Chapter 3

Community-local-blocks-national-international-based SMC establishment

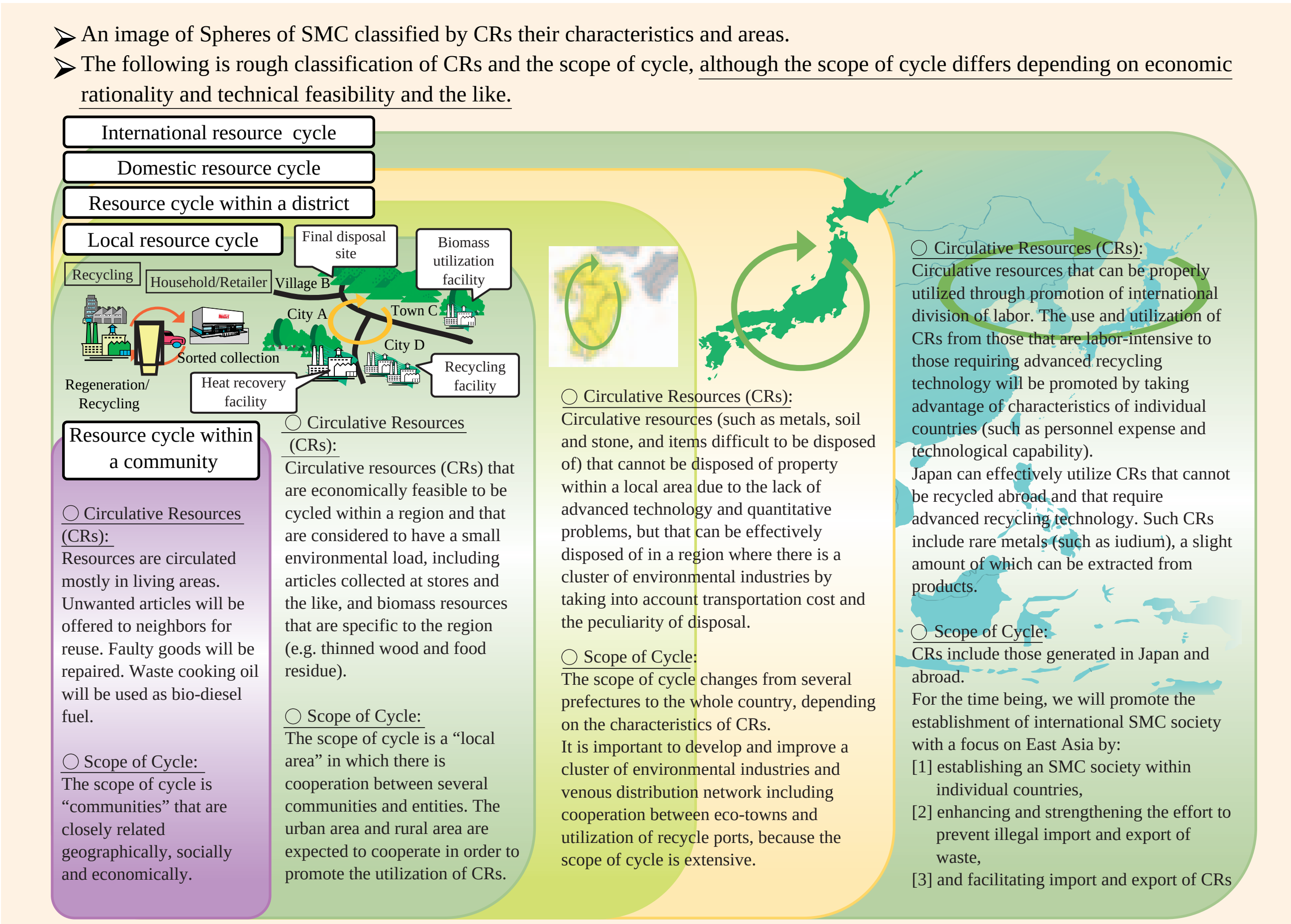
Section 1 Establishment of SMC blocks

(1) Significance of SMC blocks

The First Fundamental Plan for Establishing a SMC Society defined material flow indicators, which measure the macroscopic progress of SMC formation, and effort indices, which measure progress in terms of the efforts made by different entities, and set numerical targets for both. Since the formulation of this plan, progress has been reviewed in every fiscal year. The review results have been used for the development of the new fundamental plan, which has again defined material flow indicators and effort indices and introduced supplementary indicators as well as indicators for trend monitoring. By defining national-level indicators and numerical targets, the new fundamental plan has provided clear motivation for the establishing a SMC Society and is now capable of evaluating the results.

A new concept introduced to the second Fundamental Plan is the establishment of SMC blocks, in which a material cycle of optimal size is formed in accordance with the characteristics of the region and the properties of its CRs. With appropriate waste management as a precondition, the idea of SMC blocks is aimed at establishing the opti-

Figure 4-3-1 Various Spheres of SMC



Source : Ministry of the Environment

mal size of material cycle for each type of CR by considering regional characteristics from an environmental perspective (e.g., anti-global warming, biodiversity conservation), a resource perspective (e.g., scarcity, utility), and an economic perspective (e.g., transport efficiency, treatment costs). For example, circulation within the region would be suitable for biomass CRs, which are characterized as being generated in specific areas and are easily decomposed, whereas wide-area circulation would be more desirable for CRs requiring advanced treatment technology,etc. (Figure4-3-1).

(2) A vision for SMC blocks

Chapter 2 of the Fundamental Plan provides a medium- to long-term vision for the establishment of a SMC Society. This is a specific medium- to long-term vision of how a SMC is to be formed by around 2025, focusing on the creation of a sustainable society, and serves as a basis for cooperation and collaboration among the different entities which are essential for the establishment of a SMC Society. A particularly important component of this vision is the idea of creating a SMC in such a way that it makes the most of local and regional characteristics.

This basic concept underlying SMC blocks involves establishing a more customized and more effective SMC by forming SMC blocks of optimal size. The optimal SMC block can be based at the community level, the regional level, the special block level, the national level, or even the international level, in accordance with CR properties and regional characteristics. This concept is expected to become a driving force for local community revitalization based on self-reliance and mutual cooperation.

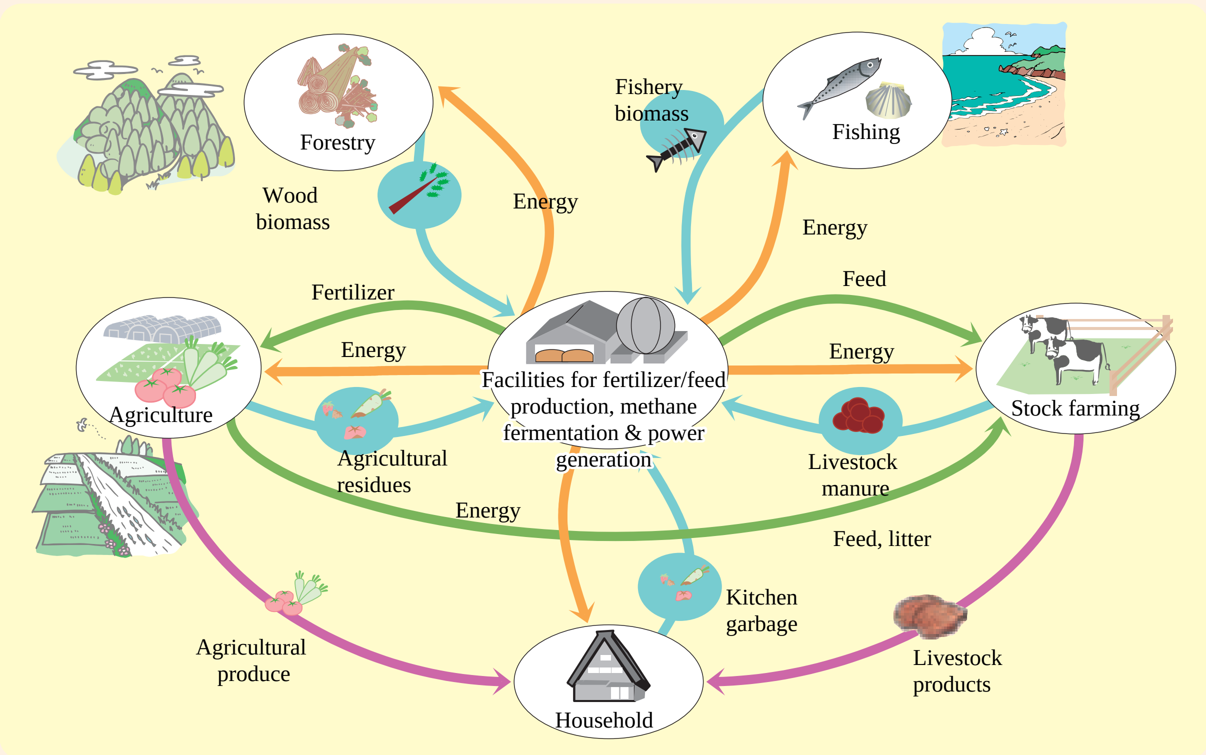
The following sections describe some of the concepts

Figure 4-3-2 Material cycle in agricultural, forestry and fishing villages

Agricultural, forestry and fishing villages

A conceptual image of a SMC based on community size and characteristics is described below.

- ➢CRs produced in agricultural, forestry and fishing villages include lumber from thinning, livestock manure, and shells, as well as kitchen garbage, which is collected separately from other municipal solid wastes.
- ➢These CRs, together with other CRs, are used as biomass resources for energy recovery through methane fermentation and the production of fertilizer, feed, soil conditioners, etc.
- ➢This forms a material cycle in which agricultural products produced using this fertilizer are consumed within the same region (local production for local consumption)



Source: Ministry of the Environment

related to SMC blocks, as proposed by the Fundamental Plan as part of its medium- to long-term vision for the establishment of a SMC Society.

A Communities

At the community level, unwanted articles are reused through exchanges between neighbors or through their sale at flea markets. Broken-down products are repaired in order to extend their useful lives as much as possible. In addition to the reuse and recycling of goods through recycling centers, recycling activities involving citizens and NGOs/NPOs are also conducted, mainly at municipal recycling facilities that also have the capability to educate the public, leading to the development of community businesses. With regard to transport, contributions are made to the development of communities with low environmental burdens through initiatives such as the effective use of bicycles.

B Agricultural, forestry and fishing villages

CRs generated in agricultural, forestry and fishing villages include lumber from thinning, livestock manure, shells, and kitchen garbage subject to sorted collection. As biomass CRs, they are converted into fertilizer and feed which are then used for agriculture, stock farming and fishery, the products of which are then consumed within the same area. This forms a material cycle based on local production for local consumption. The formation of this type of material cycle, based on local production for local consumption, and other such efforts directed towards sustainable agriculture, forestry and fishery all contribute to the conservation of satochi-satoyama, which are community-based nature areas serving as habitats for wildlife (Figure4-3-2).

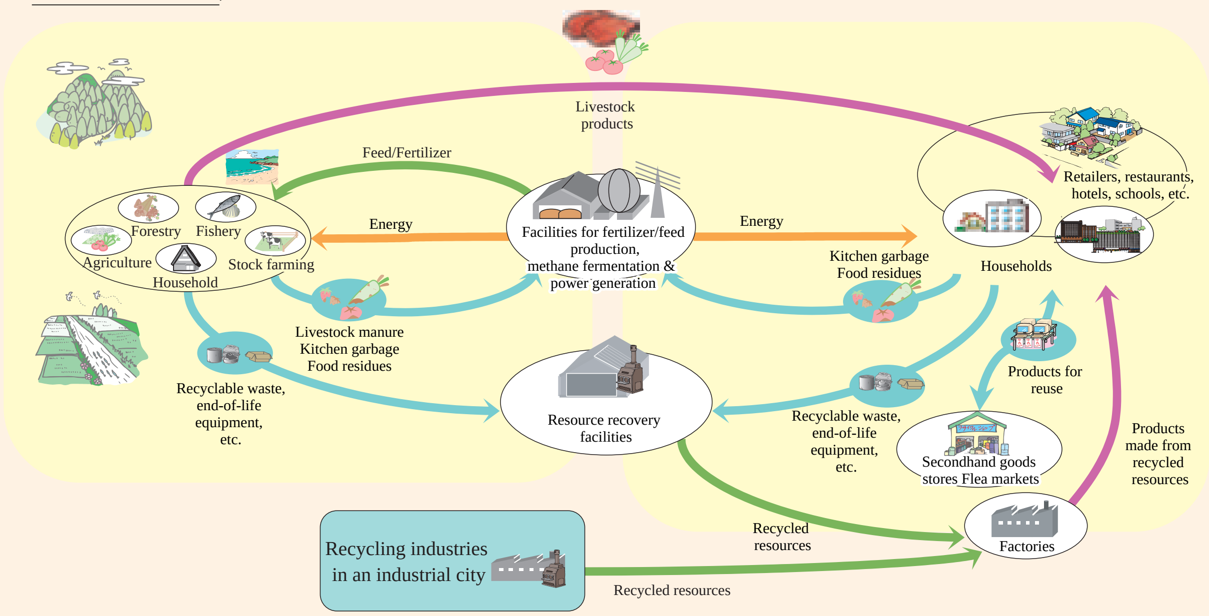
C Small and medium cities

Small and medium cities, if they are close to farming villages, form material cycles that connect urban and rural areas. In such a cycle, biomass CRs which are constantly generated in cities are carried to farming villages to be used as fertilizer and feed in agriculture and stock farming so that the resultant agricultural and stock farm products can be consumed in the cities. The use of such CRs as energy sources is promoted in accordance with local characteristics. If no facilities exist in the neighborhood, industrial waste is distributed elsewhere in order to be reused as CRs across a relatively wide area by means of a distribution network (Figure4-3-3).

Figure 4-3-3 Material cycle in small and medium cities

Small and medium cities

- When a city is close to farming villages, biomass waste that is steadily generated in the city is carried to those villages to be used as fertilizer and feed.
- Agricultural produce from these villages is consumed in the city.
- If no resource recovery facilities exist in the neighborhood, industrial waste is distributed across a relatively wide area through a distribution network, to be reused as CRs.



Source: Ministry of the Environment

D Large cities

In large cities, large amounts of wastes are constantly generated and collected because of the concentration of waste generators. Extensive resource recovery, waste reduction (by incinerating non-recyclable wastes) and heat recovery during these processes can therefore be carried out efficiently on a large scale. For example, the multi-stage, large-scale use of wastes can be implemented fully and efficiently through the recycling of residues from the primary cyclical use of biomass CRs and plastics or through heat recovery (Figure4-3-4).

E Intra-block and national circulation

In SMC blocks formed within special blocks or at the national level, the material input required for production activities is strictly restrained in the industrial cluster at the center of the material cycle. Also, as recycling industries concentrate around these activities, the wide-area collection of CRs can be carried out by means of land and marine transportation, and the efficient use of CRs is facilitated by economies of scale and mutual cooperation within the cluster. Efforts directed towards zero emissions are intensified through the application of technologies, infrastructure and the expertise of arterial industries. In particular, CRs can be more efficiently utilized by means of new technologies, such as those used for recovering valuable CRs that are present in only limited amounts (e.g., rare metals) and those used for detoxifying hazardous wastes (Figure4-3-5).

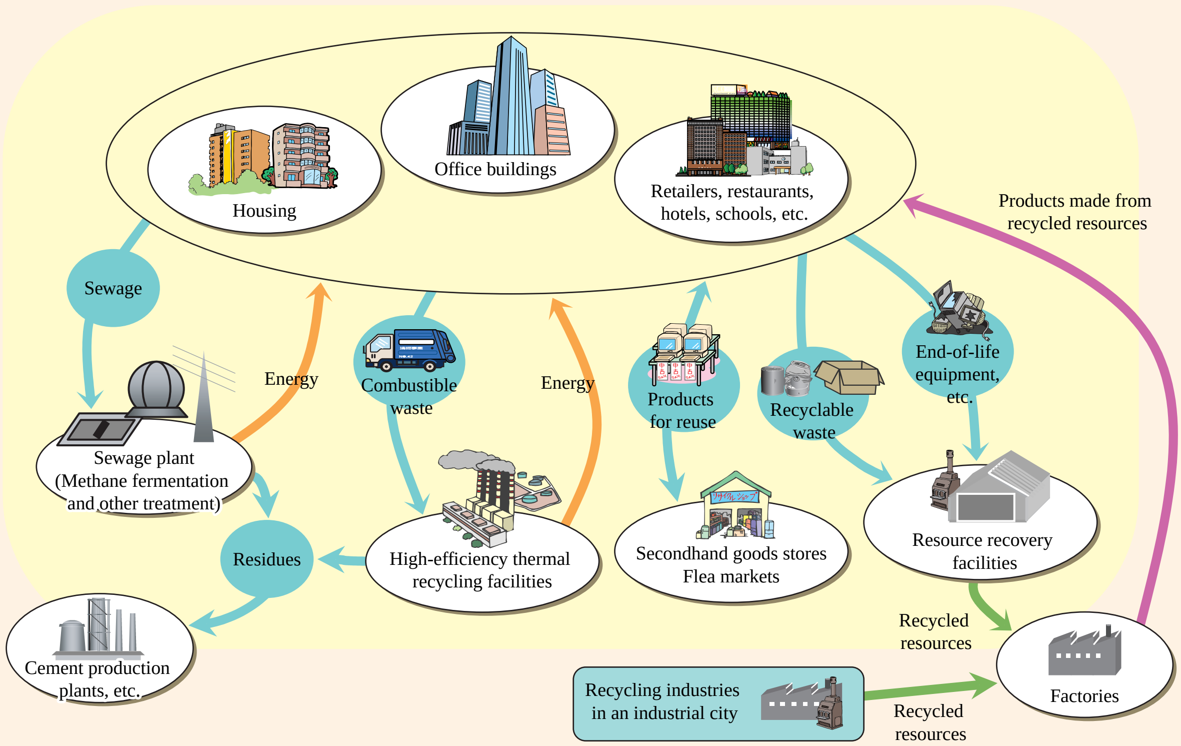
F International resource circulation

In international SMC blocks, CRs are utilized in a way that makes the best use of each country's characteristics. Japan uses CRs that require advanced recycling technologies and are therefore difficult to recycle in other countries. First, a domestic SMC Society is formed in each country, followed by the enhancement of measures to prevent illegal imports and exports of wastes and the establishment of traceability procedures to monitor the transboundary movements of wastes. Consequently, transboundary movements of CRs are facilitated in consideration of a division of labor between the countries involved (Figure4-3-6).

Figure 4-3-4 Material cycle in large cities

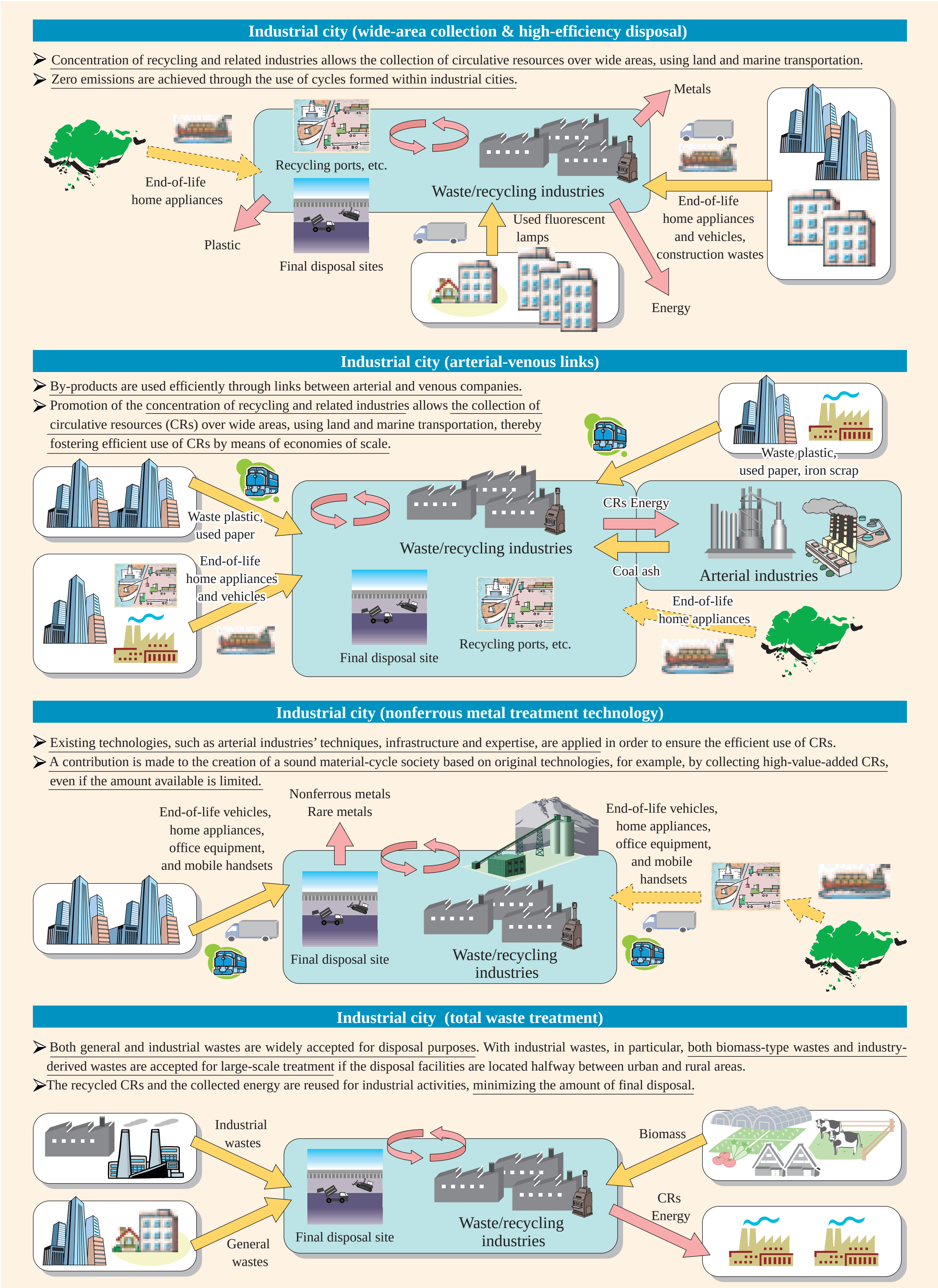
Large cities

- Large amounts of waste are constantly generated and collected because of the concentration of waste generators. Waste reduction through resource recovery and incineration, and heat recovery during these processes, are carried out efficiently on a large scale.
- Sewage sludge is subject to methane recovery, with residues used in cement and other industries as resources that can be steadily supplied in a large quantity.



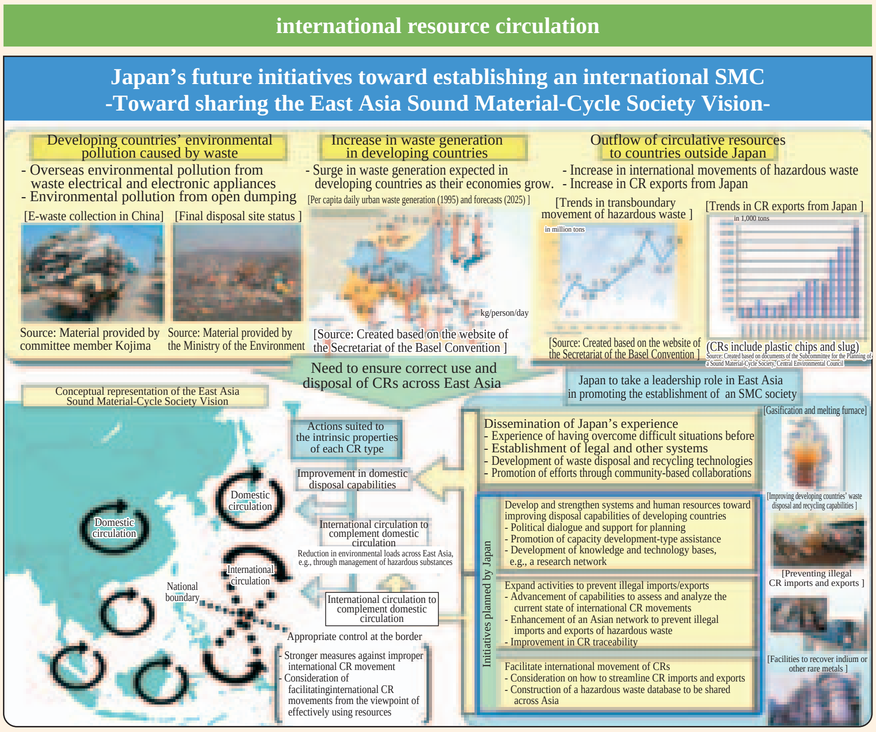
Source: Ministry of the Environment

Figure 4-3-5 Intra-block and national circulation



Source: Ministry of the Environment

Figure 4-3-6 international resource circulation



Source : Ministry of the Environment

Section2 Resource circulation in SMC blocks~Examples that have led to successful revitalization of local communities

(1) Community-based and local resource cycles

A Rape Blossom projects

Rape Blossom projects are currently underway in many communities and involve collaboration between farmers and members of the public. In these projects, rapeseed oil is extracted from rape blossoms grown on land converted from paddy fields. The oil produced is used for cooking at schools (for school meals), restaurants and homes, while oilcake is used to make animal feed and compost, which is then returned to the rape blossom fields as fertilizer. Waste cooking oil is collected for use as biodiesel fuel. Some projects aim at a higher level of local involvement by incorporating beekeeping, advertising rape blossom fields as a tourist attraction, and providing environmental education programs for elementary, junior high and high schools. Efforts such as these, directed towards community development and focusing on resource circulation and energy independence, are being carried out in many parts of Japan .

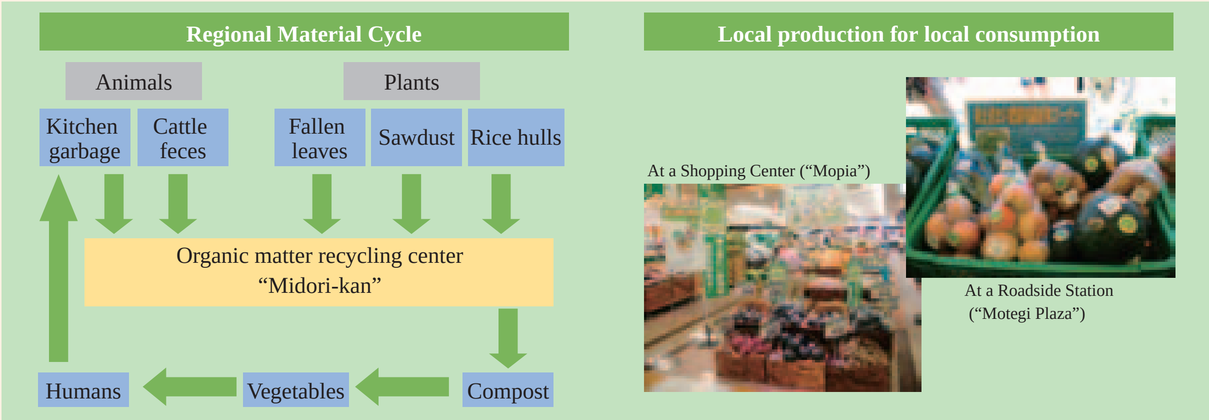
B Motegi Town

In the town of Motegi (Motegi-machi), kitchen garbage (collected separately from other waste) is mixed with fallen leaves from forests and livestock manure to produce compost at Midori-kan, the town's organic matter recycling center. Composting not only helps reduce incineration costs and hazardous substance generation, but also allows the restoration of traditional agriculture, involving soil improvement with compost and the promotion of eco-friendly agriculture which uses no chemical fertilizers or pesticides. This initiative aims to produce safe, high-quality agricultural produce. The town has established both a mechanism for local production for local consumption, in which the agricultural products produced are consumed by local people, and a system to supply food products for use in school meals, with the aim of providing better nourishment for children's minds and bodies (Figure4-3-7).

C Shibushi City

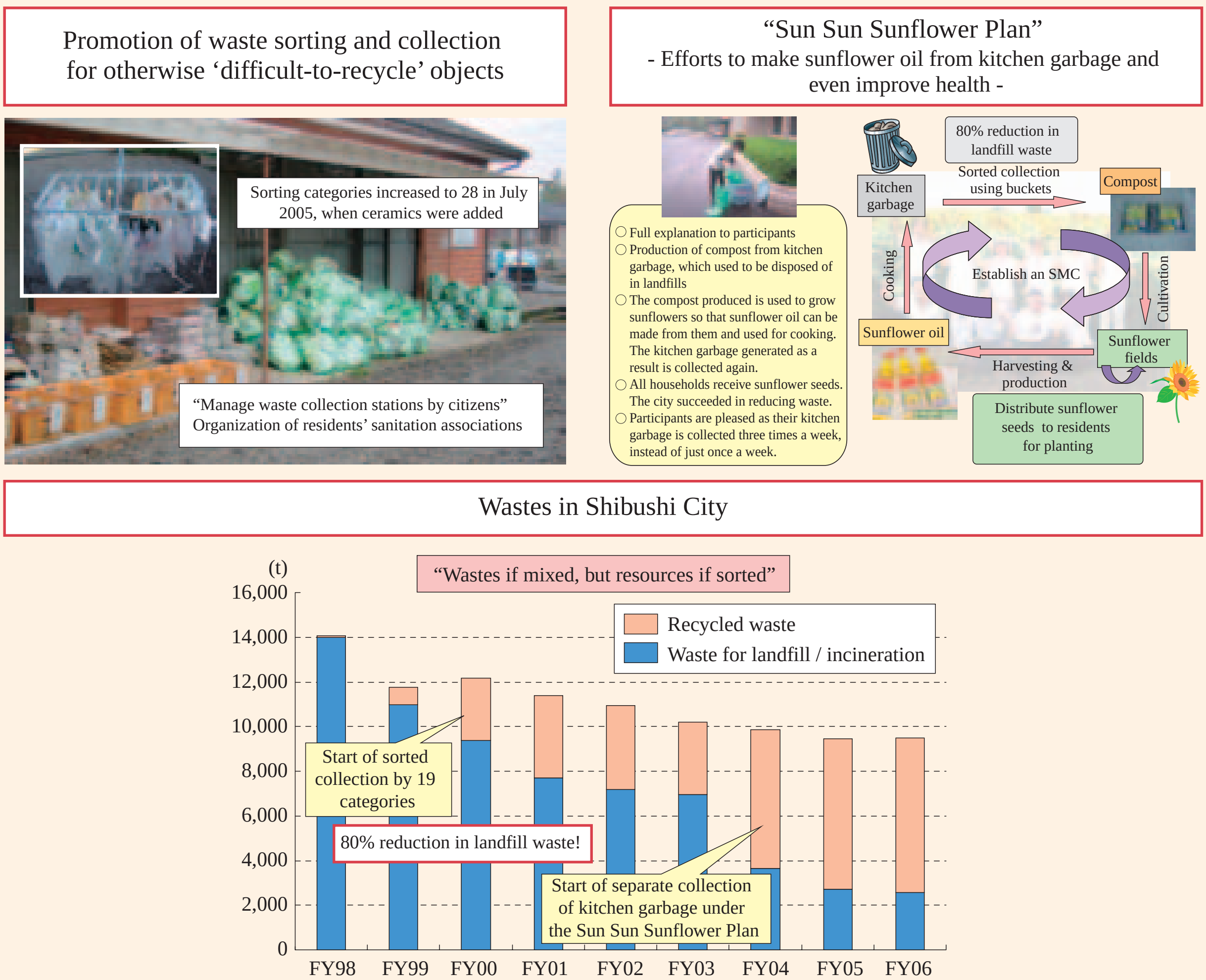
With no incinerating facilities of its own, Shibushi City has to dispose of all its wastes in landfills. By means of the sorted collection of wastes into 28 categories, the city government has successfully reduced the amount of landfill wastes by 80%. This was achieved by forming organizations called residents' sanitation associations and by enforcing sorted collection in cooperation with the public under the slogan of "Promotion of tiresome things." To deal with kitchen garbage, the city also implements the "Sun Sun Sunflower Plan," which produces sunflower oil from kitchen garbage as part of its efforts to achieve zero landfill wastes through regional collaboration (Figure4-3-8).

Figure 4-3-7 Regional Material Cycle



Source: Documents provided by the Central Environmental Council

Figure 4-3-8 Efforts in Shibushi City



Source: Documents provided by the Central Environmental Council

D Aichi Prefectural Federation of Agricultural Co-operatives (together with Uny Co., Ltd. and Hirate Sangyo Ltd.)

These three entities have established a food recycling loop. Uny Co., Ltd., a food retailer, completely separates all food residues on the basis of category, then grades them and keeps them in cold storage in order to maintain quality until they are delivered to Hirate Sangyo Ltd., a food waste recycler. From these wastes, Hirate then produces fully fermented, good-quality compost that farmers can use. Aichi Prefectural Federation of Agricultural Co-operatives, while serving as a contact point between the various entities in the loop, also provide guidance on controlling the quality of recycled compost and producing and selling agricultural products. All the vegetables grown with recycled compost are purchased by Uny and then sold in its stores.

This is a successful example of a food recycling loop involving steady and continuous high-reliability inputs (Figure4-3-9).

E Effective use of fish of foreign origin

Shiga Prefecture has set up the “Lake Biwa Rules” to assist the restoration of Lake Biwa’s diverse ecosystem. A policy to prevent the release of any fish of foreign origin (bluegill and black bass) caught in the lake is promoted as part of this initiative. Fish of foreign origin collection receptacles and collection boxes are placed around the lake and anglers are requested to cooperate in the no-release policy. All fish of foreign origin that anglers place in the collection receptacles are carried to the Dainaka Aguri no Sato (a business-oriented cooperative work center) for composting. The compost produced is used for eco-friendly vegetable farming and is sold as fertilizer, ensuring its effective use (Figure4-3-10).

(2) Wide-area resource circulation at the block, national and international levels

The previous section focused on efforts directed towards community-based and regional circulation of biomass CRs. However, there are also wider-area resource cycles formed in accordance with the characteristics and the uses of CRs and the location of the facilities that process and use them.

For example, the destinations (prefectures) of CR shipments from construction-wood crushing facilities in Chiba Prefecture vary widely, depending on the intended use. This is also the case with receiving facilities. For example, a recycling plant for a city located in northern Saitama Prefecture receives rubble, wood waste and waste

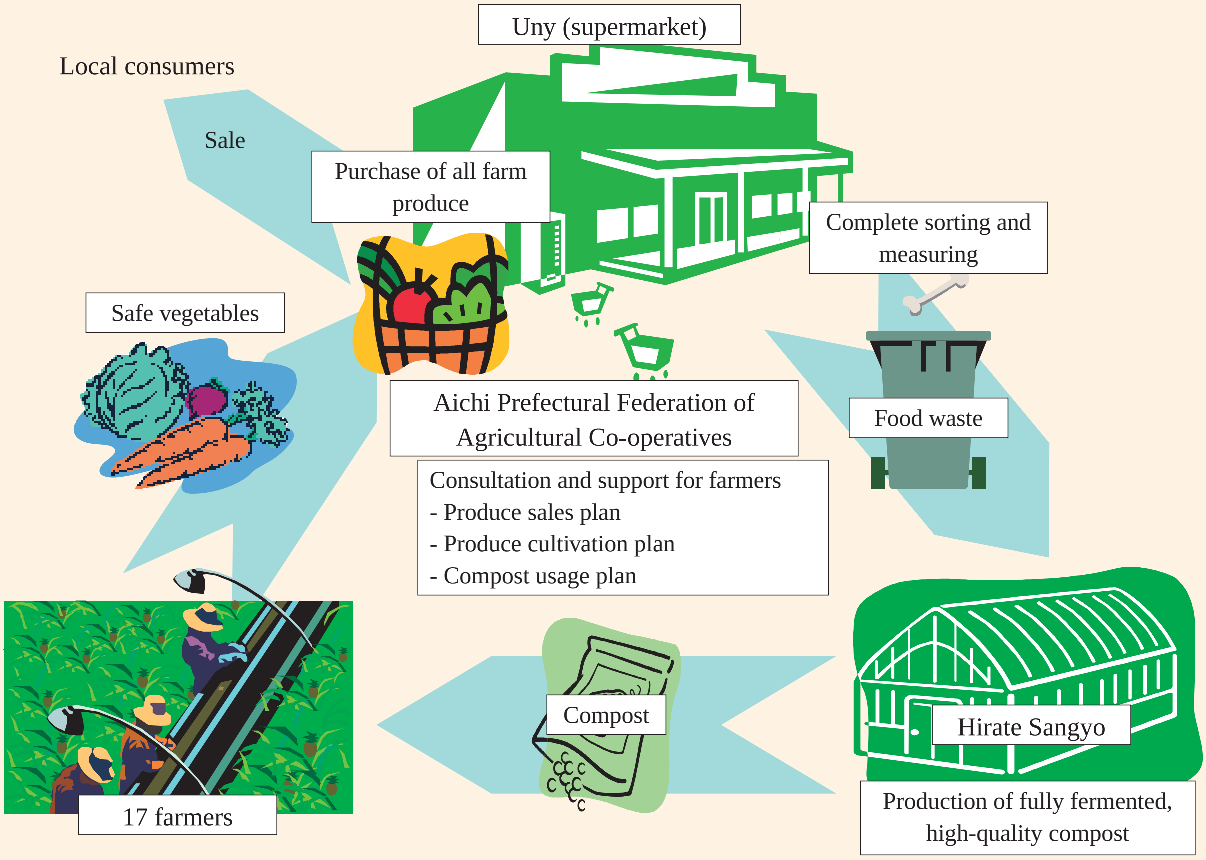
Column

Rate of food losses

Food losses refer to leftovers and other wasted food. A food loss survey of households and restaurants (conducted by the Ministry of Agriculture, Forestry and Fisheries in FY 2006) shows just how much food Japan wastes in the form of leftovers and garbage (only leftovers were surveyed in the food service industry). When compared with the number of people in each household, the rate of food loss can be seen to be highest (6.4%) in single-member households and only 3.5-4.0% in households with two or more members. In the food service industry, the percentage of food left uneaten in cafeterias and restaurants (3.1%) is greatly exceeded by banquet halls used for wedding receptions (22.5%) and facilities used for other parties (15.2%). When the data are examined on the basis of food type, beverages can be seen to account for over half the amount of the total leftovers. An analysis of leftovers in cafeterias and restaurants, based on the type of dish served, indicates that pickled vegetables are the type of food most often left unfinished, accounting for 11.0% of all leftovers. Based on the type of restaurant, those serving traditional Japanese cuisine account for the largest percentage (4.3%) of uneaten food.

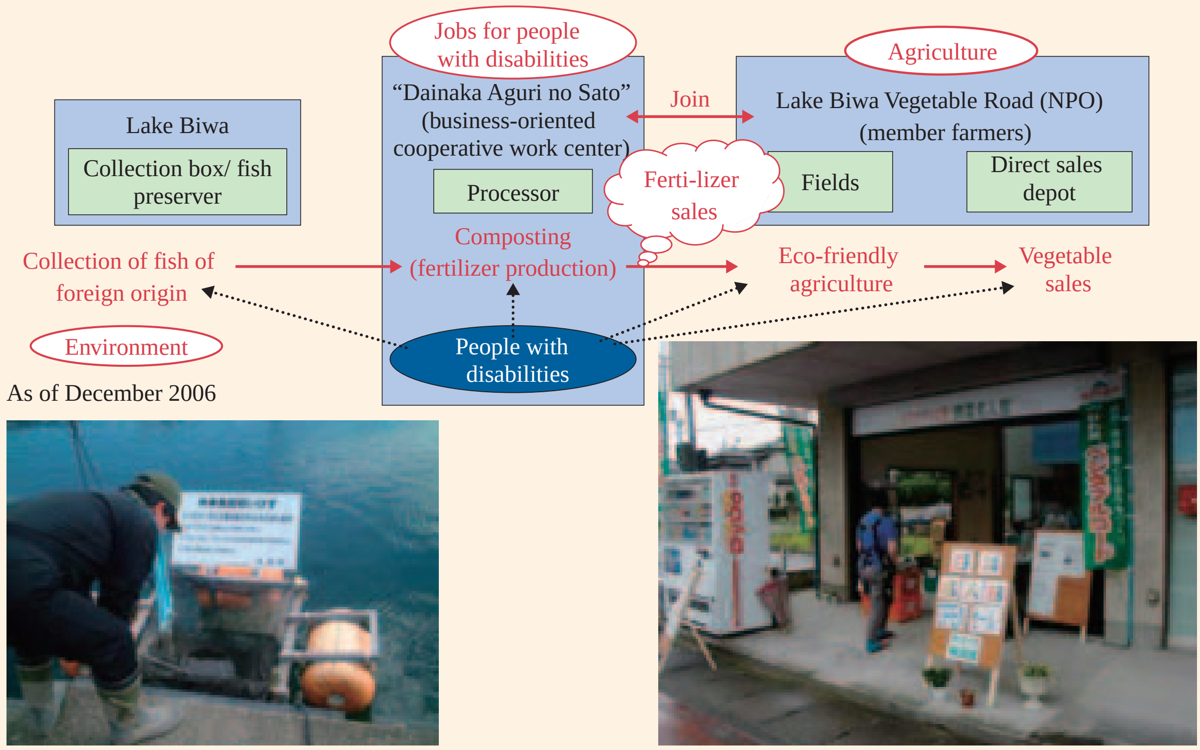
What kinds of measures should be taken to reduce such food losses? When families were asked about those things they took into consideration when purchasing food, the majority (72.5%) of respondents answered that they choose products carrying more recent dates of manufacture or those with longer shelf lives. However, overemphasis on food freshness can lead to an increase in waste at the retail stage. The First Food Consumer Monitor Survey in FY 2005, a survey of Food Consumer Monitors (selected from ordinary consumers living in major cities) conducted by the Ministry of Agriculture, Forestry and Fisheries, shows that what consumers want most is for restaurants to clearly explain on the menu, or by some other means, that customers can choose their preferred serving size, allowing them to finish all their meal (as cited by 45% or respondents). It is hoped that efforts to reduce food losses will expand in homes and restaurants alike.

Figure 4-3-9 Aichi Prefectural Federation of Agricultural Co-operatives



Source : Ministry of the Environment

Figure 4-3-10 Joining together welfare, agriculture and environmental conservation



Source: Shiga Prefectural Center for Support of Employment, Living and Participation plastic from a different range of areas because of the difference in weight between these wastes (Figure4-3-11).

An analysis of the circulation of iron scrap, by region, suggests that the majority of iron scrap generated is used within the same regional block, both for economic reasons and because of the presence of electric furnaces that use iron scrap. Interregional circulation is observed only on a complementary basis (Figure4-3-12).

There are also attempts underway to recover valuable resources from hazardous or hard-to-treat wastes by using advanced technologies. Since the number of facilities capable of treating such CRs is limited, wider-area resource cycles should be formed to allow them to be used most effectively (Figure4-3-13).

A Northern Akita Prefecture

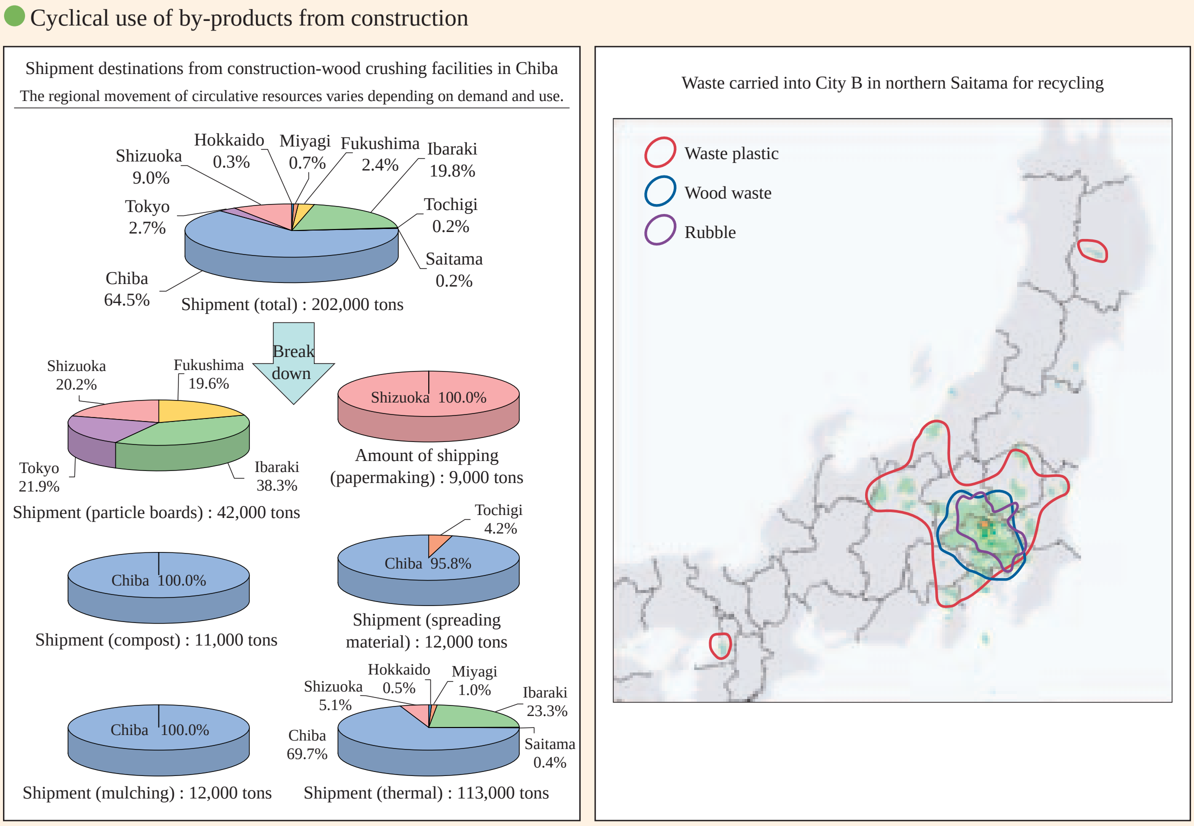
In the northern part of Akita Prefecture, which was once one of the world's richest mining areas, a project to recycle metals by making use of the local mines and refineries is now underway. Based on the zero-emissions concept, which aims to completely eliminate waste by using all industrial waste as raw materials in other sectors, the region has been approved under the Eco-town program which seeks to create communities in harmony with the environment while also fostering regional development. The region now serves as a wide-area recycling center for metals, including rare metals (Figure4-3-14).

A private enterprise initiative in this region, carried out in cooperation with the Secretariat of the Basel Convention and participating Asian countries, is planning a project to collect used mobile phones from Asia and recover resources from them.

B Kawasaki City

Kawasaki City has developed its coastal "Kawasaki Eco-town," which aims to minimize environmental burdens on the region and create a sustainable society in which industrial activities are in harmony with the environment. In this Eco-town, local companies seek to reduce environmental impact factors in every aspect of their activities, from production through to the disposal of their products. As well as promoting such company-level efforts, the Eco-town strives to establish a regional resource cycle through collaboration among companies and the use of recycling facilities. The material flow in Kawasaki Eco-town indicates that cyclical use has increased within Kawasaki (Figure4-3-15).

Figure 4-3-11 Examples of intra-block resource cycles



Source: Action Plan to Promote Construction Wood Recycling in Chiba (Ministry of Land, Infrastructure and Transport)

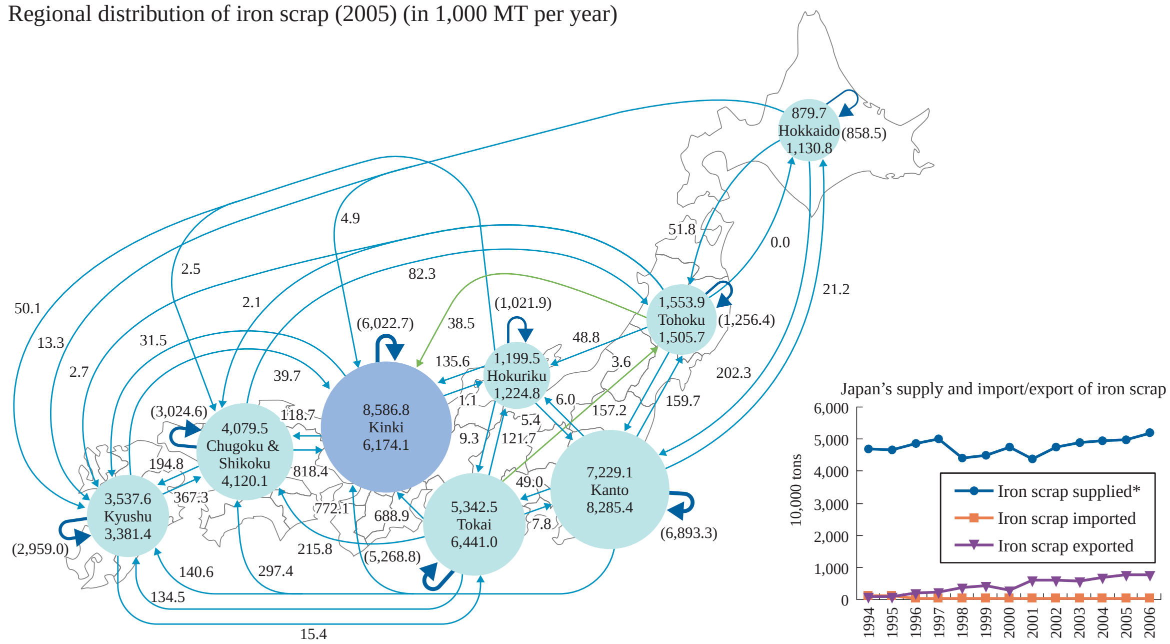
Source: National Institute for Environmental Studies

Figure 4-3-12 Circulative use of iron scrap

Examples of domestic resource cycles

● Circulative use of iron scrap

Regional distribution of iron scrap (2005) (in 1,000 MT per year)



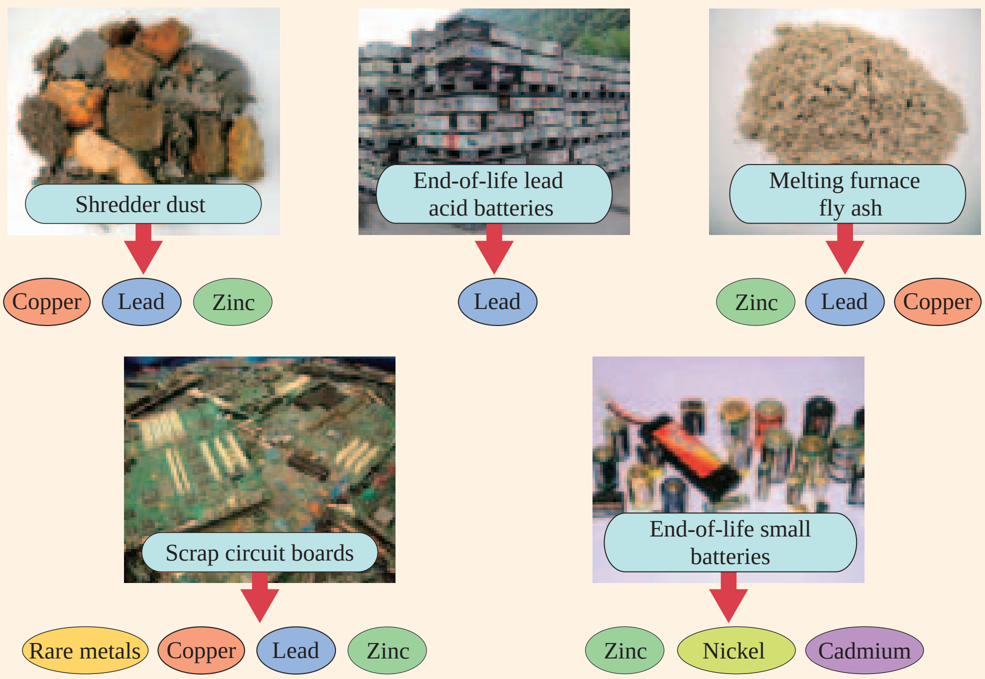
The size of the circle represents the amount purchased. The top and the bottom figures refer to the amount purchased and the amount shipped, respectively. Parenthesized values denote the amount of intraregional circulation included.

* Iron scrap supply amounts represent annual values in individual fiscal years.

Source: Left: Japan Ferrous Raw Materials Association; Right: Annual reports on steel, nonferrous metal and ferrous metal products, and trade statistics

Figure 4-3-13 Examples of waste disposal and collected items

Collection of useful metals from wastes considered difficult to dispose of and wastes containing hazardous materials and potentially having a serious impact on the environment if released



Source: Japan Mining Industry Association

Figure 4-3-14 Eco-town projects

Eco-town projects

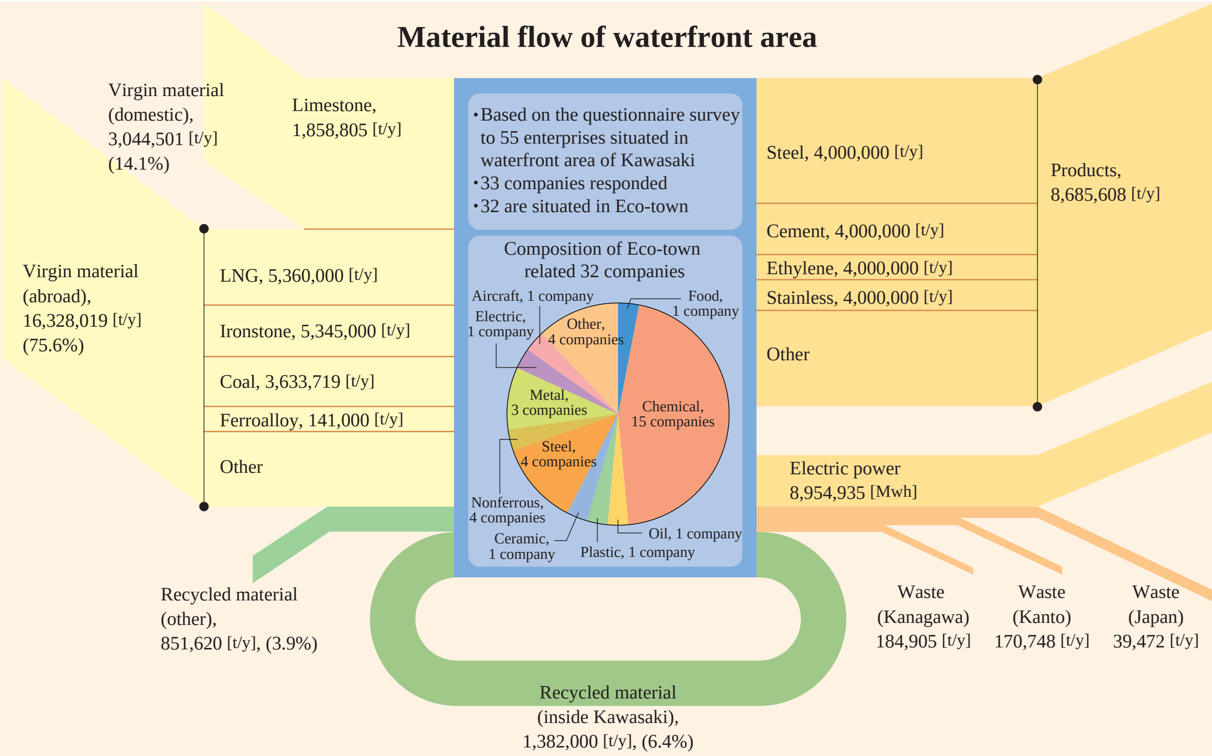
This is a program based on the zero-emissions concept, which aims to completely eliminate waste through the use of all waste from industry as raw materials in other sectors. Eco-town projects seek to create communities in harmony with the environment while fostering regional development. To date, 26 regions have been approved.
One project related to rare metals is the "Northern Akita Prefecture Eco-town Plan" (approved in November 1999), which intends to promote metal recycling in a region that was once one of the world's richest mining areas, by using its mine and refinery facilities.

<Outline of the Northern Akita Prefecture Eco-town Plan>

Facilities	Operating entity	Project description
Home appliance recycling facilities	Eco-Recycle Co., Ltd.	◆Recycles four types of home appliances pursuant to the Home Appliance Recycling Law, along with office equipment (6,000 t/yr in throughput) Four types of home appliances, etc. → Disassembly & crushing /sorting by material type → Ferrous & nonferrous metals Cullet
Nonferrous metal collection facilities	Ecosystem Kosaka Co., Ltd.	Shredder dust Waste circuit boards → Metallic vapor collection furnace → Gold, silver, copper, lead, etc. ◆Collects metals from circuit boards containing valuable metals (removed from end-of-life home appliances) by using them as recycled raw materials in a refinery (50,000 t/yr in throughput)
Facilities for manufacturing new building materials from	Akitawood Co., Ltd.	◆Mixes waste plastic with waste wood to produce energy-efficient construction materials by extrusion molding.
Coal ash and waste plastic recycling facilities	Akita Eco Plash Co., Ltd.	◆By using wastes such as plastic containers and packaging, produces secondary plastic products (materials for electrical facilities and construction materials)

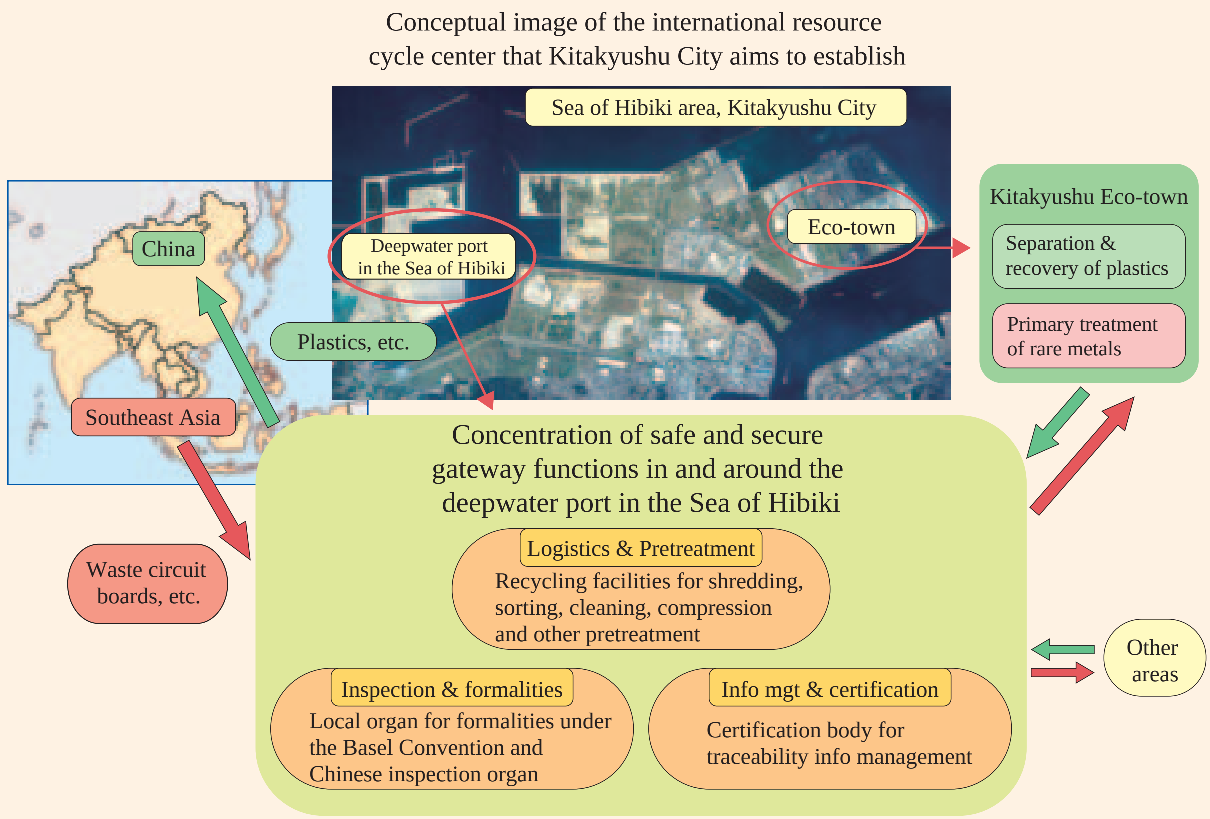
Source : Ministry of the Environment

Figure 4-3-15 Material flow of waterfront area



Source: National Institute for Environmental Studies , Japan

Figure 4-3-16 Kitakyushu City's efforts



Source: Documents provided by the Central Environmental Council

C Kitakyushu City

Based on its experience in overcoming serious pollution problems, and having already implemented Eco-towns and other projects for the establishment of a SMC, Kitakyushu City has been cooperating with other Asian regions on environmental issues. In an effort to construct a mechanism for international resource circulation, the city is conducting a field trial for waste tracking using IC tags. In this trial, waste circuit boards are imported from Asian countries for advanced recycling, while waste plastics are exported back to those areas. The city is also acting as a center for international resource circulation in other ways, considering such things as the inclusion of safe and secure gateway functions in its Eco-town and port, including inspection and formality execution and the certification capability needed for traceability information management (Figure4-3-16) (Table 4-3-1).

Section3 Implementing more effective measures

(1) Organic combination of institutional frameworks and support measures

The optimal size of a SMC block depends on the properties of the CRs involved. Therefore, when establishing a SMC block (with appropriate waste management as a precondition), the government will determine the optimal size for each type of CR by considering regional characteristics (e.g., the state of waste generation, the location of relevant treatment facilities) from an environmental perspective (e.g., anti-global warming, biodiversity conservation), a resource perspective (e.g., scarcity, utility), and an economic perspective (e.g., transport efficiency, treatment costs). On the other hand, the government will also follow the procedures described below in establishing SMC blocks whose optimal size is already fairly obvious. These include SMC blocks for biomass CRs, for which intraregional circulation is suitable because biomass is generated in specific regions and decomposes easily, and those for CRs requiring advanced treatment technology, for which wide-area circulation is more desirable.

Table 4-3-1 Major regional efforts (based on a hearing survey by the Subcommittee for the Planning of a Sound Material-Cycle Society of the Central Environment Council, after the formulation of the First Fundamental Plan)

Region	Major efforts
Hokkaido Prefecture	Formulated the Hokkaido Prefectural Fundamental Plan for Establishing a SMC Society to launch efforts to create a Hokkaido-style SMC, and strives to enact a municipal law as an institutional framework.
Yamagata Prefecture	Formulated the Yamagata Prefectural Fundamental Plan for Establishing a SMC Society (Zero-Waste Yamagata Promotion Plan), and takes measures to develop recycling-oriented industries and reduce the amount of final disposal to zero, with the aim of becoming the prefecture with the smallest amount of waste generation in all Japan.
Kawasaki City	Formulated the “Kawasaki Challenge 3Rs” policy, which addresses the transformation of industrial structures and the concentration of R&D-oriented industries, and set up a kitchen garbage recycling plan that takes account of regional characteristics.
Kyoto City	Formulated the Kyoto Waste Management Strategy 21, which incorporates a variety of numerical targets such as effort indices for the public, enterprises and government, and takes measures to address the upstream processes of waste management, sorting and recycling, and responsible disposal.
Kamakura City	Achieved the highest recycling rate for two consecutive years (in FY 2004 and 2005) among those cities with a population of 100,000 to 500,000, through the sorting of waste into 20 categories.
Hachinohe City	Works toward the goal of “creating a Hachinohe model for an eco-friendly city based on the establishment of a SMC Society” by making use of Eco-town and recycling port projects, and by becoming designated as a Special Zone for Aomori Prefecture Environment and Energy Industry Creation.
Shibushi City	Successfully reduced the amount of landfill waste by 80% after enforcing the sorting of waste into 28 categories.
Motegi-machi, Tochigi Prefecture	Seeks to achieve regional circulation based on local production for local consumption, by promoting eco-friendly agriculture which starts from the soil improvement stage, using compost produced at the organic matter recycling center.
Takigawa City	Seeks to reduce waste, mainly by making use of one of Japan’s largest kitchen garbage biomass plants.
Funabashi City	Promotes recycling based on local production for local consumption and the reuse of unwanted articles, and has proposed the use of gift boxes that eliminate the need to use wrapping paper.
Ikeda-cho, Fukui Prefecture	Promotes advanced ecological farm communities by capitalizing on farm communities’ capabilities through activities such as soil improvement by means of compost made from kitchen garbage, the sale of the products of organic farming, and an eco-point program to encourage consumers to bring their own containers.
Kamikatsu-cho, Tokushima Prefecture	Promotes zero waste, e.g., by declaring that the town will reduce the amount of landfill and incineration waste to zero by 2020, through the sorted collection of waste into 35 categories, and by means of other programs.
Fukushima Prefecture	Promotes a society in harmony with nature, a zero-waste society, and a society based on the mottainai spirit, in line with the municipal law for establishing a SMC Society and a plan for the establishment of a SMC Society.
Kyoto Prefecture	Formulated the Kyoto Prefectural Plan for the Establishment of a SMC Society, which sets specific targets over a wide variety of areas, and promotes enterprise efforts through certification and registration systems.
Aichi Prefecture	Aims to create recycling businesses that take advantage of the local concentrations of industries and technologies, in line with the Aichi SMC Society Establishment Plan and its action plan, the Aichi Eco-town Plan.
Nagasaki Prefecture	Working towards “zero-waste Nagasaki”, and has established promotion and implementation plans and 221 actions to be taken as part of these plans.

Source: Ministry of the Environment

In the case of biomass CRs, Biomass Town projects are already underway in many municipalities, in line with the Comprehensive Biomass Nippon Strategy, and based on community-based or local circulation. As of the end of April 2008, 141 municipal governments have announced their Biomass Town projects. A biomass town is an area in which a total regional biomass utilization system is established through joint efforts by a variety of regional entities, efficiently connecting every biomass-related process from generation through to utilization, and in which biomass is, or is expected to be, steadily and appropriately used. It is hoped that these towns will contribute to regional revitalization (Figure4-3-17).

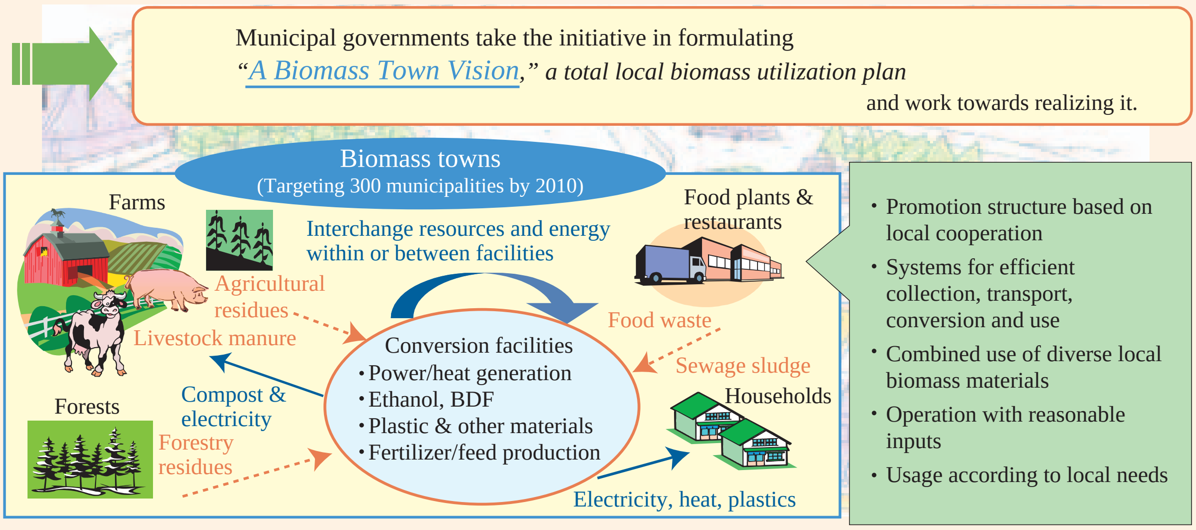
As part of this strategy, the government will develop structures for local production for local consumption in the fields of food and energy, in accordance with regional characteristics (e.g., large cities vs. provincial towns) and through collaboration among the various entities concerned. One example is a program to certify food recycling loops under the Food Waste Recycling Law. The government will also foster the development of so-called local community businesses, continuously engaged in for-profit recycling activities such as the composting of kitchen garbage collected and disposed of by municipal governments or private enterprises and the production of feed or biofuel from waste oil. The effective use of biomass materials such as livestock manure and sewage sludge will also be promoted.

CRs derived from products and CRs containing exhaustive resources will be fully subject to measures under the

Figure 4-3-17 Biomass town vision

Biomass town

○ A biomass town is an area in which a total local biomass utilization system is established through joint efforts by a variety of local entities, efficiently connecting every biomass-related process, from generation to utilization, and in which biomass is, or is expected to be, steadily and appropriately used.



Efficient use of the total local biomass by everyone in the area
rather than the use of only some biomass by some people

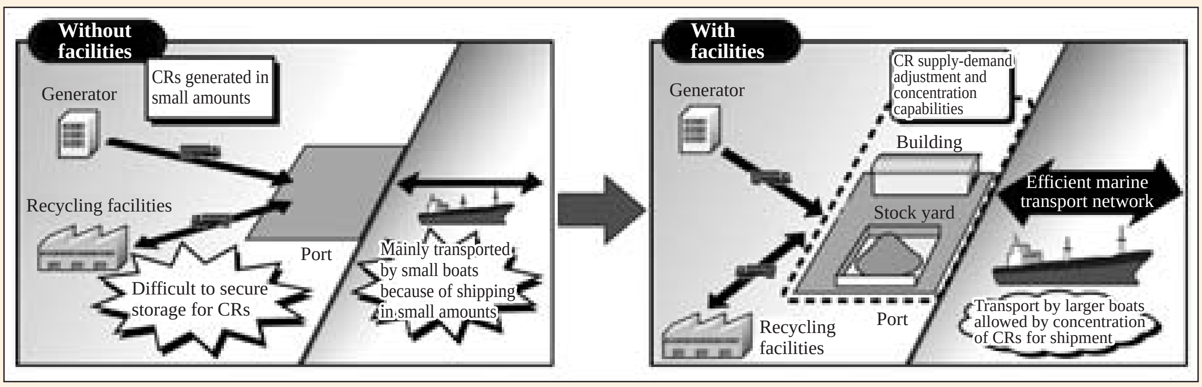
Source: Documents provided by the Central Environmental Council

Figure 4-3-18 Subsidy program to support circulative resource handling (other facilities expenses)

FY 2006: Outlaid as part of 800 million yen government expenditures

FY 2007: Outlaid as part of 1 billion yen government expenditures

- Eligible entities: Any legal person which a local government invests in or finances (e.g., third-sector companies)
- Rate of assistance by subsidies: One third of the total project costs in any region
- Eligible projects
- Projects which construct facilities to warehouse or store circulative resources in order to facilitate the efficient handling of CRs at ports designated as recycling ports.



Source: Documents provided by the Central Environmental Council

recycling laws and the Law for the Promotion of Effective Utilities of Resources, with a view towards wider-area circulation. The wide-area certification and recycling certification programs under the Waste Management Law will also be appropriately used for these CRs. Through inter-industry collaborations, the multi-stage recycling of CRs will be fostered by further restricting the resource input into supply chains and by promoting the wide-area use of materials. In particular, in order to ensure the appropriate and strategic use of valuable resources contained in CRs, the government will take measures to make recycling technologies and systems more sophisticated, to expand collection structures, and to strengthen joint efforts with consumers while improving credibility.

The Eco-town program should be effective for such wide-area SMC blocks. This program was instituted in FY 1997 with the aim of promoting advanced community development projects, in harmony with nature, by using the zero-emissions concept (completely eliminating all kinds of wastes through the use of all industrial wastes as raw materials in other sectors) as the basic concept for communities trying to establish an eco-friendly economy and society, and by fostering this concept as the key to regional development. To date, 26 Eco-towns have been approved. They are expected to act as centers for wide-area regional circulation.

With regard to the medium- and long-distance transport of CRs, the government will work towards implementing a venous distribution network that has a low impact on the environment, by making the most of rail and marine transport. In particular, more efficient marine transport will be pursued through the promotion of recycling ports (Figure4-3-18).

As a major precondition for these initiatives, the government will ensure the correct use and disposal of CRs (e.g., correct waste disposal) and the conservation of the living environment. Considering the potential presence of regions where the amount of CRs, the availability of facilities to handle them, and demand for recycled products are not in balance, the government will also foster regional alliances based on appropriate information.

(2) Advances in technologies and systems

The establishment of SMC blocks, as mentioned above, calls for the development of suitable technologies to underpin them. By advancing the development of 3R-related technologies and systems, the government will promote efforts to achieve the 3Rs across the entire product life cycle and the entire supply chain, which will then contribute to the formation of SMC blocks. This requires effectively forging ahead with the R&D and commercialization of 3R technologies and systems, as well as the development and commercial application of 3R-oriented business models, with product life cycles and supply chains also taken into consideration.

During the manufacturing phase, it is important to decide priorities based on the toxicity of the materials to be used and the rarity of the metals and other substances present, and to further the advancement of those technologies and systems needed to design and manufacture DfE (Design for Environment) products in accordance with the functionality and properties of each product.

In the recycling phase where end-of-life or used products are subject to cyclical use or appropriate disposal, it must be ensured that product/component reuse, material recycling, raw material recycling, energy recovery and use, and correct disposal are all conducted step by step.

As well as focusing on each individual stage, including the reuse, recycling, energy recovery/use, and disposal stages, it is essential that technologies and systems be improved in order to reduce the impact on the environment associated with the cyclical use and disposal of materials. Strategically advancing technologies and systems to make the most of regenerable biomass materials is, therefore, just as important.

Furthermore, by integrating technologies that can evaluate the effects of the above 3R technologies and systems with other individual technologies, systems and social systems, the government will strategically promote the development of design technologies to implement a 3R-oriented production and consumption system (Table 4-3-2).

(3) Development of basic infrastructure

The government will implement measures to develop basic infrastructure for CRs. An example of this will be to provide support for regional model projects that help create a SMC and for the formulation of recycling-oriented community visions, with the aim of sharing and disseminating information to communities across Japan regarding outstanding contributions made by key contributors to recycling-oriented community development, such as municipal governments, NPOs and enterprises. Since FY 2005, the government has been implementing an assistance program that provides subsidies to promote the establishment of a SMC rather than the construction of waste disposal facilities, in order to support municipalities developing systems for the efficient recovery of resources and energy from wastes by building disposal facilities for municipal solid waste, based on their own voluntary and creative efforts. In addition to this, assistance will be provided for projects aimed at establishing SMC blocks. This will include active financial support for projects to build facilities for the effective use of regional waste-derived biomass.

Human resources for promoting a SMC will also be enhanced in terms of both quality and quantity. Specifically, this will involve prompting industry, academia and government, including enterprises, universities,

Column

Promoting the collection of mobile handsets

With the appearance of lighter, cheaper and more capable handsets, mobile phones are now so common that over 100 million people use them in Japan. Since mobile handsets contain gold, silver copper and rare metals such as palladium at concentrations higher than those found in natural ores (see "Valuable metals contained in mobile and PHS handsets"), they need to be appropriately recycled and disposed of from the viewpoint of effectively using resources.

For this reason, a voluntary collection and recycling system has been established by mobile and PHS carriers (the Mobile Recycling Network) in order to promote recycling (see "Changes in collected mobile handsets in number and weight").

However, the number of handsets collected has actually been declining over the years. Approximately 6.6 million units were collected in FY 2006, while about 50 million units were shipped to the domestic market in the same fiscal year. The factors behind this can be observed in the results of a consumer questionnaire. When asked about the reasons for keeping their old handsets, most respondents cited their desire to keep the phone as part of their personal collection or for sentimental reasons, while others answered that they still use their handset for purposes other than making telephone calls. On the other hand, 22.0% of respondents (a smaller percentage than in the previous fiscal year) cited no specific reasons, suggesting that many people hold onto their mobile phones for no valid reason. The percentages for those who did not know how to dispose of the handset (9.9%) and those who were too lazy to bring it to a store (5.9%) were also high. There is a need to publicize the collection system to consumers and enhance the current collection structure (see "Factors behind the reduction in the number of mobile handsets collected).

Valuable metals contained in mobile and PHS handsets

Type of mineral	Valuable metals contained in mobile and PHS handsets	Reference: Average content in ore
Gold (g/t)	400	0.92
Silver (g/t)	2,300	93
Copper (%)	17.2	1.2
Palladium (g/t)	100	181

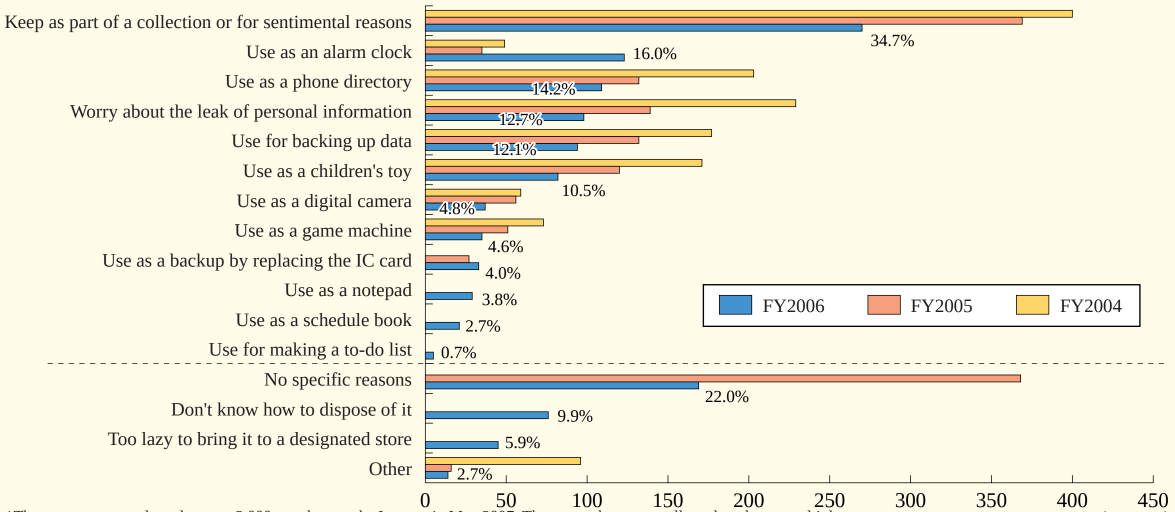
Source: Created by the Ministry of the Environment, based on the FY 2001 Annual Report for Establishing a Sound Material-Cycle Society and issued by the Ministry of Economy, Trade and Industry

Changes in collected mobile handsets, by number and weight
by fiscal year

		Before MRN	After the Mobile Recycling Network					
		FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006
Collected bodies	Number in 1,000 units	13,615	13,107	11,369	11,717	8,528	7,444	6,622
	Weight in tons	819	799	746	821	677	622	558
Collected batteries	Number in 1,000 units	11,847	11,788	9,727	10,247	7,312	6,575	6,133
	Weight in tons	304	264	193	187	159	132	125
Collected battery chargers	Number in 1,000 units	3,128	4,231	3,355	4,387	3,181	3,587	3,475
	Weight in tons	328	361	251	319	288	259	234

Source: TCA and CIAJ

Factors behind the reduction in the number of mobile handsets collected



*The survey was conducted among 2,000 people over the Internet in May 2007. The respondents were allowed to choose multiple answers.
Source: TCA and CIAJ

Table 4-3-2 Major technologies to support a SMC Society

Technology			Description
Improvement in hygiene	Johkasoh		A purification tank for treating night soil and miscellaneous domestic waste water to discharge treated water
	Mechanical collection vehicle (packer truck)		Packer trucks to efficiently collect and transport wastes without any leakage or spillage
	Intermediate treatment (incinerator)		Incineration technology, suitable for use under Japanese conditions (during hot, humid summers and in areas where final disposal sites are scarce), to reduce the volume of waste and kill bacteria
	Intermediate treatment (gasification and melting furnaces)		Melting technologies that will reduce dioxin generation: ensuring complete high-temperature combustion, rendering incineration ash harmless by melting and solidification, and allowing the effective use of molten slag
	Final disposal		Technologies for the final disposal of the waste residue remaining after intermediate treatment
	Manifest control		A manifest control system that will improve transparency and accuracy when monitoring and managing waste flows, and the adoption of electronic manifest control technology
Measures against hazardous substances	Measures to reduce waste mercury levels		Recycling technologies for waste batteries and fluorescent bulbs
	Measures to reduce waste dioxins levels		Systems and technologies to reduce the amount of dioxins generated during waste incineration
	Measures to reduce waste PCBs levels		Methods and programs to ensure the responsible disposal of polychlorinated biphenyls (PCBs)
	Measures to reduce waste asbestos levels		Systems, final disposal methods, and studies concerning the responsible management of asbestos
	Measures to reduce infectious waste		Incineration for infectious waste from medical facilities
Technologies to support	Container and packaging reductions		Measures to reduce waste through the use of thinner PET bottles, the development of refillable bottled products, and the adoption of replacements for bottled products (e.g., liquid soap, detergent)
	Home appliance -related reductions		Technologies to reduce the number of component parts, produce smaller parts, reduce weight by means of modularization, and extend the useful life of PCs
	Vehicle-related reductions		Technologies to reduce vehicle body weight through the increased use of aluminum, and extend the useful life of engine oil by increasing designated replacement intervals
	Reuse of copiers		Initiatives to reuse exterior components through the development of improved cleaning technologies, in addition to the drive unit and other interior components, which have already been used.
	Reuse of slot machines		Initiatives to reduce the amount of resources needed to manufacture new models of “pachislo” slot machines by encouraging their reuse
	Reuse of vehicles		Initiatives to restore and recondition vehicles by replacing worn or broken components with new ones based on parts removed from end-of-life vehicles
	Eco-design home appliances		Designs incorporating “ease of decomposition,” using product assessment projects and washing machines as pilot cases
	Eco-design vehicles		Adoption of recycling-conscious resources, such as recycled materials and recyclable resources, and the use of the “Easy Disassembly Mark” labeling system
	Recycling of waste containers and packaging		Material recycling and chemical recycling for waste plastic and PET bottles
	Recycling of end-of-life vehicles		Recycling for aluminum wheels, shredder dust, and waste tires
	Recycling of end-of-life home appliances		An end-of-life home appliance recycling flow, and the utilization of recycling to provide more added value (closed recycling)
	Recycling of construction waste		Technologies to sort mixed construction waste and recycle construction sludge
	Recycling of food waste		Technologies to produce compost and eco-feed and to recycle food waste for other uses, such as fuel
	Paper recycling		Technologies to manufacture pulp from used paper in order to produce recycled paper
	Recycling technology for non-burnable waste and large discarded articles		Technologies to crush/shred and sort non-burnable waste and large discarded articles in order to effectively recycle valuable waste
	Recycling of incineration ash		“Eco-cement,” manufactured mainly (50%) from wastes such as urban waste incineration ash and sewage sludge
	Waste power generation		Waste power generation systems utilizing the waste heat from waste incineration facilities
	Biomass power generation		Power generation systems using biomass materials such as wood chips and bagasse (sugarcane chaff)
	RDF		Refuse-Derived Fuel (RDF), produced by shredding and drying burnable waste and removing any impurities
	RPF		Refuse-derived paper and plastic Fuel (RPF), produced mainly from the used paper and waste plastic (difficult to recycle) included in industrial waste
	Biodiesel fuel		Biodiesel fuel (BDF) as a substitute for light oil in automotive diesel engines
	Bioethanol		Bioethanol, produced mainly from waste construction wood with other wastes such as waste paper and food residues added
	Metallic resource circulation technology	Iron, copper, aluminum	Technologies and material flows to recycle iron, copper and aluminum scrap
		Rare metals, heavy metals	Technologies to recover and recycle rare metals and heavy metals from waste, as an extension of existing smelting technology

Source: Ministry of the Environment

research institutes, central and local governments and NGOs/NPOs, to foster people-to-people exchanges as well as information exchange. In particular, the development of coordinators will be promoted through the nurturing of young researchers at universities, through the transmission of technologies in industries and universities from one generation to the next, and through people-to-people exchanges between NGOs/NPOs. In addition, the government will foster improvements in the capabilities of leaders, including central and local government officials and teachers engaged in environmental education and learning, by expanding their training programs.

As mentioned in Chapter 2, a prerequisite to the establishment of SMC blocks is that every entity involved plays its part through cooperation and collaboration with all others (linking ability). In particular, in order to strengthen such collaboration, local governments play a key role in promoting the establishment of regional SMCs and are expected to act as an essential coordinator between different entities. For example, they are expected to foster cooperation between companies from different sectors and provide a framework for their collaboration. To be more specific, the prefectural government should take the lead in aligning the efforts of the municipal governments and other entities involved, approaching the issues from a broad perspective. The municipal government should play its role as the fundamental governing body closely related to citizens' lives by carrying out activities such as the construction of a local circulation system. At the same time, the prefectural and municipal governments all need to work in close cooperation.

There are many kinds of information to sive the base of each entity's efforts: domestic material flows, the amounts of different types of waste generated, the cyclical use and disposal of different types of waste, future prospects, technical data on wastes (e.g., materials, composition, design), and the environmental effects of the use and disposal of wastes. It is essential that a system to gather all this statistical information be immediately reviewed and improved so that accurate information can be obtained swiftly.