

# **Co-benefits of Sustainable Waste Management for Preventing Air Pollution – Prospects for Circular Economy**

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**Guilberto Borongan  
Senior Programme Specialist  
AIT RRC.AP, Thailand**

# Air Pollution from Poor Waste Management

**3%** of global GHG emissions

**27%** of waste related GHG emission is from Asia

Source: CCAC, 2016



**SLCP ( Particulate matter, Black carbon, Methane etc...)**



# Haze issue from biomass burning



Malaysia



Vietnam



Thailand



Singapore



Kalimantan, Indonesia



Philippines

**Southeast Asian (SEA) haze** was an air pollution crisis affecting several countries in SEA in 2015. Haze blamed for **deaths in Indonesia and respiratory illnesses** in around **500,000 people**.

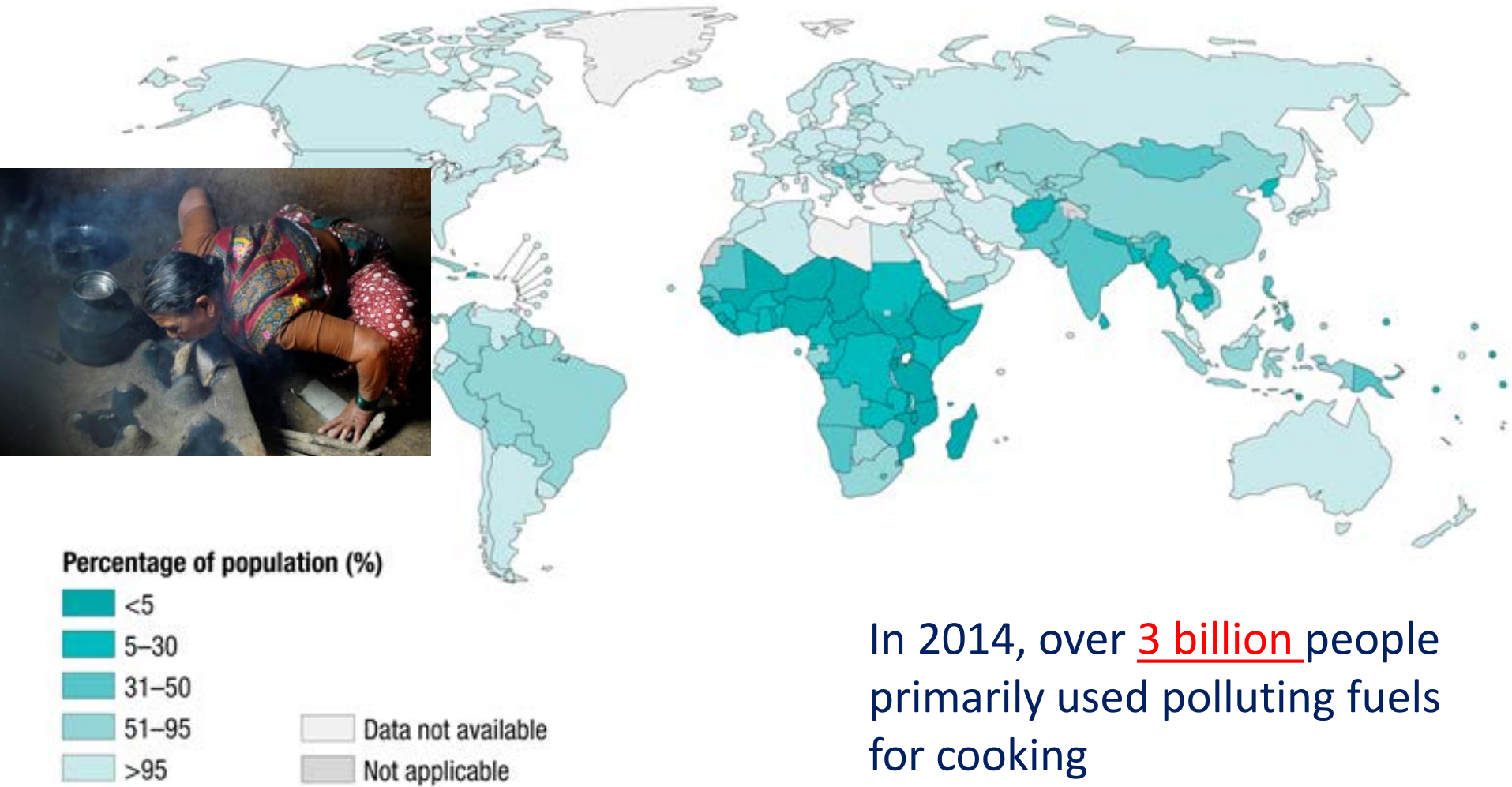
Source:  
<http://www.bbc.com/news/world-asia-34265922>

## Causes:

- Forest fires/biomass burning: Most haze events resulted from uncontrolled burning from "slash and burn" cultivation in Indonesia, and affected several countries in SEA
- El Nino-Southern Oscillation
- Land clearing activities by burning



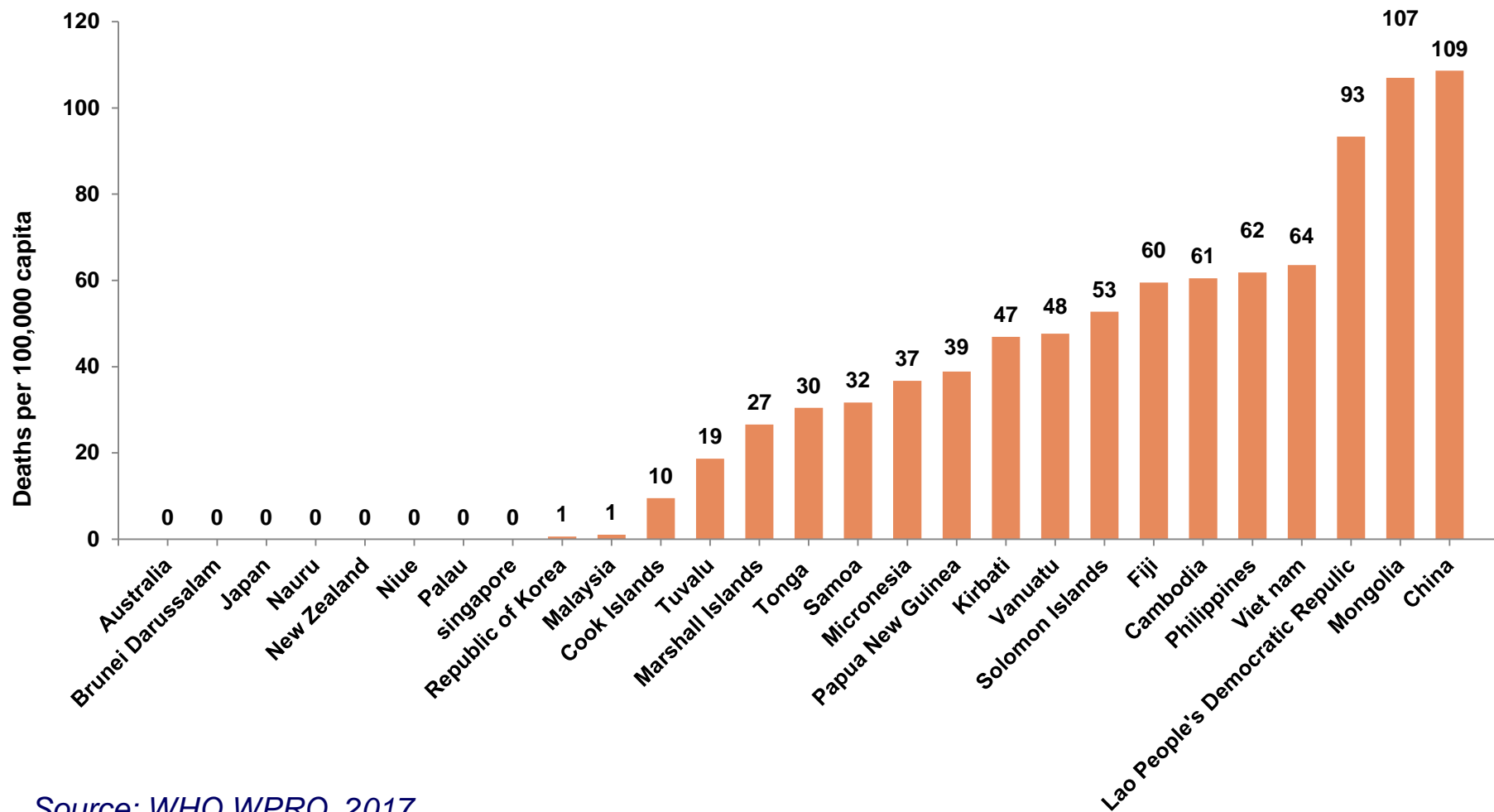
# Household air pollution : Use of clean fuels and technologies for cooking, 2014



In 2014, over 3 billion people primarily used polluting fuels for cooking

# Burden of Indoor Air Pollution

## Deaths attributable to household air pollution



Source: WHO WPRO, 2017

# Case: Massive garbage dump site fire

Massive garbage dump site fire, Muang district Samut Prakan, Thailand in 2014

- 200 people from 90 families in three communities were evacuated



A woman walks through thick smoke caused by a massive fire at an open dumping site.

Source: SOMCHAI POOMLARD, Bangkok post, 2014

Area	24 hectare (150 Rai)	
Chemical Vapour at the dump site	Thai STD	Conc. Level (measured at 200 meters radius)
CO <sub>2</sub>	27 ppm max.	175 ppm
SO <sub>2</sub>	0.2 ppm	4.5 ppm
VOC	0.0 ppm	0.9 – 1.0 ppm

Source: PCD, 2014 cited by Bangkok Post

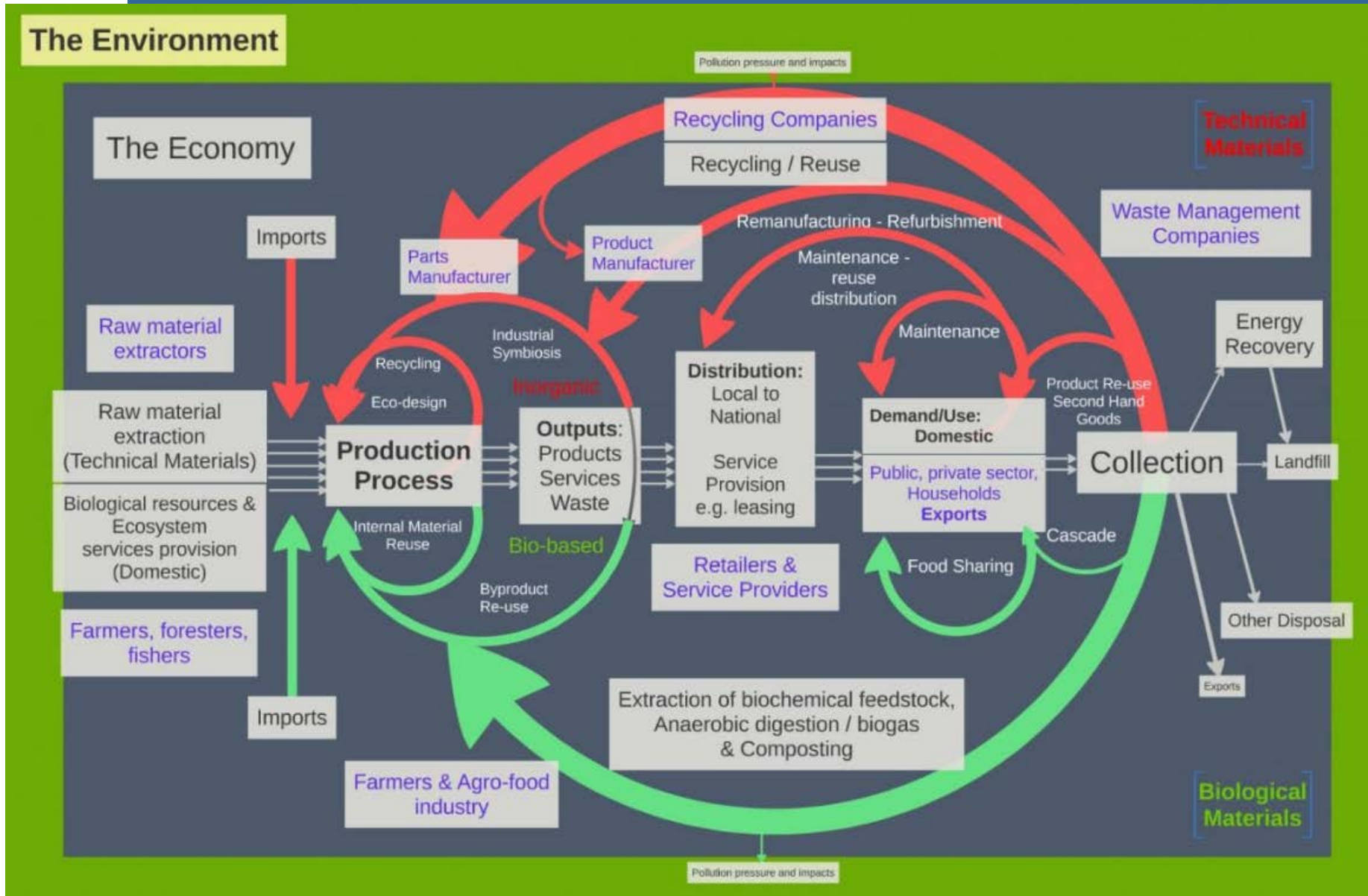
# Sustainable Waste Management



Source: UNEP 2017, AWMO



# A Circular Economy





## Economic Co-benefits achieved through Composting in Bangladesh & Indonesia

Composting in Bangladesh results in co-benefits of **US\$ 94 per tonne** of GHG emissions reduction. Co-benefits (public & private) cover 3 sustainability dimensions:

### **Economic:**

- Public sector: saves 1.1 m<sup>3</sup> of landfill per tonne of organic waste composted, resulting in a US\$ 23 saving (as no need to transport and landfill the waste), 25 per cent savings on the chemical fertilizer subsidy (US\$ 4)
- Private sector: 25 per cent savings in fertilizer usage by using compost (US\$ 10)

### **Social:**

- Public and private sectors: benefit due to creation of 4 jobs for waste pickers to process 2 tonnes of waste each, which reduces 1 tonne of CO<sub>2</sub>-eq. (US\$ 8)

### **Environmental and Economic:**

- Public and private sectors: benefit due to the increase in crop yield of 0.21 tonnes of rice per half-hectare resulting in a 1 tonne of CO<sub>2</sub>-eq. reduction (US\$ 49)

Bangladesh model - shows how small changes in moving thinking up the waste management hierarchy can have significant sustainability benefits.



Source: Md. Maqsood Sinha (2016).



## Co-benefits of Sustainable Waste Management: Si Mum Muang Market, Thailand

Recyclable waste collection: Laborer collects bagful of recyclable items and earn additional income. Laborer has to deposit max. of 10 bags filled with recyclables per month. Innovation – each net bag is tagged with a barcode.



Organic waste management: waste segregation centre, animal feed preparation & Effective Microorganism (EM) production unit



Recycling Section [sorting of plastic, paper, metal and glass]





## Co-benefits on Methane Recovery in Landfill, Surabaya, Indonesia



Co-benefits and the ability to save public funds through MSW reutilization - raise public awareness, provide clear benefits, and create incentives



## Co-benefits achieved through household biogas digester in Cambodia & Philippines

7 biogas digesters in Takeo, Cambodia

2 biogas digesters in General Santos, Philippines



Biogas digesters in operation, providing **sustainable supply of clean fuel for cooking and lighting and natural fertilizers**





## Way forward [1]

- Several **existing initiatives on air pollution**, tackling multiple issues simultaneously such as local pollution, transboundary aspects, link with climate change: EANET, Haze agreement, etc.
- Opportunity to **maximize synergy among different networks** in view of common interest in the region to strengthen international cooperation, particularly on **3R and Circular Economy**.
- **Co-benefits** of **sustainable waste management** include:
  - improvement of human health and ecosystems
  - resource recovery (materials and energy)
  - reduction in the consumption of virgin resources
  - generation of employment (especially for the informal sector)
  - reduction in the emission of greenhouse gases/SCLPs
  - reduction of footprint of landfills

## Way forward [2]

- **Diverting waste (technical & bio-nutrient materials) from disposal for preventing air pollution or SCLPs through adoption of 3R and circular economy provides social, economic and environmental benefits**
- **Innovative community-based waste management activities have proved to provide the co-benefit of a reduction of financial burden for administration and operation from landfill – toward sustainable waste management**

## References:

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*UNE, AIT, ISWA (2017). Asia Waste Management Outlook*

*Barnaby Lo (2010), <https://www.cbsnews.com/news/living-off-toxic-trash-in-the-philippines/>, 2010*

*EU (2014). Scoping study to identify potential circular economy actions, priority sectors, material flows and value chains*

# Thank you for your attention!

