



# Bio Waste Recycling for Local Revitalisation:

## *Lessons from Japanese Cities*

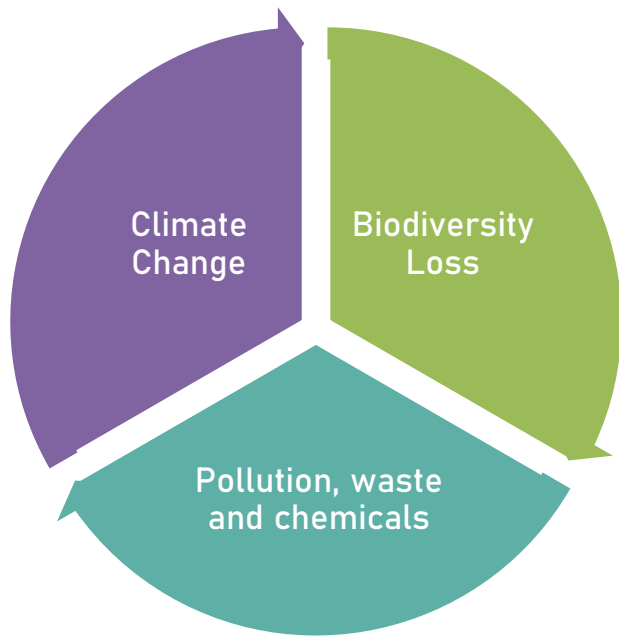
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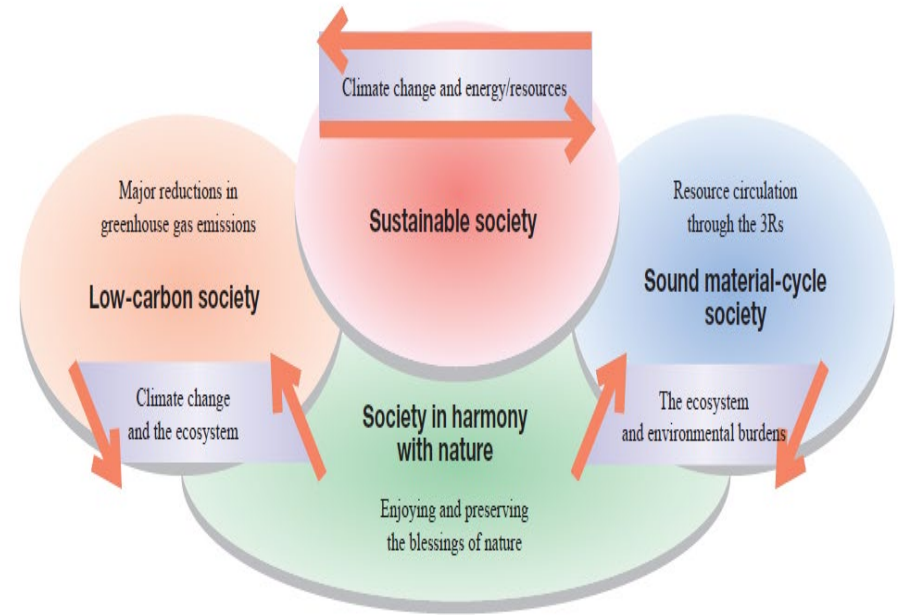
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# Urgency of Creating Sustainable Society

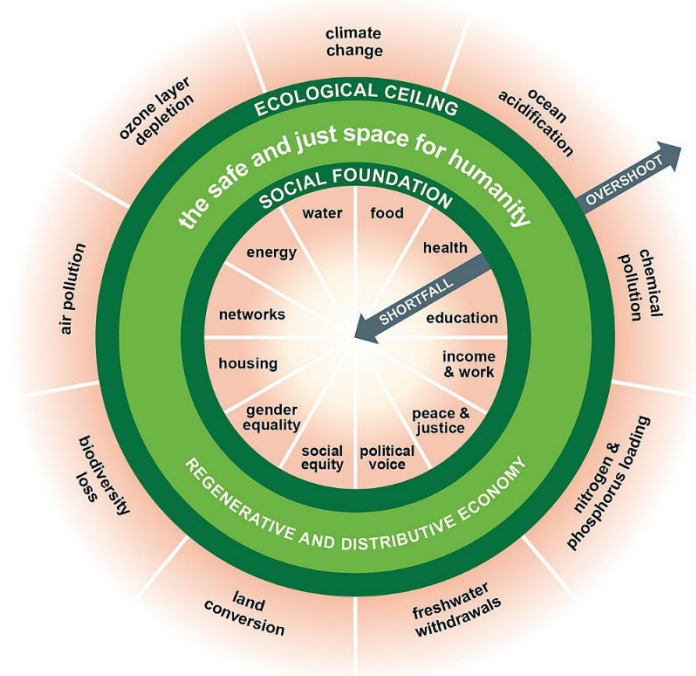
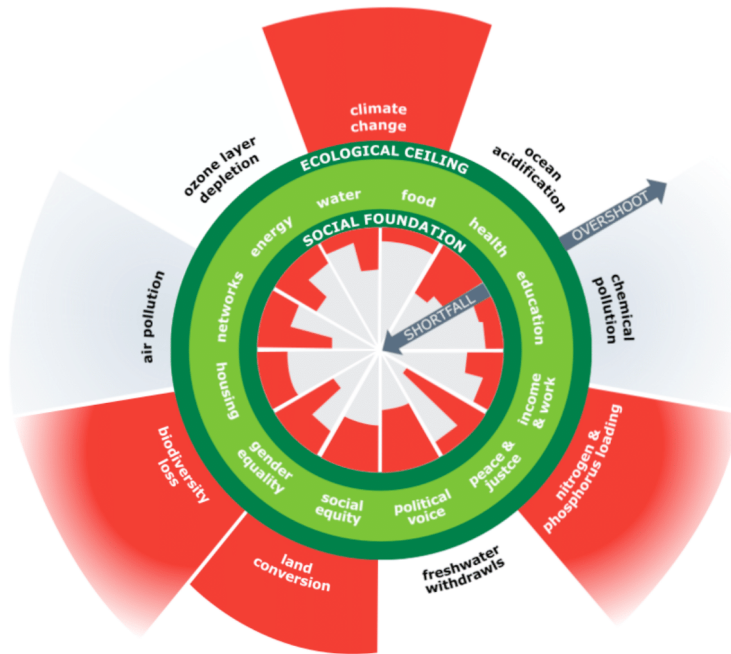


**Triple Planetary  
Crisis**



**Sustainable  
Society** (Source: MOEJ, 2008)

Transition to a sustainable society requires a shift from traditional economic growth thinking to ecological thinking.

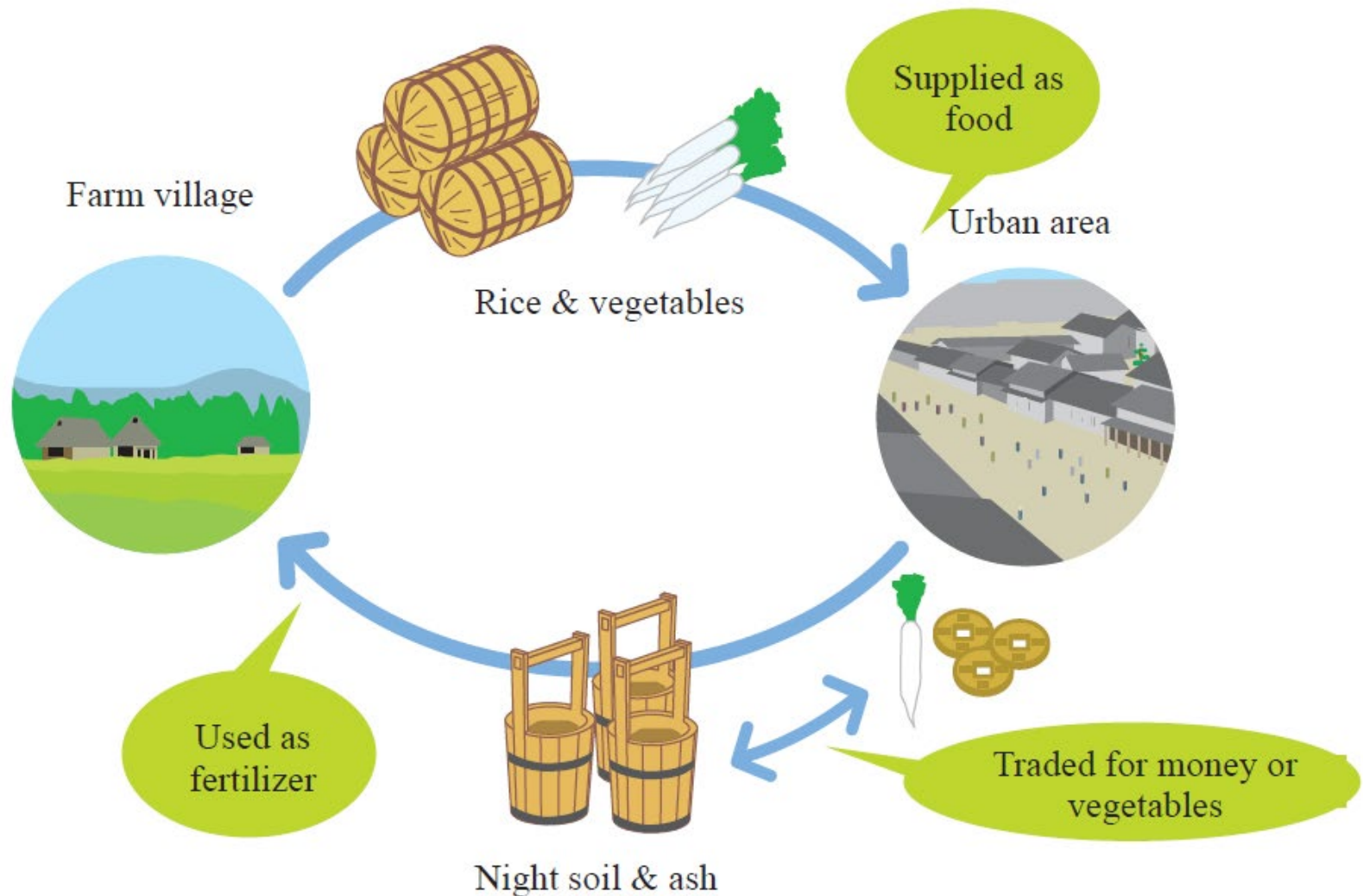


Planetary boundaries

Doughnut Economy

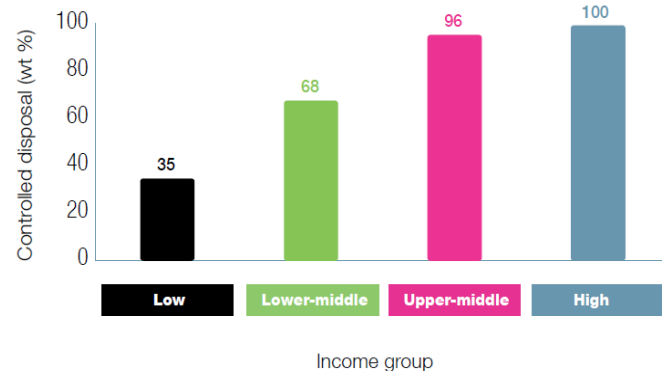
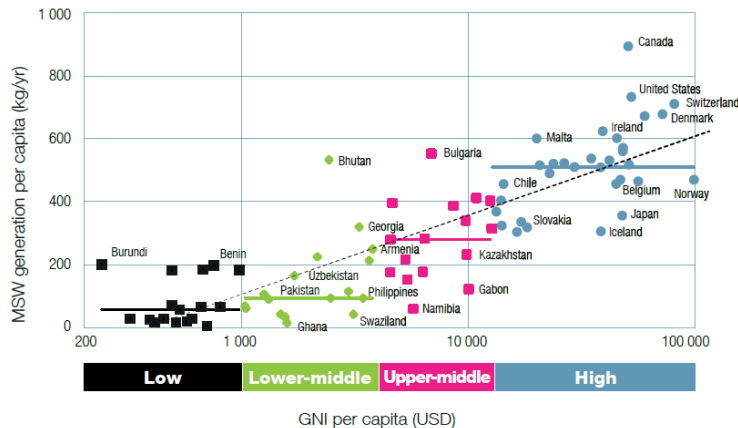
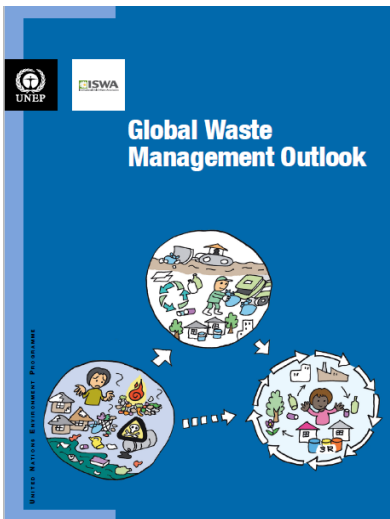
(Source: <https://www.kateraworth.com/doughnut/>)

# Practices of Resource Circulation System before Industrialisation



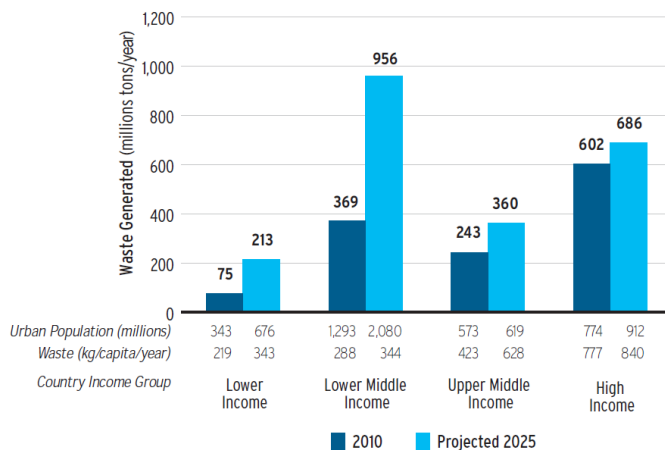
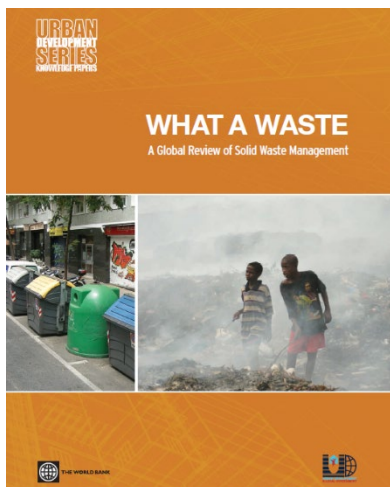
(Source: MOEJ, 2008)

# Challenges in managing waste in developing countries



The richer we get, more we discharged

Open disposal and open burning is the main option in many low/middle income countries



MSW generation will be doubled in lower/middle income countries by 2025

Rate of waste collection service is between 40%-70% in low/middle income countries

# Biomass City Development in Japan

## Sado, Niigata Prefecture

### Using regional resources for an island to live people and wild ibis together

Sado is aiming to make its island more energy self-feeding and environmental -friendly using woody biomass and food oil waste. The goal is to cover the island's energy needs using resources generated in the island.



Source: Sado Ibis Conservation Center

## Kasai, Hyogo Prefecture

### The Symbol of Regional Recycling: The "Field mustard blossom train"

BDF\* trains and public vehicles trigger to realize environmental-friendly and sustainable lifestyle such as biomass utilization in the all city  
BDF\*, biodiesel fuel



## Maniwa, Okayama Prefecture

### The birthplace of the Biomass Town Tour

The "Industrial sightseeing tour" takes visitors to facilities utilizing woody biomass, and promotes biomass industries with urban-rural interchange and revitalization of recycling-based industries.



## Oki, Fukuoka Prefecture

### Creating an environmental town through reducing waste

Sludge from septic tanks, and food/human waste are fermented and converted into energy and liquid fertilizer. The latter is used in fields and paddies. Creation the biomass town based on recycling-society Concept activities, for example, environment learning at biomass utilizing facilities.



## Hita, Oita Prefecture

### Leading biomass resource department store

The town utilizes various types of biomass. The biomass-derived products are biogas, wood chips, feed and compost.



## Shimokawa, Hokkaido

### Living together with forests: leading low-carbon society

By implementing self-reliant and economic system utilizing woody biomass, and challenging fast-growing willow trees as fuel source, Shimokawa has made it Woody Biomass Refinery town.



## Kosaka, Akita Prefecture

### Effective biomass utilization in a 3R (reduce, reuse and recycle) town.

With the towns' expedience related to mining, refining mine and recycling industries, Field mustard blossom growing project and others are carried out for recycling resource suited to the town capacity.



## Motegi, Tochigi Prefecture

### Locally-produced/locally-consumed "Midori" compost and agricultural products.

"Midori" compost is made from a biomass, including fallen leaves from mountain forests and organic resources from farms, and the is used to grow farm produce. The town's farm product brand has been successful, resulting in a system of local production/local consumption.



## Shirakawa, Gifu Prefecture

### Forests & Energy: aiming for regional recycling

The Tono Hinoki Product Circulation Cooperative leads effective use of the woodchips and other scrap left behind by lumber mills, and converting it to energy. With this regional energy recycling system, the town has succeeded in revitalizing the lumber industry, a key industry.



# Creating ecological and circular society: a case of Oki Town, Japan

- Small agricultural town located in Fukuoka Prefecture
- About 13,850 people and 4,775 households in 2020
- 14% of town's total land area of 18.44 sq.km is comprised by canal network
- Popular for its local agricultural production, such as Strawberries and Mushrooms

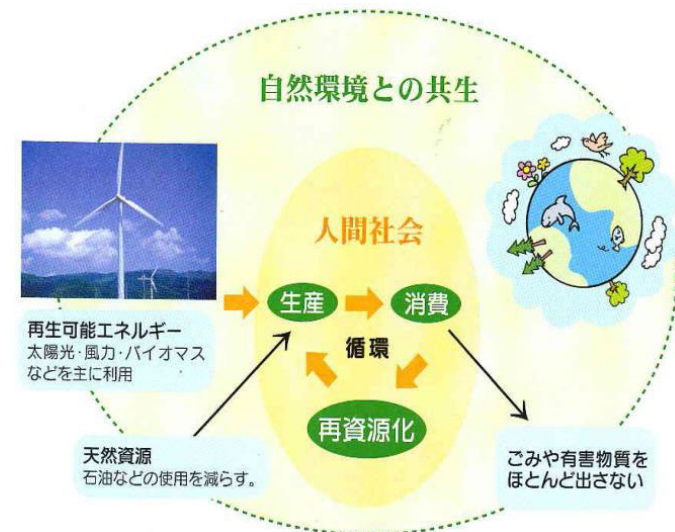


# Initiative to create ecological and circular society

Step 1: Making a zero waste city declaration (Okimachi Mottainai Declaration)

With an active citizen participation and dialogue the city has developed a vision in 2007

- We shall create a town without waste anything
- We shall promote the recycling of waste and become a town that does not dispose of waste by incineration or landfills by 2016
- We shall create a sustainable community and improving social harmony



(Photo courtesy: Oki Town)



# Initiative to create ecological and circular society

Step 2: Introduced a new waste management rule to promote waste separation at source.

- Organized awareness-raising workshops to make people aware about the new waste management system through citizen dialogue
- Currently, the waste is separated into 21 categories at household based on the value of materials
- Recyclable materials are collected once a month at the town recycling center
- The kitchen waste collection takes place twice a week. The collection baskets, one for ten households are placed certain locations the day before collection
- Other waste (residual) is collected once a week



(Photo courtesy: Oki Town)

# Step 3: Establishment of socio-economic infrastructure to support ecological and circular system



**Kitchen Waste Separation**  
Separation of kitchen waste at home and at schools



**Human Waste and Septic Tank Sludge**

**Local Agricultural Product Supply**  
Supplying of agricultural products produced using liquid manure to homes and schools



**Fermentation Recycling**  
Fermentation at biomass plant to recover bio-gas and liquid manure

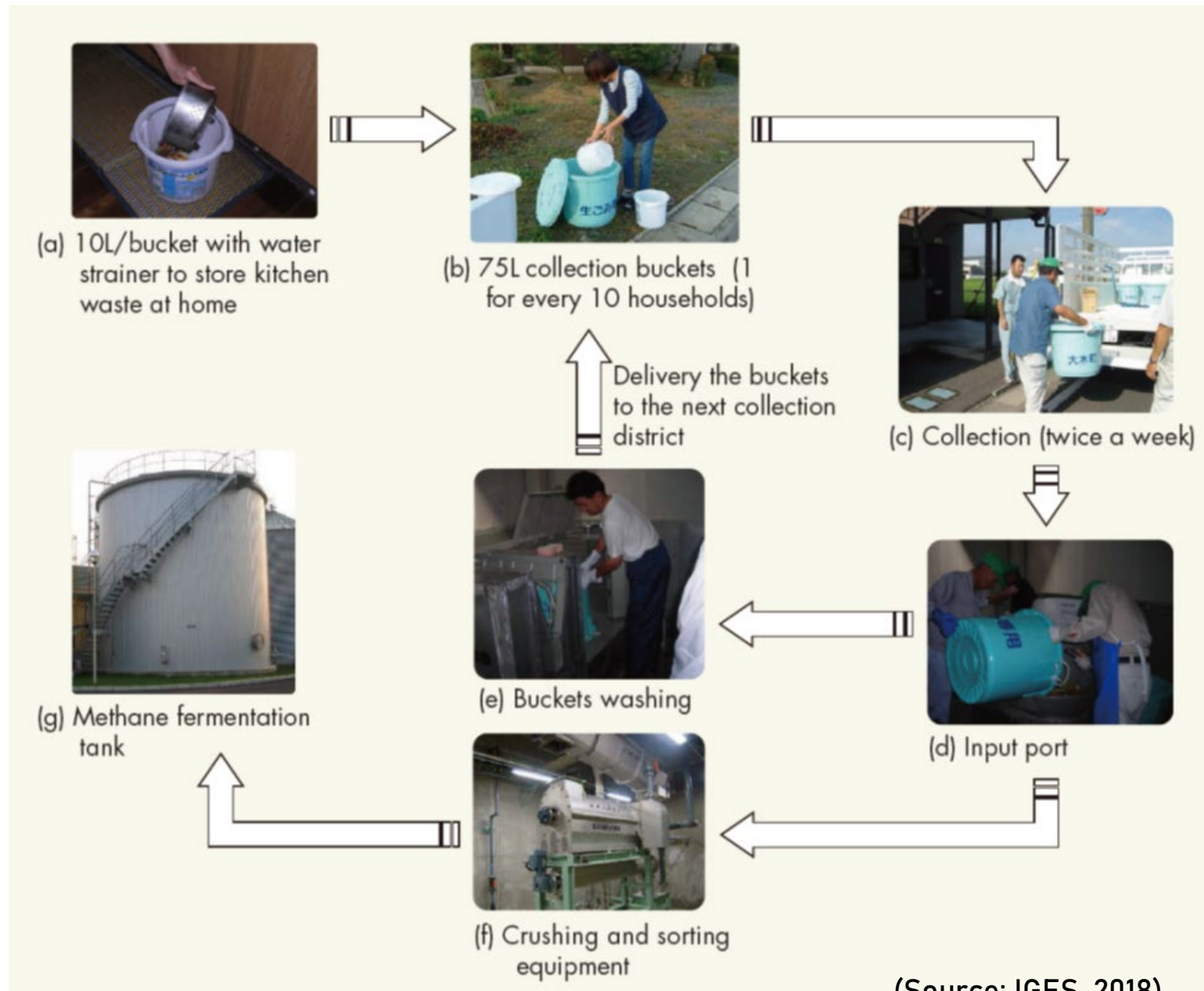


**Liquid Manure Usage**  
Bio-gas liquid manure returned to farms as an organic fertilizer



(Source: IGES, 2018)

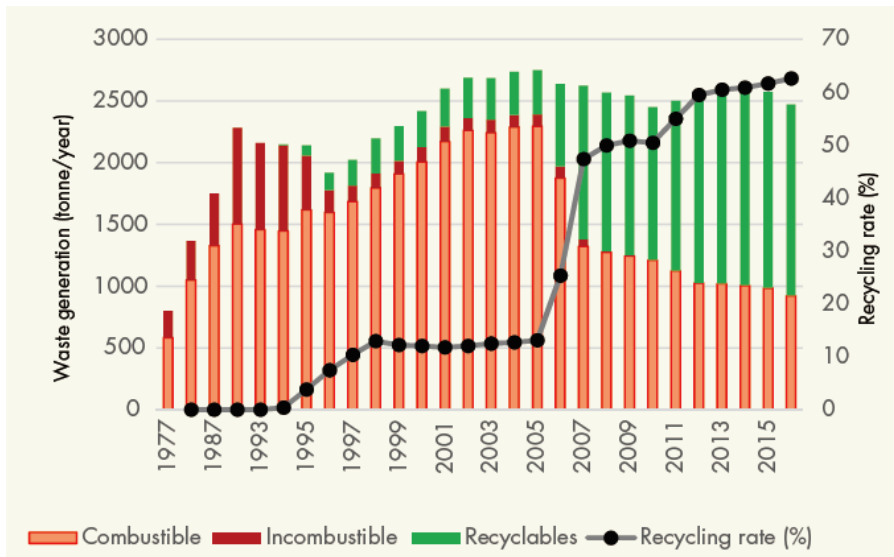
# Biogas/digester facility for organic waste, human waste and septic tank sludge treatment



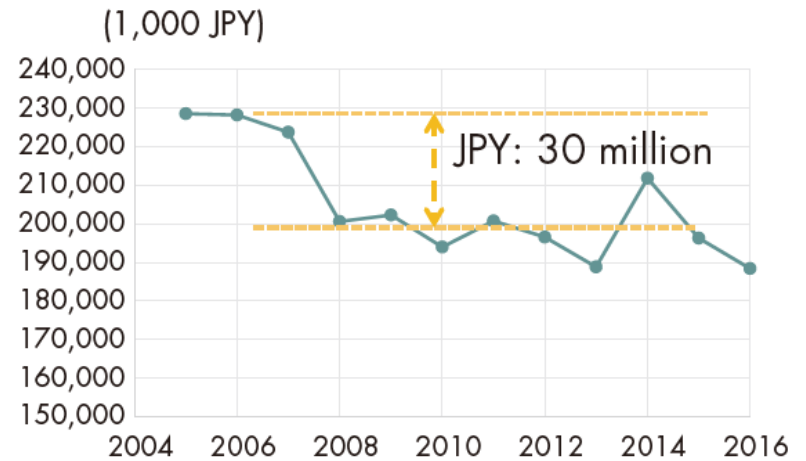
(Source: IGES, 2018)

# Co-benefits

## (1) Increase of material recovery



## (2) Reduction of waste management expenditure



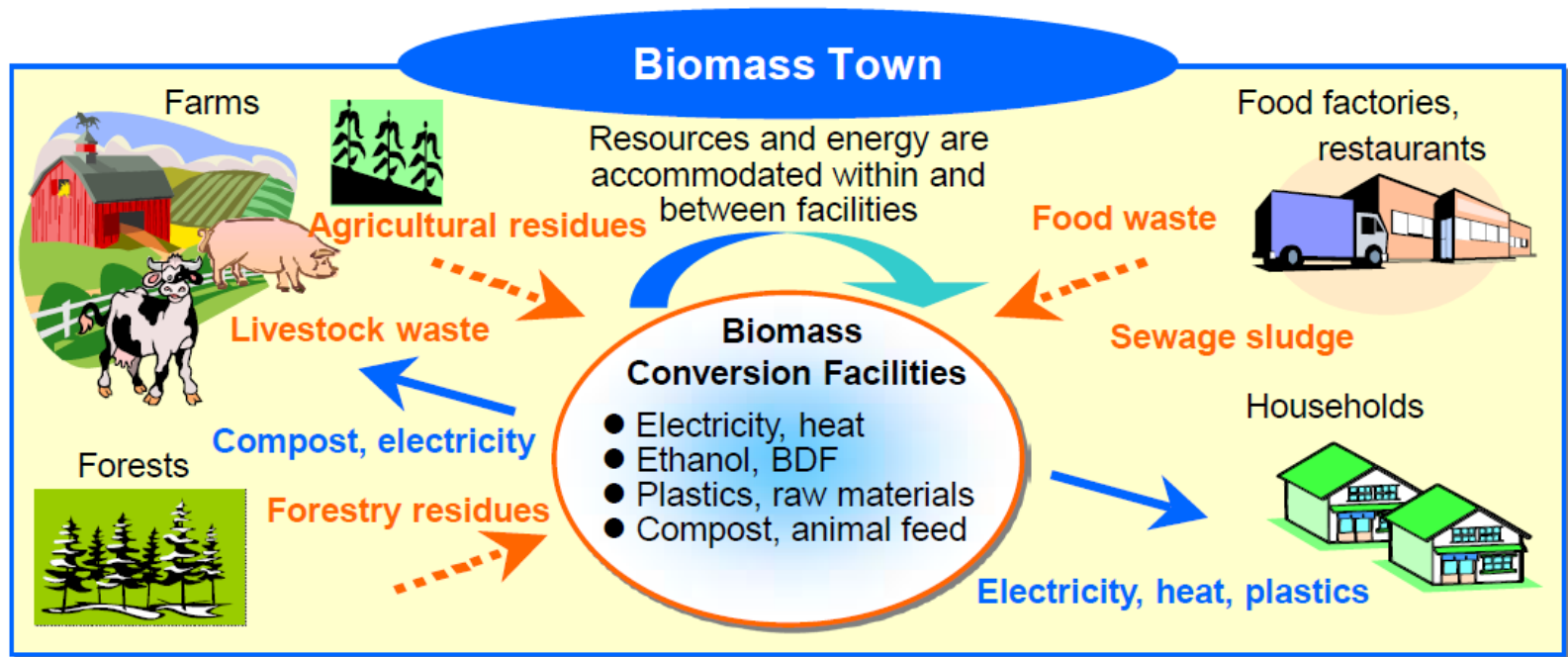
## (3) Reduction of GHGs emission

Case	GHGs emission	
	t-CO <sub>2</sub> eq/year	t-CO <sub>2</sub> eq/tonne
A: "Kururun" methane fermentation system	313	0.027
B: Incineration for organic kitchen waste and human waste treatment system for human waste and septic tank sludge	1,159	0.101
Reduction effect (B-A)	846	0.074

(Source: IGES, 2018)



# Lessons Learned



(Source: <https://www.maff.go.jp>)

- Establishing a system based on local conditions
- Establishing an economically feasible recycling system
- Establishing partnership within local community

ご清聴ありがとうございました。

Thank you for your attention.

You can find more information:  
<https://www.ccet.jp/publications>

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