Nohona ‘Ae‘oia</td>
<td>• Global Partnership for Oceans</td>
</tr>
<tr>
<td>• Bringing Biogas to Samoa</td>
<td>• Global Partnership on Waste Management (GPWM)</td>
</tr>
<tr>
<td>• Japanese Technical Cooperation Project for Promotion of Regional</td>
<td>• Global Partnership on Marine Litter (GPML), also functioning as one</td>
</tr>
<tr>
<td>Initiative on Solid Waste Management in Pacific Island Countries</td>
<td>of the thematic areas under GPWM</td>
</tr>
<tr>
<td>(J-PRISM)</td>
<td>• International Partnership for Expanding Waste Management Services</td>
</tr>
<tr>
<td>• Pacific Waste Solutions</td>
<td>of Local Authorities (IPLA) by UNCRD</td>
</tr>
<tr>
<td>• Samoa Solid Waste Management (SWM) Partnership</td>
<td></td>
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<tr>
<td>• Sustainable Consumption and Production for SIDS Initiative</td>
<td></td>
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<tr>
<td>(within the 10YFP)</td>
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<tr>
<td>• The UK/Samoa Biogas project</td>
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<tr>
<td>• Travel Foundation, The (formerly The Sustainable Tourism Initiative)</td>
<td></td>
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<tr>
<td>• University Consortium of Small Island States (UCSIS)</td>
<td></td>
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<td>• Waigani Convention</td>
<td></td>
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<tr>
<td>• Waste Management and Sanitation Improvement (WMI) Programme</td>
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<tr>
<td>• Zero Hunger Challenge (ZHC)</td>
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</table>
Economic Instruments (EIs) vs. Command and Control Strategies (CACs)

- Provide flexibility in the overall cost of reducing emissions
- Act as incentives for the use of innovative abatement technologies
- Allocate environmental and natural resources to parties who value them most
- Guarantee self-enforcement by aligning public and private interests
- Increase transparency in resource use and allocation
- Help in cost-recovery of publicly provided services

EIs have at least 6 benefits over CACs

PPP

Polluters Pay Principle

OR

Private Public Partnership?
## Financing

<table>
<thead>
<tr>
<th>Private sector participation (PSP)</th>
<th>Debt – with combination of municipal bonds model</th>
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<tbody>
<tr>
<td>• Can bring in capital and expertise</td>
<td>• Municipal banks model</td>
</tr>
<tr>
<td>• Focus on operation, not overall responsibility for planning, monitoring etc.</td>
<td>• Municipal development funds</td>
</tr>
<tr>
<td>• Open, competitive bidding</td>
<td>• Pooled financing</td>
</tr>
<tr>
<td>• Clarity on tasks, risks and cost recovery</td>
<td>• Credit enhanced/risk mitigation financing</td>
</tr>
<tr>
<td>• Various forms of PPP – contracting, concession (BOO, BOT), franchising, open competition/free subscription</td>
<td></td>
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</table>
## Financing

<table>
<thead>
<tr>
<th>Financing through land use (remediation and control)</th>
<th>Multilateral Banks</th>
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</thead>
<tbody>
<tr>
<td>Land banking</td>
<td>• Long tenor, low interest loans</td>
</tr>
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<td>Land remediation for brownfield use</td>
<td>• Specialized funds, usually with sector focus</td>
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<tr>
<td></td>
<td>• Urban Financing Partnership Facility (UFPF), ADB</td>
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<td></td>
<td>• Carbon market program, ADB</td>
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<td></td>
<td>• Sector focused (e.g. Carbon Market Initiative Funds, Clean Energy Partnership Facility, CC Fund), ADB</td>
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<tr>
<td></td>
<td>• Public Private Infrastructure Advisory Facility (PPIAF), ADB, WB and 15 donors</td>
</tr>
<tr>
<td></td>
<td>• Sector focused (e.g. Global Environmental Facility, Special CC Fund, Clean Technology Fund)</td>
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</tbody>
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Built based on presentation by Karin Eberle Senior Urban Environmental Engineer, CDIA
W2R Technologies

Thermal technologies with energy recovery preferred

PR China, Japan, India and Australia have been investing the most

### Technology Status for Implementation of 3R in Bangladesh

<table>
<thead>
<tr>
<th>Waste Category</th>
<th>Technology</th>
<th>Status</th>
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<tbody>
<tr>
<td><strong>E-Waste</strong></td>
<td>Material Recovery, Sorting, Pulverizing, Collection</td>
<td>○</td>
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<tr>
<td><strong>Healthcare Waste</strong></td>
<td>Material Recovery, Sorting, Pulverizing, Incineration, Collection</td>
<td>○</td>
</tr>
</tbody>
</table>

- ○: Formal and Strong
- ◯: Informal but Weak
- □: Informal and Strong
- ✗: Technology Gap

#### Gaps

**Example: Bangladesh**

3RKH Secretariat, Asian Institute of Technology (2008)
<table>
<thead>
<tr>
<th>S. No</th>
<th>Attributes Unit Operation or Step in MSW Management</th>
<th>Technical Feasibility</th>
<th>Managerial Feasibility</th>
<th>Social acceptability</th>
<th>Low Capital Cost Advantage</th>
<th>Low O &amp; M Cost Advantage</th>
<th>Recycling Potential</th>
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<tr>
<td>1</td>
<td>Segregation at Source</td>
<td>5</td>
<td>8</td>
<td>8</td>
<td>6</td>
<td>6</td>
<td>6</td>
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<td>2</td>
<td>Transportation</td>
<td>7</td>
<td>8</td>
<td>8</td>
<td>7</td>
<td>7</td>
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<tr>
<td>3</td>
<td>Pre-processing of Wastes</td>
<td>6</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>6</td>
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<tr>
<td>4</td>
<td>W to E: Biomethanation</td>
<td>7</td>
<td>8</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>6</td>
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<tr>
<td>5</td>
<td>Conventional Composting</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>7</td>
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<td>6</td>
<td>Vermi-Composting</td>
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<td>7</td>
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<tr>
<td>7</td>
<td>Mechanical Composting</td>
<td>6</td>
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<td>7</td>
<td>6</td>
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<td>5</td>
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<tr>
<td>8</td>
<td>W to E: RDF Production</td>
<td>7</td>
<td>5</td>
<td>7</td>
<td>5</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>9</td>
<td>W to E: Incineration</td>
<td>9</td>
<td>3</td>
<td>8</td>
<td>4</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>W to E: Pyrolysis / Gasification</td>
<td>8</td>
<td>5</td>
<td>7</td>
<td>4</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>W to E: Plasma Arc Gasification</td>
<td>6</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>Disposal of Road Sweeping &amp; C&amp;D</td>
<td>7</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>5</td>
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<tr>
<td>13</td>
<td>Engineered Sanitary Landfill</td>
<td>9</td>
<td>4</td>
<td>8</td>
<td>4</td>
<td>8</td>
<td>3</td>
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May be treated as indicative.

Decision support for Selection of W2R Technologies

Government of India
Protoprint empowers urban waste pickers to produce 3-D printer filament themselves from the plastic waste they collect.

- greater efficiency of design
- local production
- additive manufacturing instead of injection molding, therefore less waste
- bottom-up approach

3D printing
Breakthrough 3R technology

Repurposing phones

Project Ara, Google’s Advanced Technology and Projects group

http://www.projectara.com/more/
Professional postgraduate degree and certificate training on “Holistic Waste Management.”

Strengthening the knowledge base

University Consortium

UNEP-IETC
Integrated Waste Resources Toolkit

EMC and Griffith University

Strengthening the knowledge base
Collaborating Centre Of Sustainable Consumption and Production

- The Centre provides scientific support to clients from the private and the public sector, such as UNEP and other organisations in the field of SCP.

http://www.scp-centre.org/
4. The Regional 3R Forum

Connecting the Dots to form a Circle
Goal of the Regional 3R Forum in Asia and the Pacific is to achieve low carbon and sound material cycle societies.
Increasing Participation

<table>
<thead>
<tr>
<th>R’s</th>
<th>Countries</th>
<th>Forums</th>
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<tbody>
<tr>
<td>3</td>
<td>15</td>
<td>5</td>
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</tbody>
</table>

1st 103  2nd 133  3rd 150  4th 288  5th 288
JAPAN: Towards A Resource Efficient, Sound Material-Cycle Society

MALAYSIA: Transition to a Green Economy

SINGAPORE: Technology Transfer for promoting the 3Rs – Adapting, implementing, and scaling up appropriate technologies

VIETNAM: 3Rs in the Context of Rio+20 Outcomes - The Future We Want

INDONESIA: Multilayer Partnerships and Coalition as the Basis for 3Rs Promotion in Asia and the Pacific
6th Forum

- Science-based 3R Policies
- Improved Decision Making Towards Effective Implementation of 3R
- Waste and Freshwater Nexus
- Extended Producers Responsibility (EPR) and Industrial Ecology
- Economic Opportunities through 3R – Sectoral Experiences
- Sustainable Tourism Industry
Way Ahead

National 3R Forums – We need to decentralize and network

Policy Harmonization – Let us set common goals

Data, Information and Knowledge
Awareness, Education, Training
3R Centres of Excellence on Technologies

The Waste Business – Are we missing the right audience?
More Evidence to make Economic Case?

Do we change our Language? Waste? or Material?
Thanks!

Any questions?

You can find me at prasad.modak@emcentre.com