Environmental Management Approaches in Japan: Institutional Policy and Case study

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บทคัดย่อ

ประเด็นปัญหาด้านสิ่งแวดล้อมในปัจจุบันเป็นสิ่งสะท้อนของแนวทางการพัฒนาในอดีตที่ขาดการคำนึงถึงผลกระทบที่เกิดขึ้นกับทรัพยากรธรรมชาติและสิ่งแวดล้อม ผลของการพัฒนาที่มุ่งเน้นต่อการเติบโตทางด้านเศรษฐกิจที่เน้นความมั่งคั่งของนานาประเทศทั่วโลก อย่างไรก็ตามทิศทางการพัฒนาดังกล่าวได้ถูกเปลี่ยนแนวคิดที่มุ่งเน้นให้ความสำคัญกับด้านสิ่งแวดล้อม โดยเริ่มตั้งแต่ปี ค.ศ. 1984 ที่ได้มีนิยามคำว่า “การพัฒนาอย่างยั่งยืน” ที่เป็นแนวทางการพัฒนาหลักที่นานาประเทศทั่วโลกได้นำมาปรับใช้ในการกำหนดทิศทางการพัฒนาของประเทศ ดังนั้นบทความวิชาการนี้มีวัตถุประสงค์ในการศึกษาแนวทางการจัดการสิ่งแวดล้อมของประเทศญี่ปุ่น ซึ่งประเทศญี่ปุ่นเป็นหนึ่งในประเทศที่มีแนวทางการจัดการสิ่งแวดล้อม ที่เป็นตัวอย่างที่ดีของการจัดการสิ่งแวดล้อมอย่างยั่งยืน เน้นการพัฒนาเศรษฐกิจ สังคม และสิ่งแวดล้อมไปพร้อมกัน โดยคำนึงถึงประโยชน์ของทุกฝ่ายที่เกี่ยวข้อง โดยเน้น 4 หลักการสำคัญ คือ แนวทางการป้องกัน แนวทางผู้ก่อมลพิษเป็นผู้จ่าย แนวทางการจัดการแบบมีส่วนร่วม และการกระจายอำนาจในการจัดการ หนึ่งในความสำเร็จของการจัดการสิ่งแวดล้อมของประเทศญี่ปุ่น คือ มาตรการส่งเสริมการรีไซเคิลขยะ โดยรัฐบาลญี่ปุ่นได้กำหนดเป้าหมายให้อัตราการรีไซเคิลขยะของประเทศญี่ปุ่นเพิ่มขึ้นเป็น 70 เปอร์เซ็นต์ ภายในปี ค.ศ. 2030 โดยได้ดำเนินมาตรการต่างๆ เช่น การบังคับใช้กฎหมายรีไซเคิล การส่งเสริมให้ภาคธุรกิจ และภาคประชาชนนำขยะกลับมาใช้ใหม่ เป็นต้น

คำสำคัญ การจัดการสิ่งแวดล้อม ญี่ปุ่น การจัดการกากของเสีย

Abstract

Current environmental issues reflect past development practices that lacked consideration of impacts on natural resources and the environment. The results of development focus on economic growth that emphasizes the wealth of countries worldwide. However, the development direction has been changed to focus on the environment. Starting from the year 1984, there was a definition of the word "Sustainable development," which is the main development guideline that many countries worldwide have adopted to determine the direction of national development. Therefore, this academic article aims to study environmental management practices in Japan. Japan is one of the countries that have environmental management guidelines. It is an excellent example of sustainable environmental management. Emphasis is placed on developing the economy, society, and environment together. Considering the benefits of all parties involved, emphasizing four essential principles: prevention guidelines, The polluter pays approach, the Participatory management approach, and decentralization of management. One of Japan's environmental management successes is measures to promote waste recycling. The Japanese government has set a target for Japan's waste recycling rate to increase to 70 percent by 2030 by implementing measures such as enforcing recycling laws. Promoting the business sector and the public sector reuses waste, etc.

Keywords Environmental Management, Japan, Waste Management

1. Background

Japan's environmental policy originated back in the early twentieth century. However, it was not until the 1960s and 1970s, when the country underwent significant economic expansion and industrialization, that environmental concerns became an important issue. In response, the Japanese government enacted several environmental laws and regulations, establishing the Environment Agency in 1971. The basic principles of Japanese environmental policy are four issues, including ***Prevention***--It is better to prevent pollution from happening in the first place than to clean it up afterward. ***Polluter pays***--The polluter should be responsible for the costs of cleaning up the pollution they cause. ***Public participation***--The public should have a say in

developing and implementing environmental policy. ***Decentralization***--Local governments should have a say in implementing environmental policy in their areas.

The key features of Japanese environmental policy consist of four topics: ***Cooperative Governance:*** Environmental policy in Japan is developed and implemented through a cooperative process involving the national government, local governments, the private sector, and NGOs. This contrasts with many other countries, where environmental policy is made by the government and then imposed on businesses and citizens. ***Consensus Building:*** The Japanese government places a strong emphasis on consensus building in the development of environmental policy. This means all stakeholders must agree on the policy before it is implemented. ***Market-Based Instruments:*** The Japanese government increasingly uses market-based instruments, such as taxes and emissions trading, to achieve environmental goals. Also, financial incentives like subsidies for cleaner technologies and green infrastructure projects accelerate the transition to a sustainable economy. ***Technology Development:*** The Japanese government invests heavily in developing new environmental technologies.

There are many compelling reasons to research environmental management in Japan, which has grappled with environmental challenges while achieving remarkable economic development. ***Pioneering Solutions--*** Japan has a long history of environmental innovation, developing and implementing practical solutions to issues like air and water pollution, waste management, and energy efficiency. These approaches can offer valuable insights and inspiration for tackling similar problems elsewhere. ***Reconciliation of Development and Sustainability***-- Balancing rapid economic growth with environmental protection is a complex challenge many nations face. With its successes and failures, Japan's experience navigating this tightrope walk can provide valuable lessons for other countries striving for sustainable development. ***Unique Challenges and Opportunities--*** Japan's distinct geography, population density, and cultural values have shaped its unique environmental challenges and opportunities. Researching these aspects can offer valuable insights into adapting environmental management strategies to specific contexts. ***Global Leadership***-- Japan is a significant player in international environmental negotiations and initiatives. Understanding its approach to these issues can provide valuable context for broader global efforts to address environmental challenges. To sum up, researching

environmental management in Japan can offer valuable knowledge and insights that can contribute to addressing environmental challenges within and globally.

2. General Information about Japan

Japan is a country located in East Asia. The capital city is Tokyo. The national flag by law is "Hinomaru," a red sun on a white background. The total area of Japan is 377,960 sq km. The famous mountain in Japan that the dormant volcano is Mt. Fuji (3,776 m), the country's highest peak. The last eruption of Mt. Fuji was in 1707. There are 2,265 volcanoes in Japan, but around 20 are still active (The national SOS Children's Villages association of Japan, n.d.). Population growth in Japan is shown in Figure 1, which shows the combination of people living long lives in an aging society and the low birth rate.

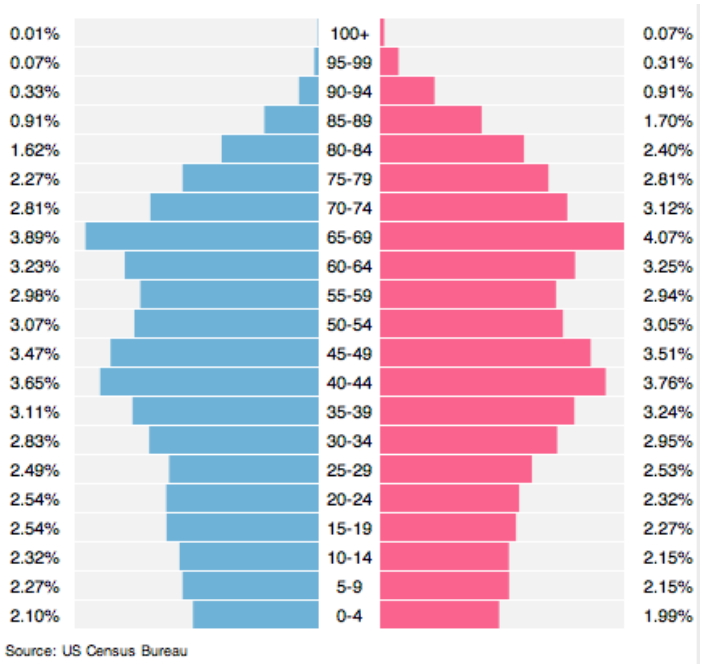

Figure 1 Japan 2016 Population pyramid

Source: Country digest, 2016

In addition, Japan is a highly urbanized country, with around 70 percent of the population living in cities. Apart from the world's 31 megacities (that is, cities with 10 million inhabitants or more) in 2016 (United Nations, 2016), Table 1 shows that The first megacity of the world was Tokyo-Yokohama, Japan which greater Tokyo is the largest urban agglomeration in the world, swallowing up the neighboring cities of Yokohama, Kawasaki, and Chiba. Despite its size, Tokyo has very efficient public transportation, which accounts for almost 80% of journeys. Toko-Yokohama's urban area was 37.8 million people, and the population density was 4,400 people per square kilometer.

Table 1 the world's 31 megacities in 2016

Rank	City, Country	Population (thousands)	Rank	City, Country	Population (thousands)
1	Tokyo, Japan	38,140	17	Lagos, Nigeria	13,661
2	Dechi, India	26,454	18	Manila, Philippines	13,131
3	Shanghai, China	24,484	19	Guangzhou, Guangdong, China	13,070
4	Mumbai (Bombay), India	21,357	20	Rio de Janeiro, Brazil	12,981
5	São Paulo, Brazil	21,297	21	Los Angeles-Long Beach-Santa Ana, USA	12,317
6	Beijing, China	21,240	22	Moskva (Moscow), Russian Federation	12,260
7	Ciudad de México (Mexico City), Mexico	21,157	23	Kinshasa, Democratic Republic of the Congo	12,071
8	Kinki M.M.A. (Osaka), Japan	20,337	24	Tianjin, China	11,558
9	Al-Qahirah (Cairo), Egypt	19,128	25	Paris, France	10,925
10	New York-Newark, USA	18,604	26	Shenzhen, China	10,828
11	Dhaka, Bangladesh	18,237	27	Jakarta, Indonesia	10,483
12	Karachi, Pakistan	17,121	28	Bangalore, India	10,456
13	Buenos Aires, Argentina	15,334	29	London, United Kingdom	10,434
14	Kolkata (Calcutta), India	14,980	30	Chennai (Madras), India	10,163
15	Istanbul, Turkey	14,365	31	Lima, Peru	10,072
16	Chongqing, China	13,744			

Source: Worldometers, 2017

2.1 Japan's Environment Organization

From this environmental problem in the past, The situation that you know, such as the mass cadmium poisoning of Toyama Prefecture in 1912 and The methylmercury outbreak of the Minamata Disease in 1956 (Midori, 2015). To make the environment as enjoyable. The first environmental law in Japan was legislated in 1967. The Basic Law for Environmental Pollution Control, legislated in 1967, was among the first "basic laws" in Japan, stating basic policy frameworks such as the role of different actors. The Environment Agency was established in 1971, and various policy measures were taken to reduce pollution during the 1970s and 1980s. It became the Ministry of the Environment (MOE) in 2001. The Ministry of the Environment (**環境省** Kanky**ō**-sh**ō**) is a Cabinet-level ministry of the government of Japan responsible for global environmental conservation, pollution control, and nature conservation. Moreover, in 2012, the Nuclear Regulation Authority was founded. Since 2012, the responsibilities of the MOE have included water and air pollution control, waste management, nature conservation, global environment, and nuclear regulation. Mr. Masaharu Nakagawa is the minister of both (the Ministry of the Environment and the Ministry of State for Nuclear Emergency Preparedness).

2.2 Environmental Management Policy and Plan in Japan

In the 1990s, Japan's environmental legislation was further developed. The mix of instruments used to implement environmental policy is highly effective. Regulations are strict, well-enforced, and based on solid monitoring capacities. Significant progress has been made in tackling non-conventional air pollutants (e.g., dioxins, benzene), and waste management can be expected to improve further with the recent overhaul of the relevant legislative framework. Strict standard setting and financial support for research and development on new environmental technologies and treatment methods have had a positive technology-forcing effect, which has helped ensure the timely implementation of stringent regulations. The present system also has some cost-effectiveness advantages: nationwide emission or discharge limits are made more

stringent at regional and local levels when needed, often through agreements negotiated by prefectures and municipalities with industry. Environmental impact assessment (EIA) is systematically applied to major projects, and consultation of the public and regional and local authorities has improved. Japanese industry has been proactive in establishing environmental management and reporting systems, and several branches have taken initiatives to reduce their environmental "footprint" (Forbes, 2005; The OECD Environment Programme, n.d.)

The new basic environment plan was thought of under six concepts. Including: (Ministry of the Environment, 2006) (shown in Figure 2). Outline of the Basic Environment Plan: The way to new richness developed from the environment consists of 3 parts. Including:

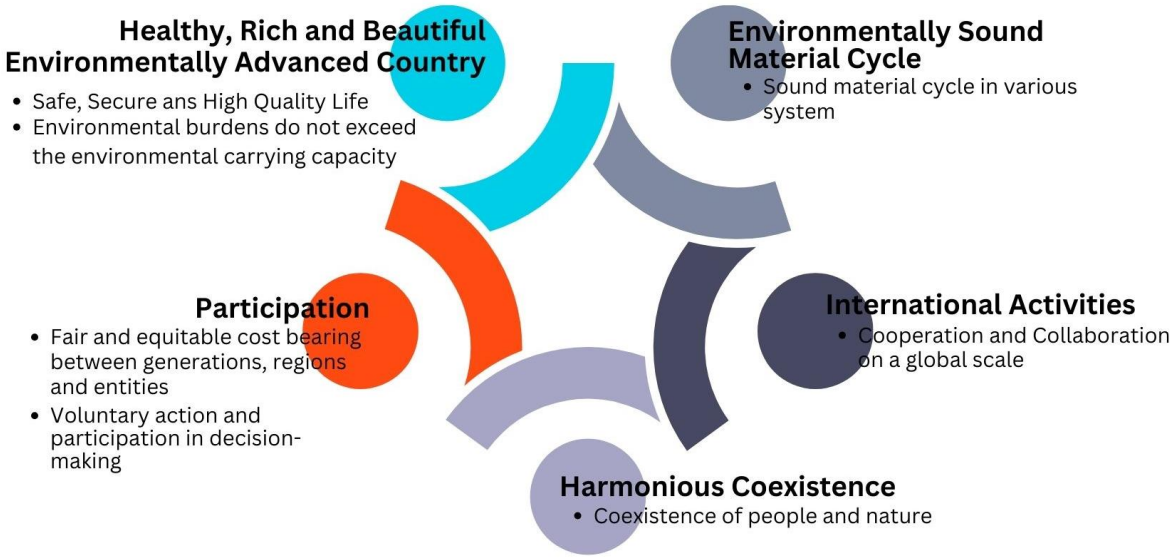

Figure 2. Objectives of the New Basic Environmental Plan

Source: Ministry of the Environment, 2006

2.2.1 Current Environmental Status and Directions for Environmental Policy Development

2.2.1.1 Integrated improvements of the environment, economy, and society

1) Realization of an “economy for a better environment” and an “environment for a better economy” that The impact on the environment differs significantly by what is used or what services are used even if a similar lifestyle is being led. Depending on a device in the product design stage, we can reuse and recycle more. If we use durable products, the energy and resources required for producing them will be reduced. As much as possible, we

need to produce goods and services in ways that have less burden on the environment. Sometimes, an environmentally friendly lifestyle creates a new service. There is hope that protecting our beautiful nature leads to Eco-tourism, and as a result, people become enriched, which would lead to activities that protect the environment.

2) Realization of a “society for a better environment” and an “environment for a better society” that Activities for protecting the environment, such as used paper recycling, gutter cleaning, and management of community-based forests, have been carried out with a common purpose, community bonds have been maintained. There is a need for everyone in the community to work together once again to protect the environment. This would lead to strengthening the social power of the community through intergenerational interaction.

3) Working towards a lifestyle that could be passed on to generations 100 years from now, Living an Eco-friendly life does not mean you have to compromise on something. Reducing the environmental burden while pursuing a rich and high-quality life for everyone is possible. However, we must consider how to lead a rich and Eco-friendly life by reviewing our lifestyles.

2.2.1.2 Formation of sustainable national land and nature

Nature brings various benefits to our lives. The trees clean the air, and a river nearby lets us have cool evening air. It is necessary to protect and strengthen such working of nature. It is necessary to create an ecosystem network with associations and dispositions according to the manner of inhabitation and growth across Japan. There is a need to think of a mechanism that utilizes and supports the environment protected by social capital left by our predecessors and the activities of agriculture, forestry, and fisheries until now. Through such efforts, we must pass on a better national land for the future.

2.2.1.3 Enrichment of research and development and measures

To solve environmental issues, scientific clarification of their causes and mechanisms is needed. Science and technology's roles in taking steps toward the issues are also important. For this, we will further improve research and development. On the other hand, if we do not take any action on an issue that has uncertain points at the time, things may become irreversible later. For such problems, we take precautionary approaches based on the size of the problem.

2.2.1.4 The new role of the national government, local governments and citizens, and the promotion of their participation and collaboration

To protect the environment, each citizen, business, organization, local authority, and country must fulfill their respective roles while working together. For that reason, we all must think about how we will protect the environment together while actively exchanging information with each other.

2.2.1.5 Strengthening of efforts with international strategies

Many environmental issues can only be solved if people worldwide work together. There is a need to actively get involved in the efforts to solve such problems and formulate the rules.

2.2.1.6 Formulation of policy measures

Our present lifestyles may significantly impact others in the future, for example, regarding global warming. For instance, we must look at the problem in the long term, such as 50 years from now, imagine the vision of our society, and think about what we can do to realize it.

2.3 Specific implementation of environmental policies in the present quarter century

The government will give priority to the following ten fields for implementation, as show in Table 2.

Table 2 10 fields for environmental implementation

Fields	Issues	Description
Individual	Efforts for global warming issues	1. Absolute achievement of the 6% reduction commitment in the Kyoto Protocol 2. Future long-term and continual emission reduction (begin the work of setting up long-term goals) 3. Adaptation against unavoidable effects of global warming
	Efforts to establish a sound material cycle society	1. Creation of a socioeconomic system with less consumption of resources and high energy efficiency 2. Promotion of efforts incorporating the spirit of “Mottainai” and partnership

Fields	Issues	Description
		3. Internalization of the 3Rs concept in the manufacturing process 4. Development of the system for the proper circulative use and disposal of waste, etc.
	Efforts to secure a good air environment in urban areas	1. Securing a good atmospheric environment in order to ensure a wholesome and pleasant urban living environment 2. Transformation of business activities and lifestyle that cause little environmental burden as measures against air pollution and the heat land phenomenon, the building of environmentally sustainable city and transportation systems
	Efforts to secure an environmentally sound water cycle	1. Conservation and sustainable use of the water environment, including water quality, water quantity, aquatic life, and waterside areas, and creation of a prosperous community through contact with accessible water environments 2. Formation of a plan by regions that is consistent with water utilization and flood control 3. Maintenance and improvement of storage penetration and recharge performance throughout all basins 4. International dissemination of the efforts and contributions to solving the world's water problems.
	Efforts to reduce environmental risks from chemical substances	1. Information collection on hazard and exposure and promotion of scientific risk assessment. 2. Effective and efficient risk management from the viewpoint of reducing environmental risks throughout the lifecycle and precautionary approach. 3. Improvement of the understanding and trust of citizens on environmental risks by promoting risk communication. 4. Fulfillment of international obligations and active international contribution based on national experiences.
	Efforts for the conservation of biodiversity	1. Conservation of Ecologically important areas and establishment of nationwide ecological networks.

Fields	Issues	Description
		2. Enhancement of wildlife management and alien species control 3. Promotion of appropriate activities related to agriculture, forestry and fisheries, and conservation of rural landscapes.
Cross-cutting	Building a system where values of the environment are actively evaluated in the market	1. Promotion of the provision of environmental information on products and services and the disclosure of information on corporate efforts for the environment 2. Consideration of economic instruments 3. Improvement of the ability to make efforts for environmental conservation, such as the environmental management system. 4. Utilization of environmental investment such as SRI (Socially Responsible Investment) and government procurement. 5. Efforts with the international market in view.
	Promotion of fostering human resources and communities for environmental conservation	1. Develop human resources that take action for environmental conservation, such as promoting environmental education and learning coupled with activities. 2. Creating an organization and network for environmental conservation, such as promoting continual efforts as a community business. 3. Create communities that utilize the respective resources and characteristics, such as promoting activities and community vitalization.
	Improvement of infrastructure such as science and technology, environmental information, and policy methods with a long-term perspective	1. Intensive promotion of environment-related research and development. 2. Development of a foundation in which anyone can quickly obtain information required for environmental assessment. 3. Establishment and promotion of methods for environmental consideration in administrative measures such as strategic environmental assessment.

Fields	Issues	Description
		4. Presentation of a super long-term vision for 2050.
	Contribution for the formulation of international frameworks and rules	1. Vigorous contribution to creating a worldwide framework on the environment on global, regional, and multilateral levels and formulating the rules. 2. Spread of effective environmental management mechanisms for global environment conservation and sustainable development, mainly in Southeast Asia. 3. Promotion of the support for environmental conservation in developing regions and international research of the environment. 4. Securing partnerships with various stakeholders and infrastructure development of information and human resources.

Source: Ministry of the Environment, 2006

2.4 Case Study: Japan' s Waste Management

History of legal systems regarding the development of a sound material-cycle society (post-war period to the present) as show in Table 3

Table 3 History of environmental legal systems

Period	Major issues	Law enacted
Post-war period to the 1950s	1. Waste management for environmental sanitation 2. Maintenance of a healthy and comfortable living environment	Public Cleansing Act (1954)
1960s – 1970s	1. Increase in the amount of industrial waste and emergence of pollution problems as a result of rapid economic growth 2. Waste management for environmental protection	1. Act on Emergency Measures concerning the Development of Living Environment Facilities (1963) 2. Waste Management Act (1970) 3. Revision of the Waste Management Act (1976)
1980s	1. Promotion of the development of waste management facilities	1. Wide-area Coastal Environment Development Center Act (1981)

	2. Environmental protection required for waste management	2. Private Sewerage System Act (Johkasoh Law) (1983)
1990s	1. Waste generation control and recycling 2. Establishment of various recycling systems 3. Management of hazardous substances (including dioxins) 4. Introduction of a proper waste management system to cope with diversification in the type and nature of waste	1. Revision of the Waste Management Act (1991) 2. Act to Promote the Development of Specified Facilities for the Disposal of Industrial Waste (1992) 3. Japanese Basel Act (1992) 4. Basic Environment Act (1993) 5. Containers and Packaging Recycling Act (1995) 6. Revision of the Waste Management Act (1997) 7. Home Appliance Recycling Act (1998) 8. Act on Special Measures against Dioxins (1999)
2000-	1. Promotion of 3R measures aimed at the establishment of a sound material-cycle society 2. Enhancement of industrial waste management 3. Enhancement of illegal dumping regulations	1. Basic Act for Establishing a Sound Material-CycleSociety (2000) 2. Construction Recycling Act (2000) 3. Food Recycling Act (2000) 4. Revision of the Waste Management Act (2000) 5. Act on Special Measures concerning Promotion of Proper Treatment of PCB Wastes (2001) 6. Automobile Recycling Act (2002) 7. Act on Special Measures concerning Removal of Environmental Problems Caused by Specified Industrial Wastes (2003) 8. Revision of the Waste Management Act (2003 to 2006, 2010) 9. Small Home Appliance Recycling Act (2013)

Source: Ministry of the Environment, 2014

Table 3 explained that the many environmental problems and environmental movements in Japan. Then, Japan tried to promote establishing a sound material - cycle society in 1991 by revising the Waste Management Act; waste generation reduction was added as a purpose of the act, along with sorted collection and recycling of waste. Currently, Japan has many ways to manage and recycle waste from the household and industry sectors, as shown in Table 4. Moreover, Japan was successful in waste management, which Its trend to decrease as shown in Figure 3.

Table 4 Conclusion of solid waste management and recycling technology in Japan

Issues	Technology
Collection and Transport	Technology for efficient waste transport 1. Increased efficiency of wide-area collection and transport through transfer stations 2. Setting up transport station to streamline collection and transport operations 3. Fuel-efficient collection and transport vehicles with high load volume
Municipal waste incineration technology	Safe and sound municipal waste incineration 2 and high-efficiency power generation 1. Advanced ability to prevent pollution and high-efficiency power generation 2. Waste incineration facilities in residential and commercial areas 3. Solution to poisonous gas and dioxin emissions 4. New-Generation Incineration Technology such as changeover to new-generation incinerators, status of transition to high efficiency electricity generation. 5. Suitable Incineration Technology in the Asian Region
Medical waste disposal technology	Sanitary disposal technology with 3 high-environment preservation capability 1. Safe and appropriate disposal of medical waste 2. Diverse incinerators that control the generation of dioxins
PET bottle recycling technology	Technology to produce high-grade recycled PET resin and recycle products 1. Collection and recycling to make diverse products 2. Collection of PET bottles and handing them over to reproduction contractors

Issues	Technology
	3. Resource recycling technology to produce high quality products 4. System to efficiently collect PET bottles
Home appliance recycling technology	Technology for high quality recycling 5 that is ecologically safe 1. Home appliances can be a source of pollution if handled inappropriately, but become useful resources if handled in the right way 2. Home appliance recycling technologies in Japan focus on the effective utilization of resources and the safe treatment of hazardous material, and methods and operations becoming more and more sophisticated.
Biomass utilization technology	Technology to efficiently recover 6 electricity and fuel from biomass waste 1. Active use of biomass 2. Japan's concrete measures for food waste, etc 3. Law for promotion of Recycling and Related Activities for treatment of Cyclical Food Resources (Food Recycling Law) 4. Using energy generated from sewage sludge 5. Utilizing farming, forestry and paper industry biomass as energy
Waste landfill technology	Landfill disposal technology that enables 7 the stabilization of waste in a short time 1. Enabling early use of land with a semi-aerobic landfill structure 2. Waste landfill technology and system- Semi-aerobic Landfills

Source: Ministry of the Environment, 2012

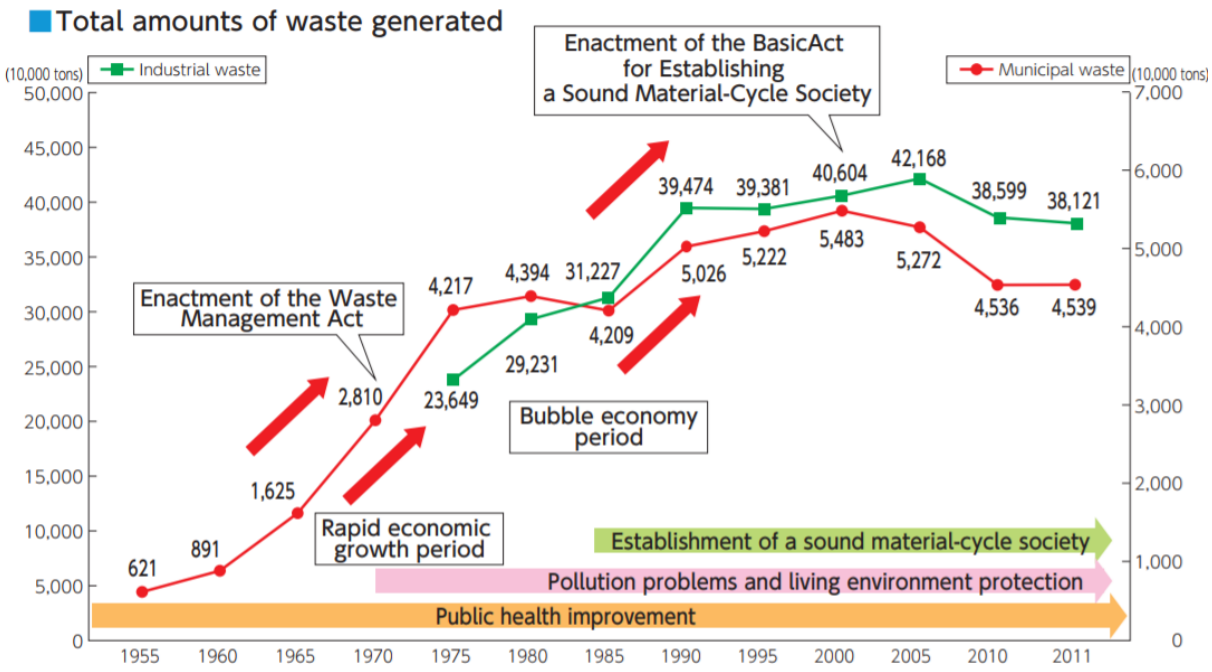

Figure 2 Amounts of waste generated in Japan

Source: Compiled from MOE, Waste Management in Japan

3. Strength and Weakness of Japan's Policy

From our analysis, environmental management in Japan found 5 things that are to be successful. First, its environmental policy was concrete and practical, and the public and private sectors cooperated. Second, Japan implants its people with environmental concerns through its primary to tertiary education system. Third, Its people's awareness of the importance of environmental issues and their strict practice result in the effectiveness of the policy. Fourth, Because of the disaster, people have learning, adaptation, and environmental protection. Last, Laws and regulations are strengthened - Home Appliance Recycle Law (HARL). Meanwhile, Weaknesses in environmental management in Japan found two things. The limit of assets or topography, lack of natural resources, and the risk of disasters have affected the loss of resources. There is no effective management of environmental emergencies, but they arise from unexpected situations like the explosion of the nuclear reactors in Fukushima.

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