A Sound Material-Cycle Society through the Eyes of Hokusai

北斎風
循環型社会之解説

Hokusai Katsushika, Gaifu kaisei (South wind, clear weather), from Fugaku sanjurokkei (The thirty-six views of Mount Fuji), property of the Tokyo National Museum
Image:TNM Image Archives Source:http://TnmArchives.jp/

A Sound Material-Cycle Society through the Eyes of Hokusai

北斎風
循環型社会之解説

Hokusai Katsushika, Kanagawa-oki nami-ura (Under the wave, off Kanagawa), Fugaku sanjurokkei (The thirty-six views of Mount Fuji)

Ministry of the Environment
Japan

Introduction

Traditional socioeconomic activities based on mass production and mass consumption tend to lead to a mass-disposal society. This makes it difficult to conserve the environment or bring about sound material cycles.

Conventional socioeconomic activities are also closely related to the exhaustion of natural resources, the destruction of nature, and the disruption of sound material cycles in the natural world. These activities and the climate change and ecosystem crises feed on each other in a vicious circle, resulting in increasingly serious global environmental problems.

In light of the current situation, there is an urgent need for Japan as well as the rest of the world to establish a sound material-cycle (SMC) society based on reduced consumption of natural resources and lower environmental burdens. Such a society can be achieved by stepping up efforts toward sustainability and integrating those efforts into actions to create a low-carbon society and a society in harmony with nature.

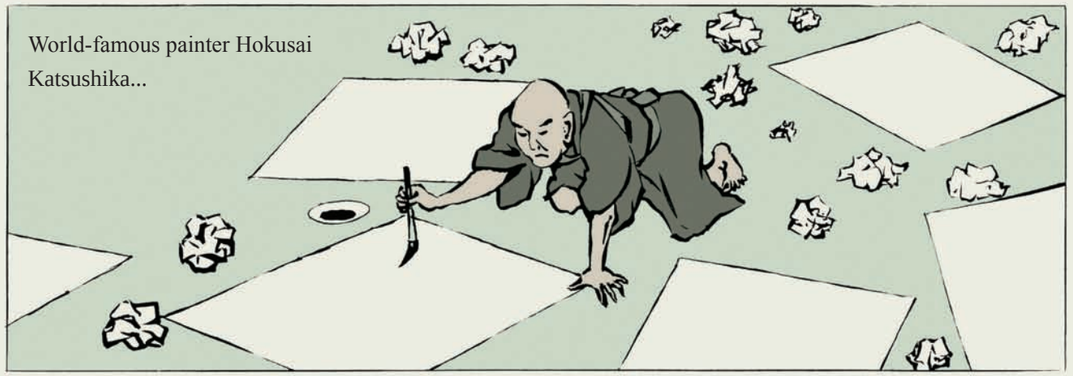
This booklet uses manga comics—a very Japanese mode of expression—to outline the White Paper on a Sound Material-Cycle Society. Hokusai Katsushika, a world-famous ukiyo-e artist in the Edo era, will guide you through the story based on this White Paper. This manga has been drawn in the style of Hokusai Manga (Hokusai Comic), one of Hokusai's most important works.

Table of Contents

Hokusai Katsushika (1760 ～ 1849)

A painter in the late Edo era. Throughout his lifetime of ninety years—very long for a person of the time—he dedicated himself to painting and created highly ambitious and original works. He produced over 30,000 works in his life, including many masterpieces like Fugaku Sanjurokkei ("36 Views of Mount Fuji") and Hokusai Manga. He is believed to have significantly influenced impressionist painters such as Van Gogh. Hokusai's achievements are regarded highly throughout the world, as shown by the fact that he was the only Japanese that made it into the Life magazine list of the 100 Most Important People of the Millennium published in 1999.

Source: Hokusai Manga

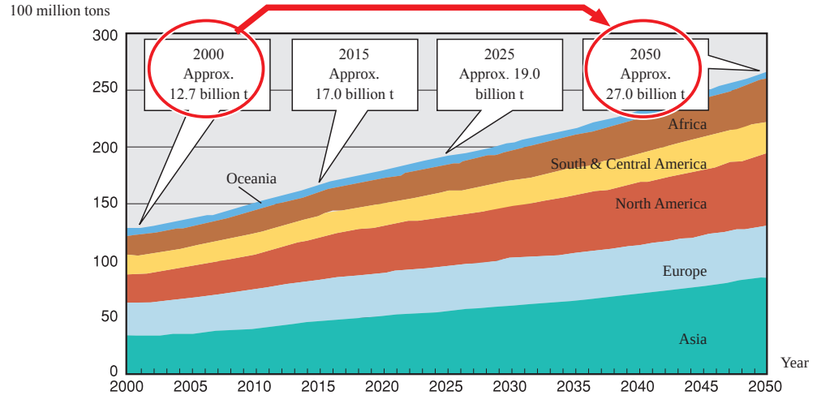


Theme 1

The World Situation concerning Waste Management and Resources

◆Increasing waste generation

The amount of waste generated globally is increasing as the economy and population continue to grow in many parts of the world, especially in Asia. A wider variety of wastes is also emerging, including medical wastes, used TVs, and used personal computers. Some estimate that the amount of waste generated worldwide in 2050 will be double that of 2000. Some of these wastes contain hazardous substances and must be treated with special care.

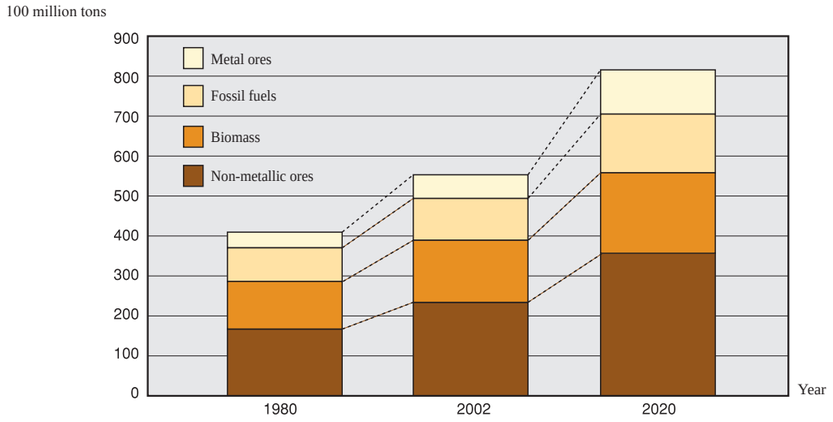


Projection of worldwide waste generation

(prof. Tanaka of Okayama University)

◆Problems associated with waste imports and exports

As demand for resources has increased, driven by economic growth in East Asia, imports and exports of circulative resources (CRs) have expanded. Such transboundary movement of CRs can, as long as they are environmentally sound, contribute to environmental conservation and the growth of developing countries. However, there are several important challenges associated with this. Some point out that the transboundary movement of CRs may hinder Japan's domestic recycling structure and that some CR importing countries with less advanced technologies are unable to appropriately treat waste and are therefore pose a risk of environmental pollution. Initiatives to foster effective transboundary utilization of CRs should take account of these issues.



Worldwide resource extraction, by type of resource

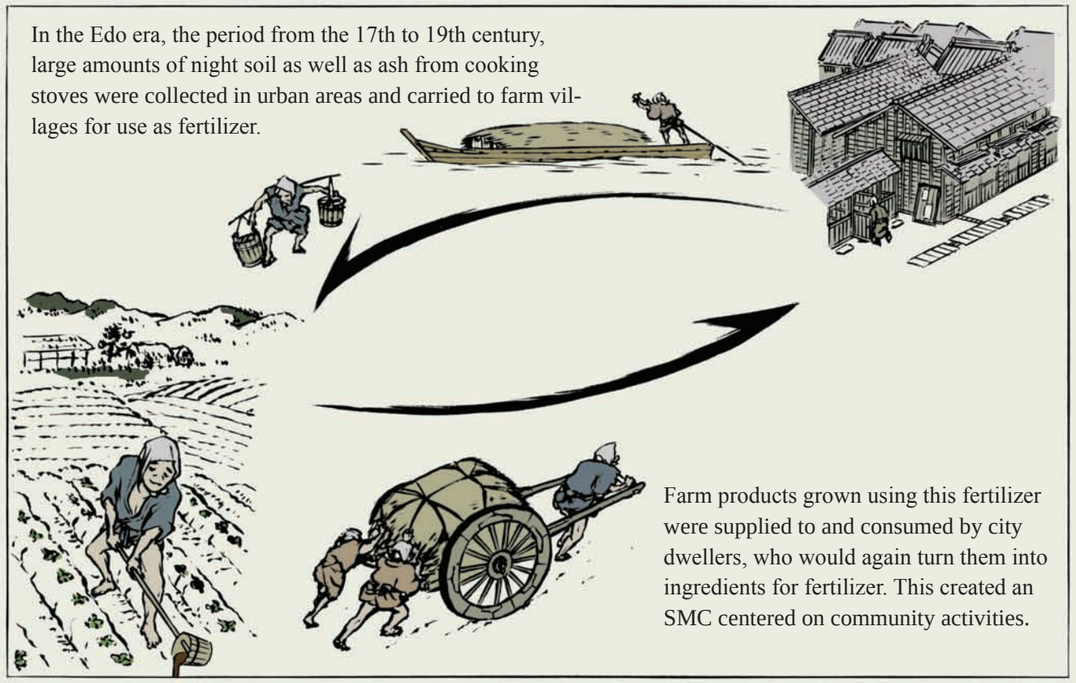
(OECD)

Theme 2

Edo's Sanitary Material-cycle System

When it comes to being eco-friendly, the Edo era had many systems from which modern society can learn a lot.

In the Edo era, the period from the 17th to 19th century, large amounts of night soil as well as ash from cooking stoves were collected in urban areas and carried to farm villages for use as fertilizer.



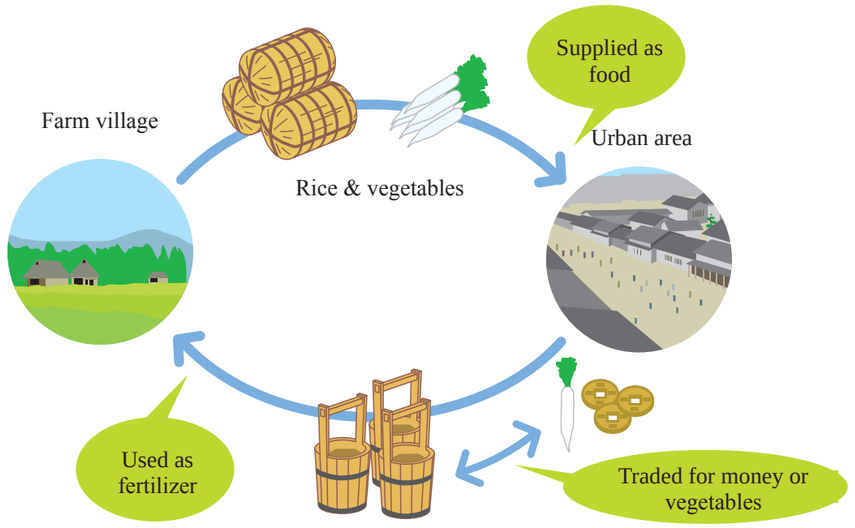
Farm products grown using this fertilizer were supplied to and consumed by city dwellers, who would again turn them into ingredients for fertilizer. This created an SMC centered on community activities.

People in the Edo era devised creative uses of their limited technologies

and successfully established an SMC society.

◆Edo's material-cycle system

People in the Edo era had outstanding material-cycle systems from which modern society can learn a great deal. An example of this is the utilization of night soil. Night soil can harm the living environment because untreated night soil has a bad odor and can spread infectious diseases. In Japan in the Edo era, large amounts of night soil generated in urban areas were collected and transported to farm villages for use as fertilizer. Night soil was accepted by farmers for free or sometimes obtained only through bartering with money or vegetables. This mechanism allowed night soil to be used as fertilizer in farm villages, while farm products grown with this fertilizer were consumed by urban people, becoming night soil again. This led to the successful establishment of an SMC system.



◆Systems for the proper disposal of waste

Edo's waste disposal systems were outstanding and may still be applicable to today's society. The waste disposal method used in the early Edo era was the dumping of waste in empty lots and rivers. However, dumping in these places had harmful effects, such as obstructing traffic and bothering nearby residents with bad odors. Subsequently, the magistrate's office in the city of Edo issued an official notice banning the dumping of waste in public sites and designated a place named Fukagawa Eitaiura (in Tokyo's Koto Ward on modern maps) as a dumpsite. The local government also created disposal companies, leading to the establishment of a mechanism in which wastes were gathered in designated places, ready to be taken for disposal by these companies. As a result of these efforts, the three key processes involved in waste management, namely collection, transport, and disposal, were all successfully organized and executed in the Edo era.

There were also many ordinances banning the dumping of waste in non-designated areas. This situation enabled Edo to construct a responsible waste disposal mechanism that somewhat resembles today's regulations to prevent illegal dumping. Meanwhile, the wastes dumped in Eitaiura eventually decomposed, forming new soil. The government found this reclaimed landfill site valuable and used it for agriculture.

Theme 3

The People in the Edo Era and Their Spirit of Mottainai*

You may wonder why people in the Edo era were good at recycling waste.

It's probably because they had the spirit of mottainai.

In the Edo era, people were divided into four classes: warriors, farmers, artisans and tradesmen. People in each class were careful to recycle things.

Warrior Farmer Artisan Tradesman

For example, even samurai warriors, who belonged to the ruling class, valued the virtue of shisso kenyaku* and lived a modest life.

*Simplicity and frugality.

An extreme example showing how seriously the ruling samurai practiced mottainai is the Hikone Castle.

Recycled construction materials were used for the castle keep, turret, and walls.

*Mottainai is a long-established Japanese concept meaning that it is a shame for something to go to waste without having made use of its potential in full. This expression incorporates a respect for the environment that has been handed down from ages past.

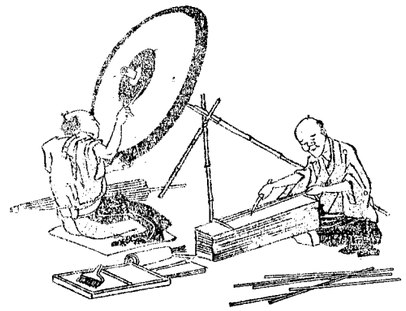
◆Farmers' way of practicing mottainai

Source: Hokusai Manga

In line with the samurai policy of promoting mottainai, farmers practiced frugality. Since farmers in those times mostly cultivated rice, many household items derived from rice cultivation. For example, rice straw left behind after harvest was a necessity in every aspect of life, including food, clothing, and shelter. This straw had many uses. It was used to make clothing, such as woven hats and rain capes. It was also utilized in bags for holding rice, furnishings such as mats, and handicrafts. These household goods were later recycled. When discarded, they were gathered by farmers for use as fertilizer.

◆Artisans and tradesmen's ways of practicing mottainai

Artisans and tradesmen upheld the mottainai spirit as follows. The industrial products in the Edo era were all made manually by artisans. This manufacturing process, although requiring a great deal of time and labor, minimized the wastage of resources. For example, in the color plate-making and printing processes used to create nishikie colored woodprints, the surface of each used wood-block was shaved flat so that it could be reused. There were also people engaged in businesses corresponding to today's reuse and repair industries. They were called akindo and ran many kinds of professional repair shops, such as those to repair pans and pots, those to glue the broken pieces of bowls and other kinds of china back together, and those to replace the paper coverings of umbrellas and lanterns.



Source: Hokusai Manga

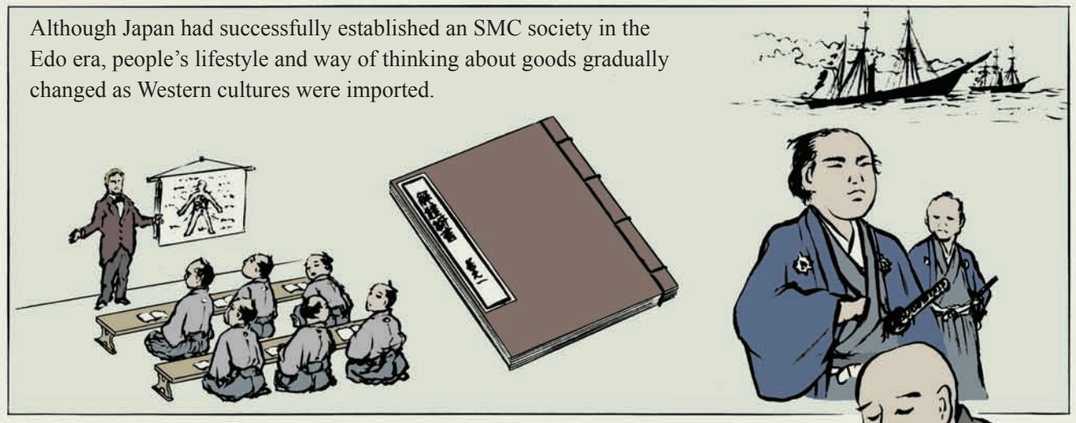
Eco comic artist
Tamiko Akaboshi's short column

Keeping with the spirit of mottainai

Traditionally, the Japanese people use goods with care. When I was small, my parents used to tell me "Mottainai!" whenever I handled anything roughly or threw away anything still useful. Using things with care means respecting the feelings of the people who made them. My mother has given me a kimono that she sewed 57 years ago. It has been carefully mended and I still wear it to this day. It would be really mottainai to throw away this kimono. I have respect for both the kimono and the feelings of the person who sewed it. That's what mottainai is all about.

Theme 4

Japan's History of Proper Disposal of Waste



◆Changes in lifestyle after the opening of the country and resulting waste disposal problems

Since Japan opened itself to the world in the late Edo era, its way of dealing with waste gradually changed under the influence of Western culture. People began throwing away things that would have been effectively reused or recycled in the Edo period. This resulted in an increase in waste volume and wastes of much greater diversity. The plague epidemic of 1887 prompted the country to review its night soil disposal system and led to the enactment of the Unsanitary Substance Cleaning Law in 1900.

◆Changes in waste disposal during the period of high economic growth

After World War II, Japanese farmers stopped using night soil as fertilizer because of the widespread availability of chemical fertilizers. Rapid economic growth led to increased amounts of waste, and how to dispose of it became a major issue. Consequently, Japan instituted the Public Cleansing Law in 1954, with the aim of improving public hygiene.

During this high-growth period, Japan faced problems such as the increase in waste from business activities and water pollution caused by illegally dumped waste oil. The government revised the Public Cleansing Law and renamed it the Waste Management and Public Cleansing Law (commonly referred to as the Waste Management Law) in 1970.

The following year saw the start of the so-called Tokyo Waste War, a waste disposal dispute between a municipal government and local residents over the site of new waste disposal facilities. This became an issue of serious public concern. By experiencing this and similar incidents, Japanese society has learned how to deal with disputes between municipal governments that plan to build waste disposal facilities and neighbors of the planned sites.

The government facilitated a shift in the night soil disposal method from use as fertilizer in farmland to sanitary disposal and made advanced disposal technologies, such as sewage systems and johkasou, widely available. In particular, as a result of technological advances, new purification tanks called johkasou were developed which were small enough to be installed in homes yet still had the same capability for high-quality treatment as public sewage systems.

See "Johkasou as an eco-friendly technology" under Theme 7, "Establishing an SMC in East Asia."

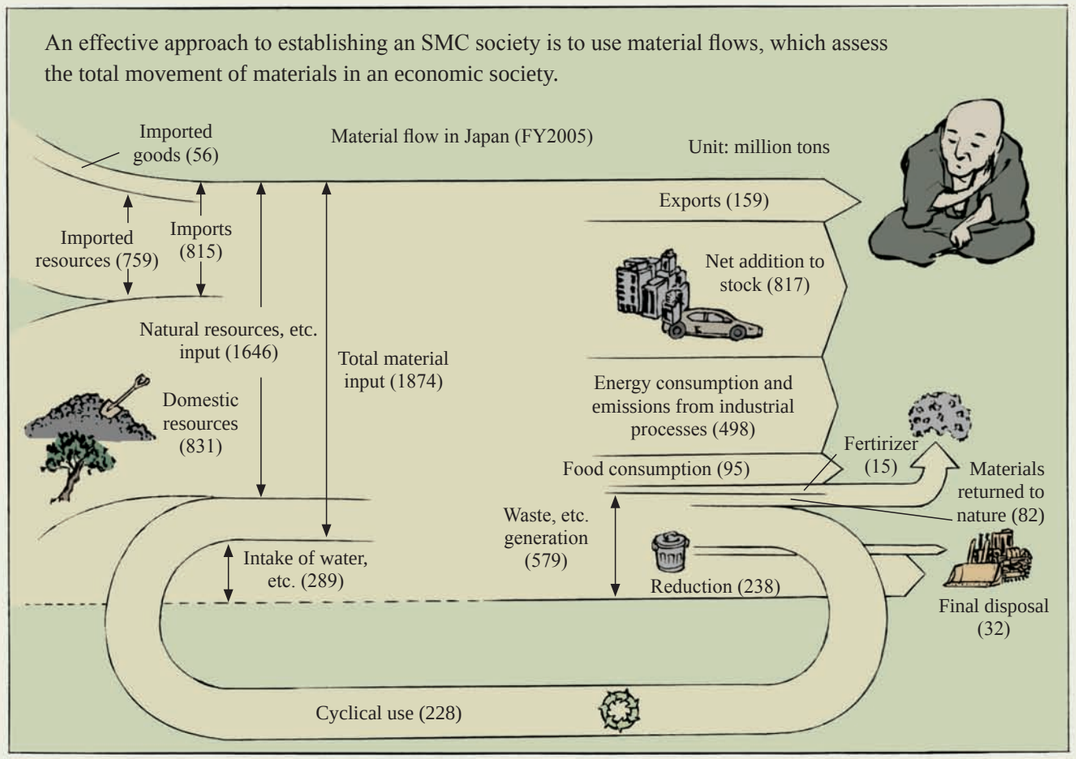
◆More recent approaches to proper waste disposal

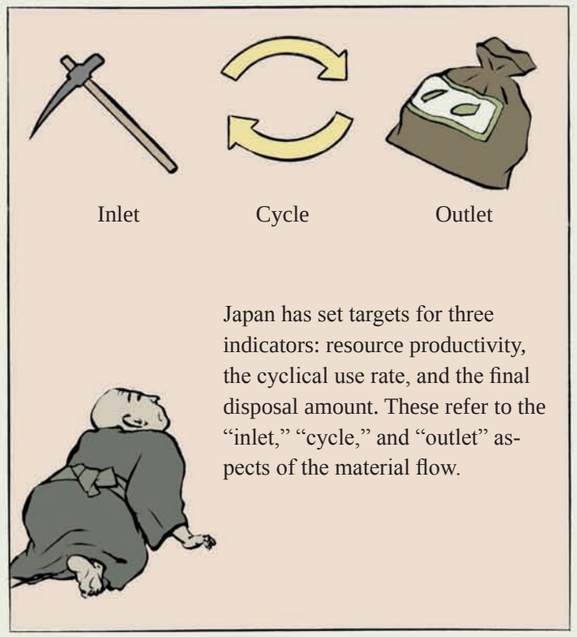
Since 1989, Japan has amended the Waste Management Law several times in order to address the very serious issue of how to deal with wastes being generated day after day. The government has also enacted several recycling laws in an effort to accelerate the establishment of an SMC society at a time when the difficulty of securing enough landfill capacity at final disposal sites and the lack of waste disposal facilities were worsening, especially in large cities. The government designated 2000 as the first year in the establishment of an SMC society because this was the year when the Fundamental Law for Establishing a Sound Material-Cycle Society was enacted, setting forth the basic principles for the creation of an SMC society.

In light of its past efforts to establish an SMC society, Japan should expand its program of assistance to other countries and help promote the establishment of an SMC worldwide.

Theme 5

Establishment of an SMC Society - Our Goal





Japan has set targets for three indicators: resource productivity, the cyclical use rate, and the final disposal amount. These refer to the "inlet," "cycle," and "outlet" aspects of the material flow.

Targets have also been set for "effort indices," which are used to measure 3R-related efforts made by the public and local governments.

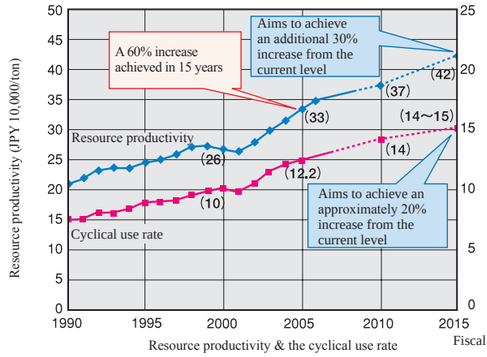
You see Japan is trying to step up its efforts by using these indicators to measure the progress of SMC formation objectively.

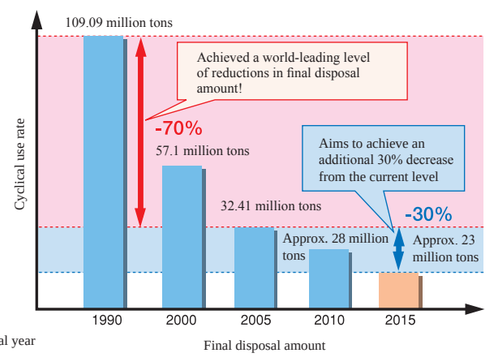
◆Material flow indicators

Japan has defined the following targets for material flow indicators, with an eye toward clarifying the sources of waste generation, restricting waste generation, and fostering cyclical use of waste.

Inlet	Resource productivity is measured. The target is approximately JPY 420,000 per ton in FY2015, or a roughly 60% increase from the FY2000 level.
Cycle	The cyclical use rate is measured. The target is approximately 14-15% in FY2015, or a roughly 40-50% increase from the FY2000 level.
Outlet	The final disposal amount is measured. The target is approximately 23 million tons in FY2015, or a roughly 60% decrease from the FY 2000 level.

In addition to these three indicators, two supplementary indicators have also been used to set targets: "resource productivity excluding the input of earth and rock resources" and "coordination with efforts directed towards a low-carbon society."
For use as reference in implementing future policies, indicators to monitor changes have also been adopted, including "resource productivity of fossil resources," "the biomass resource input rate," "the hidden flow and TMR (total material requirement)," "indicators taking account of international CRs," and "industry-specific resource productivity."





◆Effort indices

With regard to effort indices, targets have been set for the following indicators.

- Reduction of municipal solid waste and industrial waste
- Change in awareness and behavior for establishing an SMC society
- Promotion of SMC business
- Strict enforcement of recycling laws

The government has defined several indices to monitor changes and will use them to quantitatively measure the progress of 3R-related activities conducted by different entities, to provide information, and to formulate future policies. The indices of the public's efforts to reduce waste include the rate of refusal of free plastic shopping bags (rate of shoppers bringing their own shopping bags) and the volume of sales of disposable products (imported chopsticks), and the indices of local governments' efforts to reduce waste, include the percentage of local governments charging for garbage collection.

Theme 6

Community-based Establishment of an SMC

In addition to defining indicators and setting numerical targets, the government has proposed a new method to foster an SMC society:

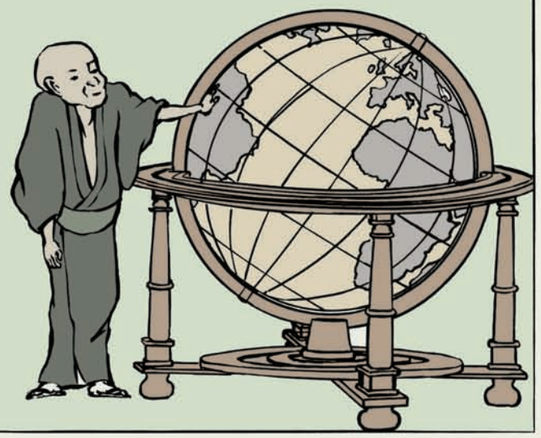
establishing what are called "SMC blocks."

It seems that establishing SMC blocks means creating a material cycle of optimal size in accordance with the characteristics of the region and the properties of the CRs available there.

For example, circulation within the region would be suitable for kitchen garbage, which quickly starts to rot.

Circulation within a large block formed around advanced treatment facilities would be more desirable for CRs whose reuse requires advanced treatment technology.

This way, a more customized SMC can be established effectively. The SMC blocks can be of a variety of sizes; they can be based at the community level, the local level, the special block (such as the prefectural) level, the national level, or the international level, in accordance with the properties of the CRs involved.

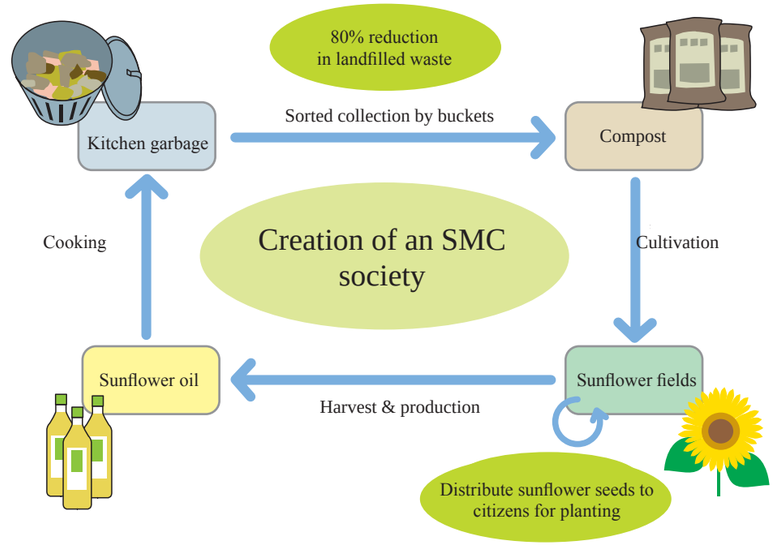


◆A vision for SMC blocks constituting an SMC society

Agricultural, forestry, and fishing villages	SMC blocks involve a cycle in which biomass CRs are converted into fertilizer and feed to be used in agriculture and stock farming, the products of which are then consumed within the same region.
Small and medium cities	Biomass CRs generated in cities are transported to farming villages to be used as fertilizer and feed so that the resultant agricultural and stock farm products can be consumed in the cities.
Large cities	Extensive resource recovery, waste reduction (by incinerating non-recyclable wastes), and heat recovery during these processes are carried out efficiently and on a large scale.
National circulation	The material input required for production activities is carefully restricted in the industrial cluster at the center of the material cycle. Collection of CRs is carried out across a wide geographical area. The efficient use of CRs is facilitated by economies of scale and mutual cooperation within the cluster.
International circulation	CRs are utilized in a way that takes advantage of each country's unique characteristics. Japan uses CRs that require advanced recycling technologies and are therefore difficult to recycle in other countries.

◆An SMC block in the city of Shibushi, Japan

The city of Shibushi in Kagoshima Prefecture has no incineration facilities of its own and therefore has to landfill all its waste. By means of sorted collection of waste into 28 categories, the city government has successfully reduced the amount of landfilled waste by 80%.
The city also implements the "Sun Sun Sunflower Plan," which promotes the composting of kitchen garbage for use as fertilizer to grow sunflowers. Their seeds are used for the production of sunflower oil.

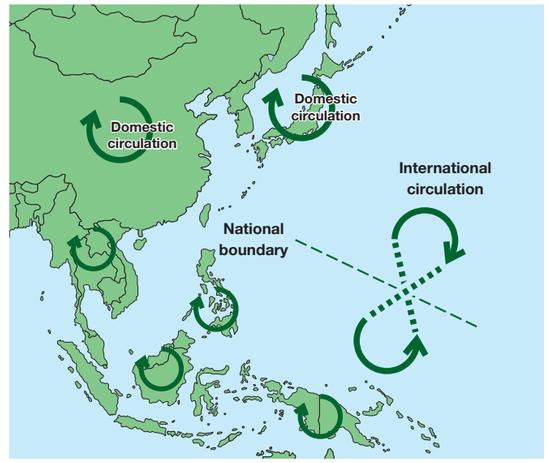


Theme 7

Creating an SMC in East Asia

◆Basic principles involved in the creation of an international SMC

As their economies have grown, East Asian countries have been facing increasingly serious waste management issues. Since the mutual relationship between these countries and Japan has been deepening and the transboundary movement of CRs increasing, there is an urgent need to establish an SMC throughout East Asia. The first step toward this is to create a domestic SMC in each country. This should be followed by reinforcing efforts to prevent illegal waste imports and exports, and then facilitating CR imports/exports.



◆Initiatives and cooperation to establish an SMC in Asia

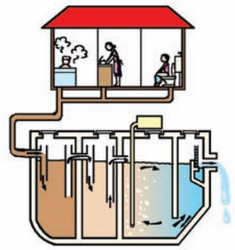
Japan is contributing constructively to the establishment of an SMC in East Asia by making use of its abundant experience in tackling waste management and environmental problems. This includes (i) support for the formulation of national 3R plans and strategies, (ii) policy dialogues, (iii) establishment of 3R-related information centers and research networks, (iv) technology cooperation on the 3Rs and waste management and assistance for the development of associated infrastructure, and (v) international dissemination of 3R and waste management technologies.

An example of Japan's endeavors in this last area is the dissemination of information on Japanese johkasou purification tank technologies. Among other occasions, this information was presented at the Asia-Pacific Water Summit, held in Oita Prefecture, Japan in December 2007 ahead of the start of International Sanitation Year 2008.

Eco comic artist
Tamiko Akaboshi's short column

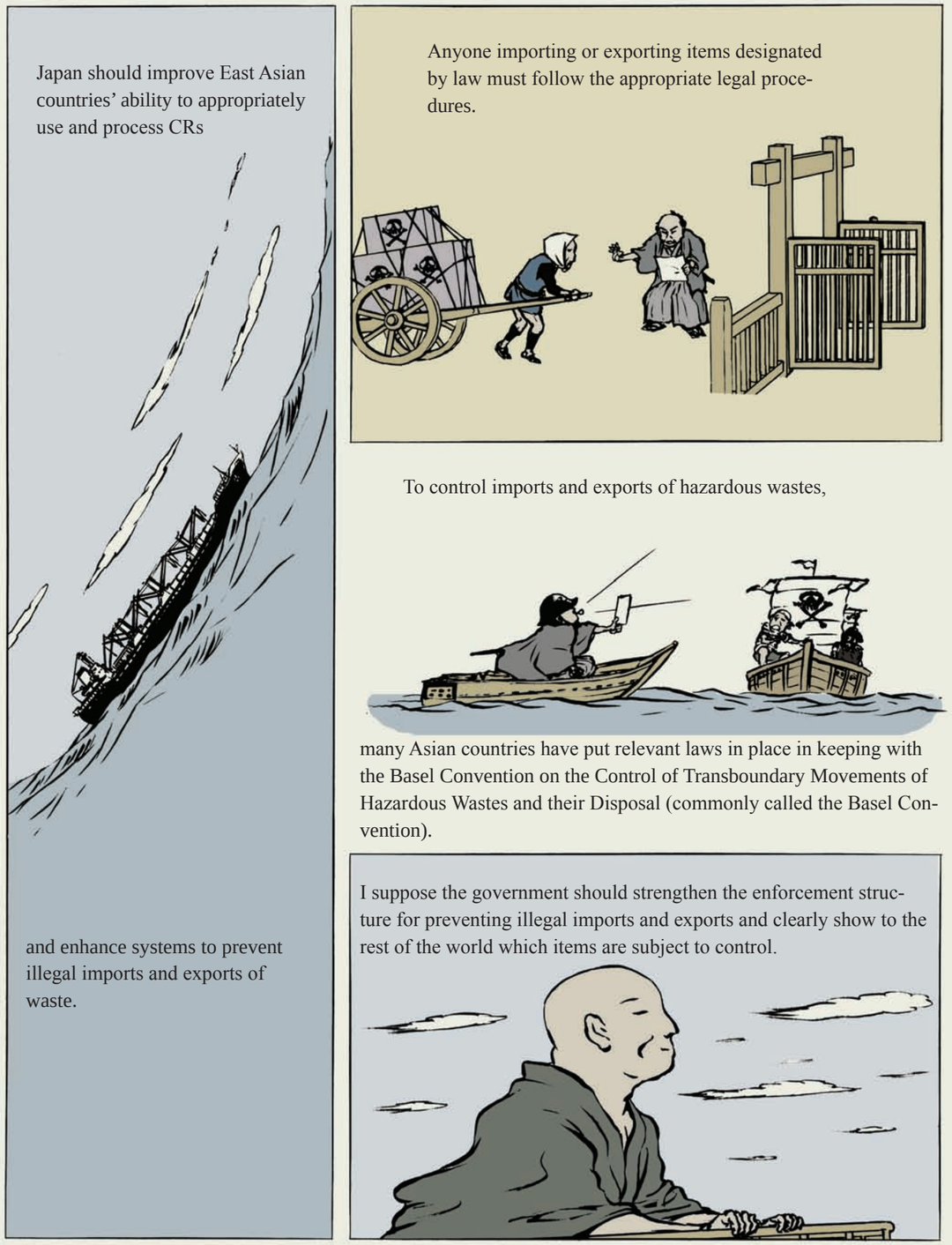
Johkasou purification tanks as an eco-friendly technology

Japan's fast-running rivers have turbulent flows through which oxygen is constantly being supplied in a phenomenon known as aeration. This stimulates bacterial activity, speeding up the decomposition of organic matter. The johkasou purification tank makes use of rivers' natural water clarification mechanism. The purification tank harbors bacteria. When oxygen is fed into the tank by an aerating fan, these bacteria efficiently decompose sewage drained from households. A river could go dry if households take in water from upstream and then send wastewater to the downstream sewage treatment plant via the sewage system. We can conserve rivers by clarifying water there at the point of usage and then returning clean water to them.



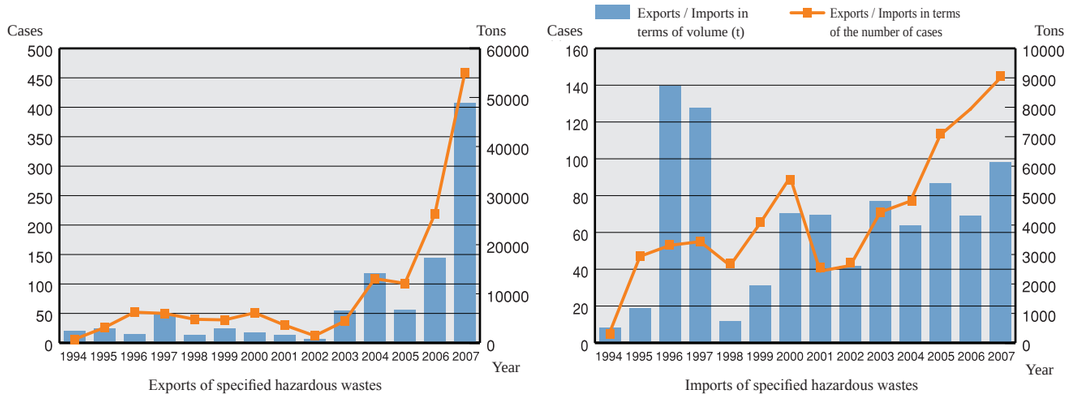
Theme 8

Preventing Illegal Waste Imports and Exports



◆Efforts to prevent illegal imports and exports

Japan's imports and exports of specified hazardous wastes are increasing in both the volume of waste involved and the number of cases.



Source: Ministry of the Environment of Japan

To prevent illegal imports and exports, Japan has been implementing the following measures.

1. Domestic measures

- Enforcement framework
  - Hosting explanatory sessions for companies involved in imports and exports
  - Providing preliminary consultation on individual import/export cases for companies importing or exporting CRs
  - Imposing stricter controls at the border, such as careful inspections by the customs authorities
- Clear definition of regulated items
  - Clearly defining items subject to control under the Basel Law and the Basel Convention

2. International measures

- Promotion of an Asian Network for Prevention of Illegal Transboundary Movement of Hazardous Wastes
- Support for the Partnership on the Environmentally Sound Management of Electrical and Electronic Wastes for the Asia-Pacific Region
- Collaboration with Japan's major CR trading partners under multilateral and bilateral frameworks

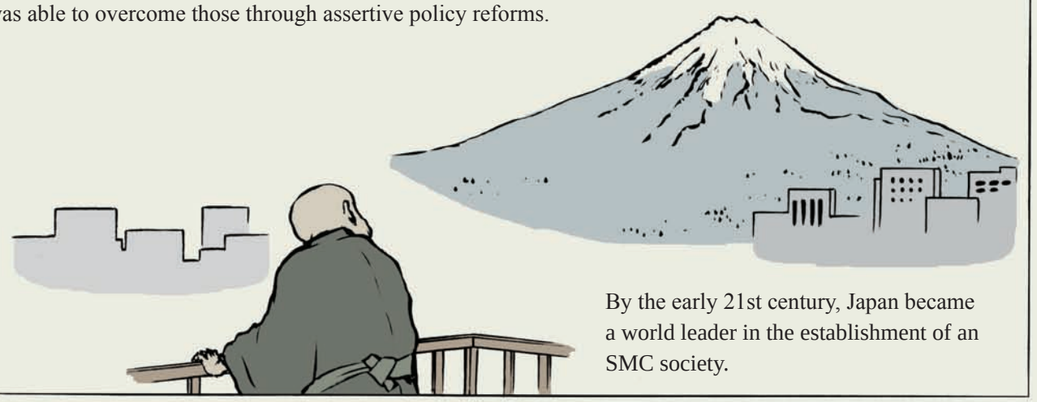
◆Toward establishing an East Asian SMC block

Japan plans to launch full-fledged initiatives to establish an East Asian SMC block. The first step will be to formulate an East Asia Sound Material-Cycle Society Vision by 2012 to help bring about a sustainable material cycle in Asia.

Theme 9

Japan's Contributions to the World

Japan faced serious waste management problems in the 1990s, but it was able to overcome those through assertive policy reforms.



By the early 21st century, Japan became a world leader in the establishment of an SMC society.

At the G8 Sea Island Summit in 2004, Japan proposed the "3R Initiative."

Its aim was to promote the establishment of an SMC internationally through the 3Rs, a concept that fosters the effective use of resources, balancing environmental conservation and economic growth.

The G8 leaders endorsed this proposal and announced the "Science and Technology for Sustainable Development: '3R' Action Plan and Progress on Implementation."

Now I understand that Japan is expected to play a leading role in establishing a sustainable society by integrating its measures to create an SMC society through the 3Rs with its efforts toward a low-carbon society and a society in harmony with nature.

◆Efforts by the international community and Japan

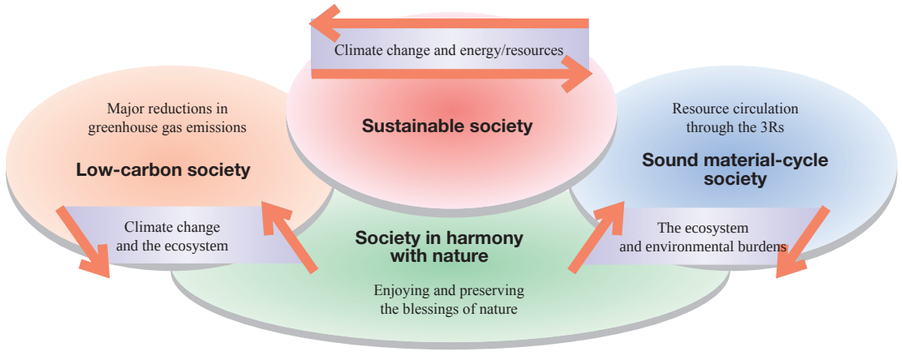
In line with the "Science and Technology for Sustainable Development: '3R' Action Plan and Progress on Implementation," Japan announced "Japan's Action Plan for a Worldwide Sound Material-Cycle Society through the 3R Initiative" (also known as "Japan's Action Plan to Promote Global Zero-Waste Societies"). Japan put forward another proposal at the G8 Summit in Saint Petersburg, Russia, in 2006, which led to an agreement to "set targets as appropriate taking account of resource productivity, in furthering efforts to optimize the resource cycle."
The G8 Environment Ministers Meeting held in Kobe, Japan in May 2008 endorsed the "Kobe 3R Action Plan," setting forth specific measures to be taken. On this occasion, Japan announced its New Action Plan to Promote Global Zero-Waste Societies to express its determination to establish an international SMC society.

International promotion of the 3R Initiative

2004	June,	**G8 Sea Island Summit (U.S.)** Then Prime Minister Koizumi proposed the 3R Initiative, which was endorsed by the other G8 leaders.
2005	April,	**Ministerial Conference on the 3R Initiative (Tokyo)** Ministers and representatives of international organizations from 20 countries agreed to internationally promote the 3Rs.
2006	July,	**G8 Summit in Saint Petersburg (Russia)** For the promotion of the 3Rs, the G8 leaders agreed to set targets that take account of resource productivity.
2007	June,	**G8 Summit in Heiligendamm (Germany)**
2008		**G8 Environment Ministers Meeting (Kobe)** The Ministers endorsed the Kobe 3R Action Plan.
		G8 Hokkaido Toyako Summit (Japan)

◆Creating a sustainable society

For the world to achieve continuous growth, it needs to create a sustainable society. This requires integrated efforts toward an SMC society, a low-carbon society, and a society in harmony with nature. A sustainable society can be created by respecting natural cycles and transforming carbon and other material cycles in human society into sound ones, in agreement with the large cycle of nature and the earth. The world has reached an important turning point in its path toward a sustainable society. Based on its history and experience, Japan intends to serve as a responsible leader in the international community and will further its contribution to the development and prosperity of the world.



The Roles Japan Should Play in the World

- Comprehensively promote efforts to establish an SMC society, in keeping with the mottainai spirit, while taking account of environmental burdens such as accelerating demands for natural resources and climate change

- Advance domestic initiatives to establish an SMC by forming SMC blocks and shifting society's awareness to promote the long-term use of social infrastructure

- Foster more effective international cooperation for the establishment of an Asian SMC, based on Japan's history and experience of overcoming pollution and waste management problems, taking advantage of the many useful technologies, programs, and systems that Japan has developed

- Lead Asian and other countries, both developing and developed, in creating a worldwide SMC

This booklet was printed using wind-generated electricity.

A Sound Material-Cycle Society through the Eyes of Hokusai

July 7th, 2008

Production	Trend Pro, Inc.	Planning & Publishing	Ministry of the Environment of Japan
Artwork	Takashi Otake		Office of Sound Material-Cycle Society,
Columns	Tamiko Akaboshi		Waste Management and Recycling Department
Cooperation for production	Ms.Tara Cannon		1-2-2 Kasumigaseki, Chiyoda-ku, Tokyo 100-8975 Japan
	UNSODO Corporation		Tel: +81-3-3581-3351 (ext. 6819)
	Tokyo National Museum		Fax: +81-3-3593-8262
			e-mail:junkan@env.go.jp