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Origins of Global Environmental Policy in Japan: Contributions of Saburō Ōkita and His Followers

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Abstract

In this paper, I explore the origins of global environmental policy in Japan, focusing on the interaction of the global trend and the transition of the Japanese society, contributions of key figures such as Saburō Ōkita (1914-1993) and his followers. First, I provide an overview of the evolution of Japan's environmental situation using under-utilized data, including that compiled by the United Nations Environment Programme (UNEP). Then, I examine the emergence of global environmental policy in and after the early 1970s and Japan's participation in the issue, focusing on Ōkita 's activities as a key player. Finally, I explore Japan's leading role in the global environmental policy through the 1980s. I found that, despite a temporary retreat in domestic regulations, the shift in the conceptual framework of environmental policy during this period had a far greater impact on Japan's transformation from a focus on material growth to a focus on the quality of people's lives. During the process, personal networks among leading figures, such as Ōkita and his followers, played a pivotal role in policy initiatives in both the national and global arenas. Japan's experience in the 1970s and 1980s highlights the importance of addressing challenges requiring structural changes to the domestic economy and society rather than avoiding them.

1, Introduction

In February 2026, the second Trump administration attacked Iran, triggering the blockage of the Hormuz Strait and the shutdown of oil exports from the Persian Gulf. This event sheds new light on the two oil crises of the 1970s and the subsequent global economic turmoil of the 1980s. Japan was one of the countries worst affected by the oil crises due to its high dependency on oil. The country experienced fundamental structural changes in its economy and society. One of the main consequences for Japan was shifting from an energy-dependent economy to an energy-saving one (Kondo, 2011).

From a long-term perspective, modern Japan's environmental problems and government policies date back to the late nineteenth century, when the country began modernizing its industries. The rapid economic growth following World War II further strained the relationship between industrial development and the environment. In the 1970s and 1980s, Japan began to adopt a global perspective on environmental issues (Table 1). The two oil crises of the 1970s greatly impacted this shift in perspective.

Table 1. Chronology of the global environmental policy in Japan

Year	World	Japan
1965	Adlai Stevenson II uses the phrase of spaceship earth in his speech.	
1967		The Basic Law for Environmental Pollution Control was enacted.
1968	The Club of Rome was established.	
1969		Ōkita Saburō, Ōshima Keiichi and Kobayashi Kōji join the Club of Rome.
1971		The Environmental Agency was established.
1972	*Limits to Growt*h was published. U.N. Conference on Human Environment was held in Stockholm.	
1980	*The Global 2000 Report to the President* was published.	Ad Hoc Group on Global Environmental Problems was established. *Okita Report* of the Ad Hoc Group was presented at the OECD and distributed at the U.N.
1982	Governing Council of the U.N. Environment Program issues the Nairobi Declaration, calling for global action.	Hara Bunbei, the Director General of the Environmental Agency, proposed establishing a special commission on global environmental issues.
1987	The World Commission on Environment and Development (WCED) releases *Our Common Future*.	WCED held the last meeting for the preparation of its report in Tokyo.
1992	The Earth Summit (U.N. Conference on Environment and Development) was held in Rio de Janeiro.	
1993		The Basic Environment Law was promulgated.
1997	Kyoto Protocol was adopted.	
2015	Paris Agreement was adopted.	

(Sources) Quality of the Environment in Japan 1993, the Environmental Agency; Ministry of Environment; Kitagawa (2022).

In this paper, I explore the origins of global environmental policy in Japan, focusing on the interaction of the global trend and the transition of the Japanese society, contributions of key figures such as Saburō Ōkita (1914-1993) and his followers. First, I provide an overview of the evolution of

Japan's environmental situation using under-utilized data, including that compiled by the United Nations Environment Programme (UNEP). Second, I examine the emergence of global environmental policy in and after the early 1970s and Japan's participation in the issue, focusing on Ōkita 's activities as a key player. Third, I explore Japan's leading role in the global environmental policy through the 1980s.

In the conventional argument, Japan's environmental policy retreated during and after the two oil crises in the 1970s and the 1980s (Ōtsuka 2020). Although environmental regulations were introduced from the late 1950s through the early 1970s in response to environmental movements against pollution and health problems during the period of high economic growth, those regulations were loosened in order to address the distressed business conditions of industries during and after the oil crises. For instance, the nitrogen dioxide (NO_2) emission standard was lowered in 1978. The Environmental Impact Assessment Bill, submitted to the Diet in 1981, was withdrawn in 1983 due to opposition from the industrial sector. The law was finally enacted in 1997 under the Framework Act on the Environment, which was enacted in 1993.

Recent studies challenge the conventional view by arguing that Japan began taking the lead in global environmental governance despite its domestic challenges (Kitagawa 2022; Metzler 2026). These studies emphasize Japan's leadership in establishing the World Commission on Environment and Development (WCED), which introduced the concept of sustainable development. Against this backdrop, I will present a comprehensive framework to understand the transformation of Japan's environmental policy. In doing so, I will focus on how leading figures expanded their views from national/local to global perspectives and how Japan transitioned its economy from material growth to improving the quality of people's lives.

2. Global Trend of Environmental Policy

2.1. Environmental Problems in Modern Japan

Modern Japan's environmental problems and government policies date back to the late nineteenth century, when the country began modernizing its industries. During the early stages of industrialization, the government and society prioritized development over the environment. Water and soil pollution along the Watarase River, for example, highlighted the tension between industrial development and the natural environment. The pollutants originated from the Asio copper mine, which produced one-third of the country's copper at the time (Shoji and Sugai 1992; Huffman 2010).

The high growth following WWII heightened the tension between industrial development and the environment (Hoshino, 1992). During the 1960s and 1970s, Japan witnessed the negative consequences of rapid growth, including environmental pollution and a decline in the quality of life for its citizens. Four major court rulings on pollution upheld the plaintiffs' claims and condemned the defendant corporations' and the government's administrative branch's unfulfilled responsibilities. In response, the government passed the Basic Law on Environmental Pollution Control in 1967 (amended in 1970) and the Air Pollution Control Law in 1970. It also established the Environment Agency in 1971. People, especially those in urban areas, suffered from photochemical smog, noise pollution, increased traffic accidents, and crime. Deteriorating working conditions, such as long hours, a grueling workload, and a poor working environment, became an issue. However, until the early 1970s, public interest and government responses to environmental issues in Japan were largely local and lacked a global dimension.

2.2. *The Limits to Growth* and the UN Conference on the Human Environment in 1972

The global environmental agenda, particularly the issue of natural resource constraints, dates back to Thomas Malthus's seminal work *An Essay on the Principle of Population* (1798). Meanwhile, the use of underground mineral resources was believed to solve this problem (Jevons, 1844). Two waves of the Industrial Revolution enabled humankind to achieve massive economic growth by using mineral resources. The first wave started in the 1770s with the introduction of the steam engine and coal, and the second wave started in the 1890s with the introduction of the internal combustion engine and petroleum (Metzler, 2026).

In the late 1960s and early 1970s, scientists and politicians around the world began to use the metaphor of "Spaceship Earth" to symbolize the finite nature of natural resources. In 1965, for

example, Adlai Stevenson II, the U.S. ambassador to the United Nations, gave a speech in which he said: "We travel together, passengers on a little space ship, dependent on its vulnerable reserves of air and soil."[1] The economist Kenneth Boulding pointed to the need for a paradigm shift from the reckless wastefulness of classical economics, which he called "cowboy economics", to the efficiency required by the economics of resource constraints (Boulding 1966; Deese 2009).

The year 1972 marked a watershed in global environmental policy with two major events: the publication of the seminal work *The Limits to Growth*, sponsored by the Club of Rome, and the United Nations Conference on the Human Environment in Stockholm.[2]

The Club of Rome was founded in 1968 as an informal group of individuals at the initiative of Dr. Aurelio Peccei, an Italian industrial manager and economist, to discuss the present and future predicament of humankind. The Club asked a team of system dynamics researchers to study the complex issue of global challenges. The team examined the five fundamental factors that determine and ultimately limit growth on this planet: population, agricultural production, natural resources, industrial production, and pollution. The team presented a report to the Club in 1972 entitled *The Limits to Growth*. The Club approved and published the report. The report proposed a path toward a world system that is sustainable without sudden and uncontrollable collapse and capable of meeting the basic material needs of all people.

Though their argument was controversial and their assumptions were criticized as oversimplified, the biggest contribution of the Club of Rome to the whole world was to successfully visualize the future of the global ecosystem and set the agenda for global discussions (Weizsäcker1990).

The Stockholm Conference was the first world conference to focus on the environment. It was attended by delegations from governments and international organizations, as well as non-governmental organizations (NGOs). Key figures from the Club of Rome also attended as advisors to their national delegations. The "unofficial" report commissioned by the Secretary-General of the United Nations, *Only One Earth: The Care and Maintenance of a Small Planet*, contained progressive ideas on environmental issues such as global warming and ozone depletion (Ward and Dubos 1972). The conference sparked a heated debate on the trade-off between economic development in developing countries and the preservation of the global environment, which remains a major issue today. One of the major outcomes of the Stockholm Conference was the establishment of UNEP.

3. Japan's Participation in the Global Environmental Policy

3.1. Saburō Ōkita and the Club of Rome

Saburo Ōkita (1914-1993) was a prominent economist in public and private institutions with an exceptional international career in his generation. Born in Dalian, Japanese concession in China, he graduated from Faculty of Engineering at Tokyo Imperial University in 1937 with a major in electrical engineering, joined the Ministry of Communications, and served in the development of power sources. In 1939, he was assigned to the Asian Development Bureau and sent to its Beijing office. In 1942, he returned to Tokyo and was transferred to the Research Division of the Ministry of Great East Asia, where he served until the end of World War II. He resumed his post-war career in the Research Bureau of the Ministry of Foreign Affairs in 1945 and joined the Economic Stabilization Board (later the Economic Council Agency and Economic Planning Agency) as head of the Research Division in 1947. After attending the 7th and 8th Conferences of the United Nations Economic Commission for Asia and the Far East (ECAFE) in 1951-1952, he served as Head of the Economic Analysis Division of ECAFE in Bangkok in 1952-1953. In 1954, he returned home and became head of the Economic Cooperation Division of the Economic Council Agency. In 1957, he was appointed Director General of the Planning Division of the Economic Planning Agency (EPA) in charge of long-term economic plans, and drafted and obtained approval for the National Income Doubling Plan of 1960, the blueprint for Japan's high growth. In 1963, he retired from the EPA and became president of the newly

[1] Illinois State University Stevenson Center website: https://stevensoncenter.org/about/stevenson/ (accessed on January 5, 2025).

[2] United Nations website: https://www.un.org/en/conferences/environment/stockholm1972 (accessed on January 5, 2025); Björk (1996).

established Japan Center for Economic Research (JCER).

With the freer position as an independent economist in the private institution, Ōkita became actively involved in the international sphere. He was a member of the United Nations Committee on Development and Planning (1965-80), a member of the World Bank's Commission on International Development (1968-69), a member of the Organization for Economic Cooperation and Development's High-Level Expert Group on Science Policy (1970-71), and a member of the Executive Committee of the Club of Rome (1970-1974).

Three Japanese members participated in the Club of Rome from the early stage: Ōkita, Keiichi Ōshima (1921-1988) and Kōji Kobayashi (1907-1996). Ōshima graduated from Faculty of Engineering, Tokyo Imperial University in 1941 with a major in applied chemistry, then pursued a career in academia specializing in nuclear engineering, and became a full professor at the University of Tokyo in 1961. Kobayashi graduated from Faculty of Engineering, Tokyo Imperial University in 1929 with a major in electrical engineering, joined the NEC Corporation, one of Japan's leading electronics companies, and became the president in 1964. Although they had different careers after graduating, they shared a common academic background of engineering.

Ōkita became acquainted with Peccei through Alexander King, a key founding member of the Club of Rome and a senior official of the OECD, in Paris in 1969. King and Ōkita first met in 1965 when King visited Tokyo to discuss Japan's science and technology systems. King later recalled that they had exchanged views on social and environmental issues beyond economic growth. When Peccei and King were forming the Club in 1968-1969, King recommended that Peccei recruit Ōkita as a member of the Club (King 1994: 504).

During 1969-1972, Ōkita devoted himself to the Club of Rome. He frequently attended their executive meetings and informal gatherings from time to time and acted as one of core members of the Club. At the same time, Ōkita and his colleagues in Japan formed a working group for the Club. The members of the working group included Ōshima; Yōichi Kaya (born 1934), a junior of Ōkita's and Ōshima's from university who majored in electrical engineering, an assistant professor at the University of Tokyo, and eventual successor of Ōkita on the Club's Executive Committee (1974-1992)[3]; Kenzo Tange (1913-2005), a renowned architect; and Tsutomu Tanaka (born 1936), a subordinate of Ōkita at EPA who studied in the Netherlands and worked for the OECD at Ōkita's recommendation. Tanaka translated *The Limits to Growth* into Japanese while under the supervision of Ōkita (Kitagawa 2022: 115-117). The working group met regularly throughout the 1970s and 1980s, suggesting that they were a driving force behind Japan's leadership in global environmental policy[4].

In June 1972, when the UN Conference on the Human Environment was held in Stockholm, Ōkita and other members of the Japanese working group of the Club attended as advisers to the Japanese delegation. Prior to the conference, he promoted the Club and the report both internationally and domestically. *The Limits to Growth* was published almost simultaneously in English and Japanese. In the Japanese edition, he says:

> When we wrote the report, I strongly argued that growth in developed countries should slow down, while aid should be expanded to boost growth in developing countries so that they can reach at least a decent standard of living as quickly as possible, so that the current situation in less developed countries does not become entrenched.
>
> It goes without saying that improving the material living standards of low-income groups within a country remains an urgent need. Since this book is a first attempt at a global approach, it does not dwell on these points, but it is a point that must not be forgotten. There is a risk that the anti-growth argument developed here will be perceived as a luxury of the materially well-off upper class to protect the environment and nature, but this is not our intention. (Japanese edition: 2-3, author's translation)

3.2 The Impact of the Oil Crises

[3] Kaya later recalled that he was invited by Ōshima to the working group (Kaya 2018a).

[4] Ōkita's diary records the meeting up to December 9, 1991 (Ōkita Documents, No. 219: Loose-leaf 92.5).

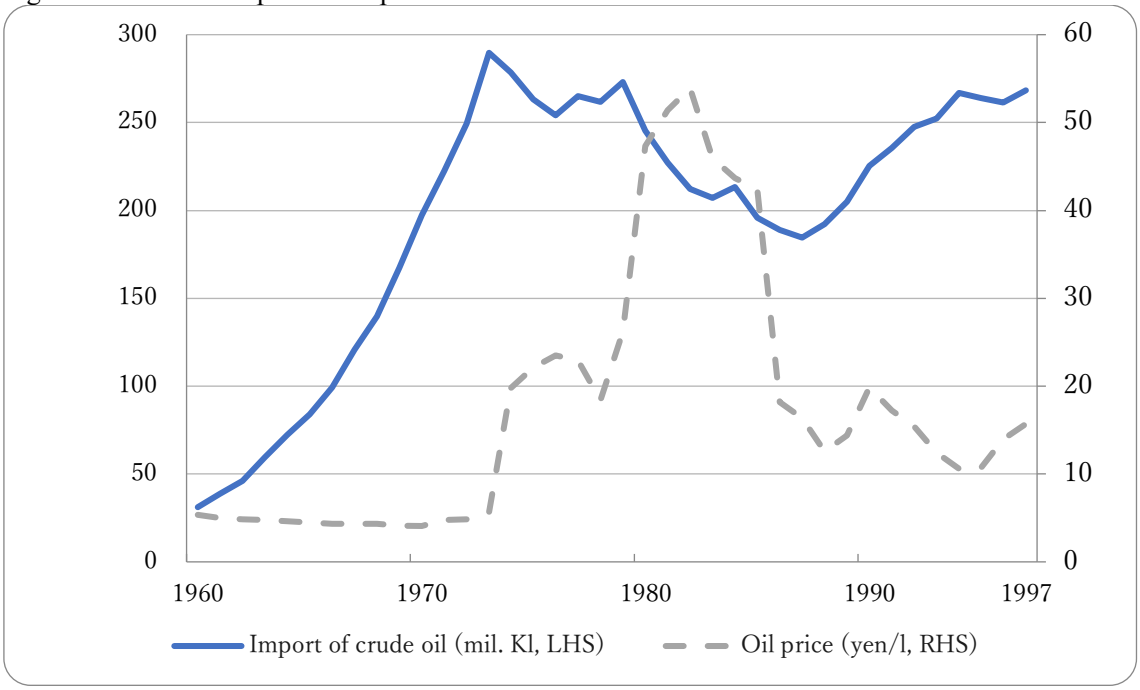
One year after the Stockholm Conference, Japan faced a serious energy problem upon the first oil crisis of 1973. Dependent on imported oil from the Middle East, the Japanese economy was affected by skyrocketing oil prices and shortages in oil imports, experiencing double-digit CPI inflation and negative GNP growth. Just as the Japanese economy was recovering from the first oil crisis, it was hit by another in 1979.

As the first response to the oil crisis of 1973, the Japanese government dispatched a special delegation to the Middle East headed by Takeo Miki (1907-1988) accompanied by Ōkita. They made a remarkable success in negotiating oil supply with oil-producing countries in the region, compensating for developmental aid to these countries. Miki expressed an independent position of Japan from the United States and major oil companies. Ōkita explained to leaders of the Middle East about post-war economic cooperations and advanced technologies of Japan to be used for development of the region. This experience reassured Ōkita of the scarcity of natural resources and the vulnerability of economy of Japan in terms of energy and environmental problems.

In the medium to long term, oil-dependent industrialized countries dealt with oil crises by pursuing conservation measures and developing alternative energy sources. The course of events differed by country due to various factors, including oil price, technology, and domestic and international politics (Santese 2018). Japan's heavy dependence on petroleum from the Middle East and its unique position as the only country to be attacked with an atomic bomb during WWII made its response distinctive.

In retrospect, throughout the 1970s and early 1980s, Japan transformed its economy and society from heavily-oil-dependent and energy-consuming to less-oil-dependent and energy-efficient in response to the two oil crises. Japan’s industrial structure shifted from oil-dependent material industries to high-tech processing and assembly industries. Japanese consumers preferred energy-saving products that were "light, thin, short, and small." These market-driven changes in the private sector increased the value of Japanese products and the non-price competitiveness of the Japanese industries. As a result, "Made in Japan" became a global brand indicating good quality at relatively low prices (Kondo 2011). From an environmental standpoint, the Japanese economy and society took their first steps toward sustainable development.

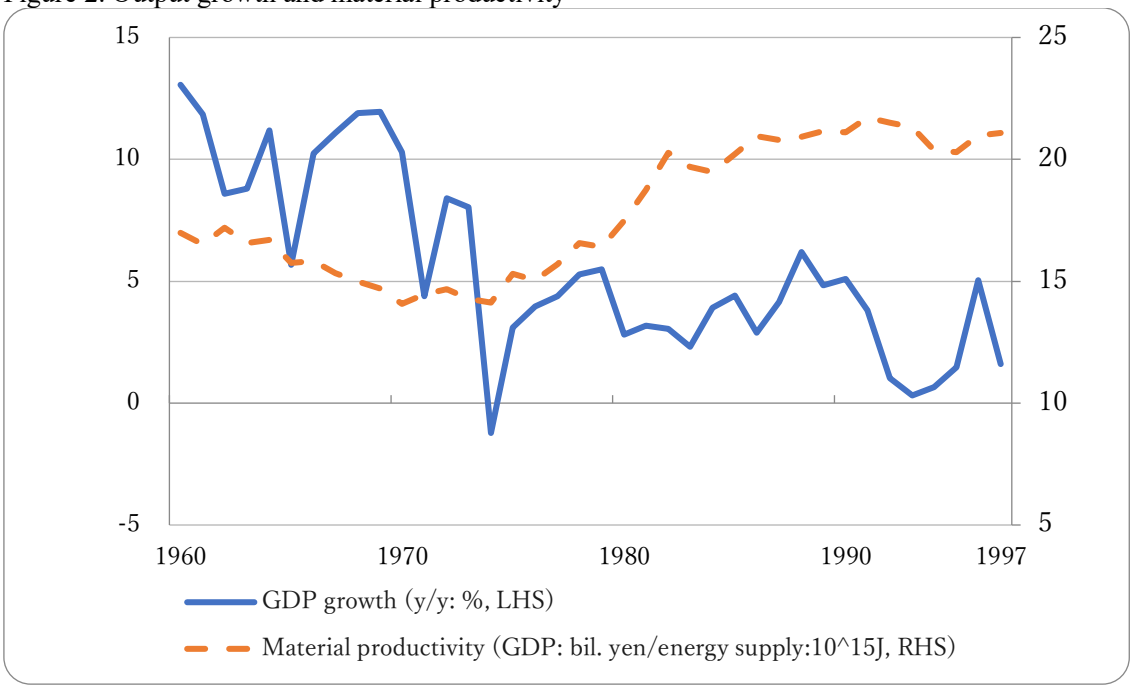
Figure 1. Volume and price of imported crude oil



(Source) Trade Statistics, Ministry of Finance.

Figure 1 shows the volume and price of imported crude oil. The oil price was around four to five yen per liter, and the volume of oil imports steadily increased during the period of high growth up to 1973. During and after the first oil crisis, the price of oil increased to over 20 yen per liter, and oil imports decreased from 1974 to 1976. During and after the second oil crisis, the oil price increased further to over 50 yen per liter by 1983, and oil imports decreased through 1987. Although the oil price fell during the second half of the 1980s, staying between 10 and 20 yen per liter through 1998, oil imports never surpassed the 1973 peak. These price and volume changes indicated a market-driven transition toward an energy-saving economy.[5]

Figure 2. Output growth and material productivity



(Sources) International Trade Statistics, Ministry of Finance; National Accounts, Cabinet Office; Integrated Energy Statistics, Agency for Natural Resources and Energy.

Figure 2 shows Japan's annual output growth rate over the previous year, as well as a "material productivity" indicator measured by the amount of real GDP produced with a unit of the primary energy supply. In 1960, the Japanese economy produced 17 yen of GDP (in 1990 prices) with each unit of primary energy source (a million Joule). From 1961 to 1973, the Japanese economy grew by 9 percent annually, while the primary energy supply increased by 11 percent annually, literally fueling the high growth. However, the Japanese economy became less "materially productive" between 1960 and 1973 because it needed more energy to produce the same value of output; it produced only 14 yen of GDP with each unit of primary energy source in 1973 compared to 17 yen in 1960.

Two oil crises reversed this trend. Between 1973 and 1988, the Japanese economy became more "materially productive." In 1988, it produced 21 yen of GDP with each unit of primary energy. This was achieved mainly through two changes. First, there was a shift in industrial production from energy-intensive sectors, such as petrochemicals and metals, to energy-saving sectors, such as machinery and services. Second, there were product innovations within industries that favored "light, thin, short, and small" items.

[5] Though imported crude oil isn't the only energy source for the economy, it has been essential to economic growth in the 20th century. Japan relies almost entirely on imports for its oil consumption.

Table 2 shows the breakdown of real GDP by sector in 1973, 1988, and 1997.[6] The manufacturing sector's share remained unchanged between 1973 and 1988. However, the petrochemical and metal sectors' shares decreased, while the machinery sector's share increased. During this period, the share of construction decreased, while the share of trade and finance increased. Overall, the share of energy-intensive sectors decreased, while energy-saving industries increased. Though the situation was somewhat mixed between 1988 and 1997, energy-intensive sectors did not revive.

Table 2. Percentage breakdown of real GDP by sector

	1973	1988	1997	Percent-point change	
				1973-1988	1988-1997
1. Industries	91.6	93.7	95.2	2.1	1.5
1) Agriculture, forestry and fishing	4.8	2.7	1.9	-2.1	-0.8
2) Mining	0.5	0.3	0.2	-0.2	-0.1
3) Manufacturing	27.3	27.3	28.4	0.0	1.1
a. Foodstuffs	4.4	3.0	2.5	-1.4	-0.5
b. Fiber	1.0	0.7	0.4	-0.3	-0.3
c. Pulp and Paper	0.8	0.7	0.6	-0.1	-0.1
d. Chemistry	1.1	2.0	2.4	0.9	0.4
e. Petroleum and Coal Products	3.6	1.0	1.0	-2.6	0.0
f. Ceramics and Earthenware Products	1.6	1.1	0.9	-0.5	-0.2
g. Steel	2.6	1.8	1.7	-0.8	-0.1
h. Non-ferrous metals	0.7	0.5	0.6	-0.2	0.1
i. Metal Products	2.0	1.6	1.6	-0.4	0.0
j. General Machinery	2.0	3.4	3.0	1.4	-0.4
k. Electrical Machinery	0.5	3.7	7.5	3.2	3.8
l. Transportation Machinery	2.0	2.7	2.3	0.7	-0.4
m. Precision Machinery	0.2	0.5	0.4	0.3	-0.1
m. Clothing and Personal Items	0.9	0.6	0.3	-0.3	-0.3
o. Lumber and Wood Products	0.4	0.4	0.2	0.0	-0.2
p. Furniture	0.6	0.4	0.3	-0.2	-0.1
q. Printing and Publishing	1.7	1.3	1.1	-0.4	-0.2
r. Leather and Leather Goods	0.1	0.1	0.1	0.0	0.0
s. Rubber Products	0.3	0.3	0.3	0.0	0.0
t. Miscellaneous Manufacturing	1.0	1.3	1.2	0.3	-0.1
4) Construction	12.4	9.7	8.7	-2.7	-1.0
5) Electricity, gas and water supply	2.3	2.6	2.8	0.3	0.2
6) Wholesale and retail trade	9.9	13.1	13.0	3.2	-0.1
a. Wholesale trade	5.2	7.7	8.1	2.5	0.4
b. Retail trade	4.7	5.4	4.8	0.7	-0.6
7) Finance and insurance	3.4	5.9	5.2	2.5	-0.7
8) Real estate	9.9	11.2	12.0	1.3	0.8
9) Transport, Information and communications	7.0	6.5	6.6	-0.5	0.1
a. Transport	5.7	5.0	4.4	-0.7	-0.6
b. Information and communications	1.3	1.5	2.2	0.2	0.7
10) Other Servise Activities	14.2	14.5	16.5	0.3	2.0
2. Government Service Providers	9.0	8.3	7.3	-0.7	-1.0
3. Private Nonprofit Service for Households	1.8	2.1	2.2	0.3	0.1
4. Adjustment	-2.4	-4.1	-4.7	-1.7	-0.6
Total	100.0	100.0	100.0	-	-

(Source) National Accounts, Cabinet Office

There were a number of anecdotes for product innovations of "light, thin, short, and small" items. Japanese manufacturers in the electronics and automobile industries introduced inexpensive, high-quality, compact items to the global market. For example, Sony began selling its portable stereo cassette player, the Walkman, in 1979. Honda introduced its compact car, the City, in 1981[7]. These

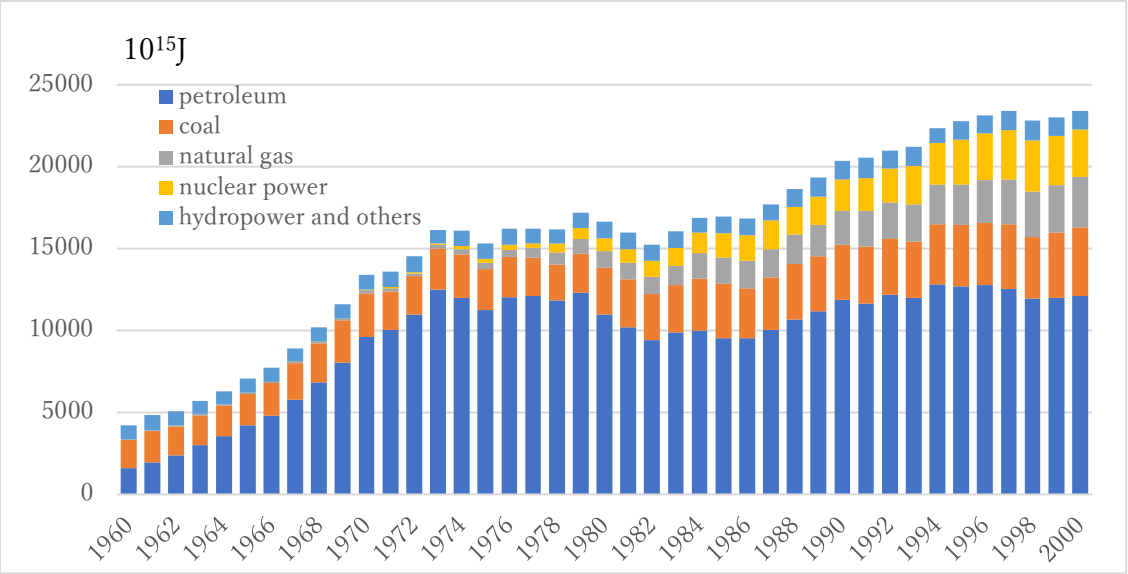
[6] These three years marked turning points in the trend of the Japanese economy and the "material productivity" indicator. The first oil crisis began in 1973, the bubble period peaked in 1988, and the Heisei financial crisis began in 1997.

[7] Nikkei Business (1982).

products met consumers' preference in both domestic and overseas markets, establishing the "Made in Japan" brand as an indicator of high quality.

Japan was also moving forward with alternative energy resources. In 1974, the government launched the Sunshine Project, a research and development plan focusing on alternative energy sources, including renewable energies such as solar, geothermal, wind, and ocean energy. However, immature technology and high costs hindered their implementation (Basosi 2018). Consequently, nuclear energy was considered a potential alternative to petroleum. As the only country to have experienced an atomic bomb attack, Japan has been committed to the non-proliferation of nuclear weapons and has focused on the peaceful use of nuclear energy, restricting its use to non-military applications (Conners and Trushin 2018; Takeda 2018). Despite incidents involving nuclear power plants, such as the Three Mile Island accident in 1979 and the Chernobyl disaster in 1986, Japan steadily increased its dependency on nuclear power throughout the 1970s, 1980s, and 1990s (Figure 3).

Figure 3. Primary energy supply by source



Source: Integrated Energy Statistics, Agency for Natural Resources and Energy.

The White Paper of the Environment Agency (now Ministry of the Environment), *Quality of the Environment in Japan 1988*, proudly declared: "As a major economic power, Japan has a significant impact on the global environment and bears great responsibility for the future of the planet. At the same time, Japan possesses strong economic and technological capabilities, as well as extensive experience and expertise in environmental conservation. This gives Japan the potential to contribute to the preservation of the global environment." [8]

3.3. Overview of the Use of Natural Resources in Japan after the First Oil Crisis of 1973

Although GDP per unit of imported oil is an indicator of "material productivity" from the 1960s to the 1990s, it is not comprehensive. In this regard, UNEP publishes the Global Material Flow Database (GMFD), which provides comprehensive information on the use of natural resources by countries and regions. The GMFD classifies natural resources into four categories: biomass, fossil fuels, metal ores and non-metallic minerals. For Japan, we can obtain reliable data from 1973.[9] The GMFD's framework follows the Kaya Identity procedure, which was introduced by Yōichi Kaya. We will return to this

[8] Website of Ministry of the Environment: https://www.env.go.jp/policy/hakusyo/s63/index.html (accessed on June 27, 2026)

[9] Although the data for Japan begins in 1970, some components are missing up to 1972.

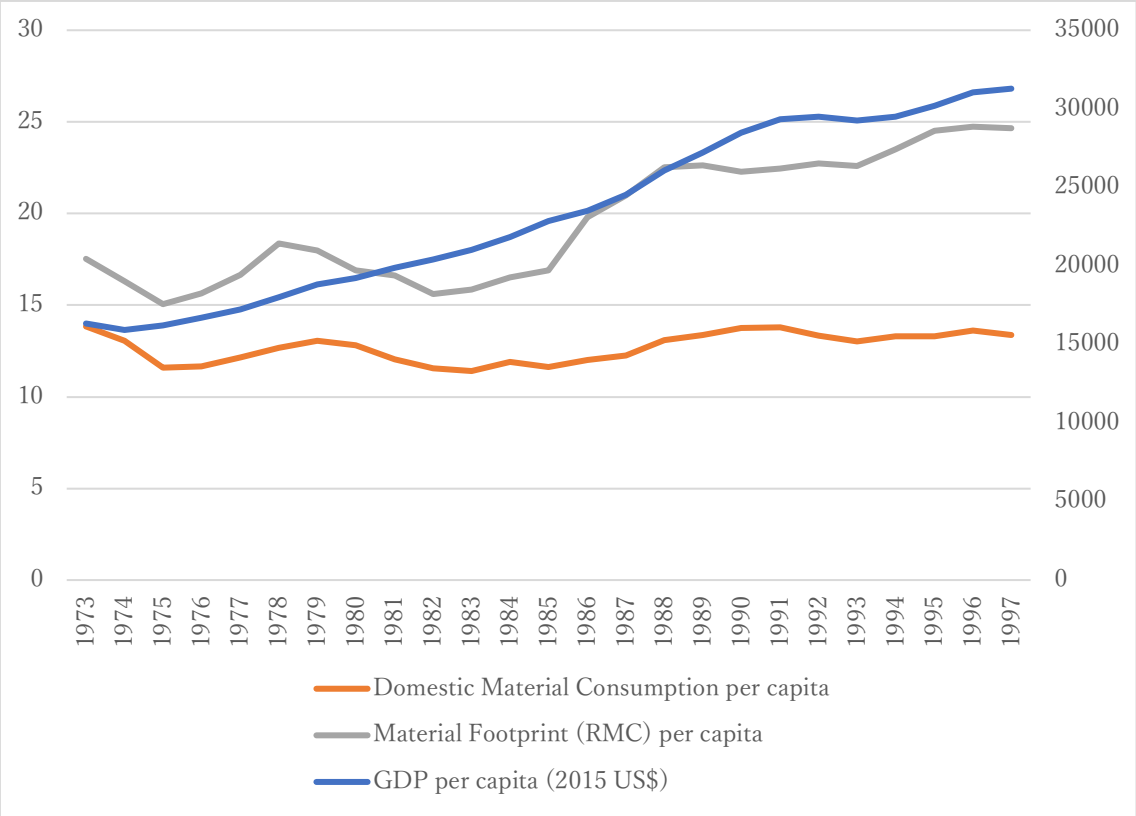
topic later in the paper.

According to the GMFD, statistics on domestic material consumption (DMC) show that the average Japanese resident consumed 13.1 tons of natural resources in 1988. This was a 5 percent reduction from 13.8 tons in 1973 and a 3 percent reduction from 13.4 tons in 1997. Meanwhile, GDP per capita (in terms of 2015 USD) increased by 1.88 times from 13,863 USD in 1973 to 26,063 USD in 1988, and by 2.26 times to 31,283 USD in 1997 (Figure 3).

In 2021, UNEP began publishing a new dataset called the Material Footprint (MF) as an extension of the Material Flow Accounts. The newly introduced MF statistics provide a view of a nation's material consumption that, unlike DMC, fully accounts for the extraction of resources in other countries that are used for local consumption, as well as the domestic extraction of resources that are ultimately used for consumption in other countries.

According to the MF data, the average Japanese resident consumed 22.5 tons of natural resources in 1988. This figure is up 29 percent from the 17.5 tons consumed in 1973 (Figure 4).

Figure 4. Energy Consumption and GDP per capita

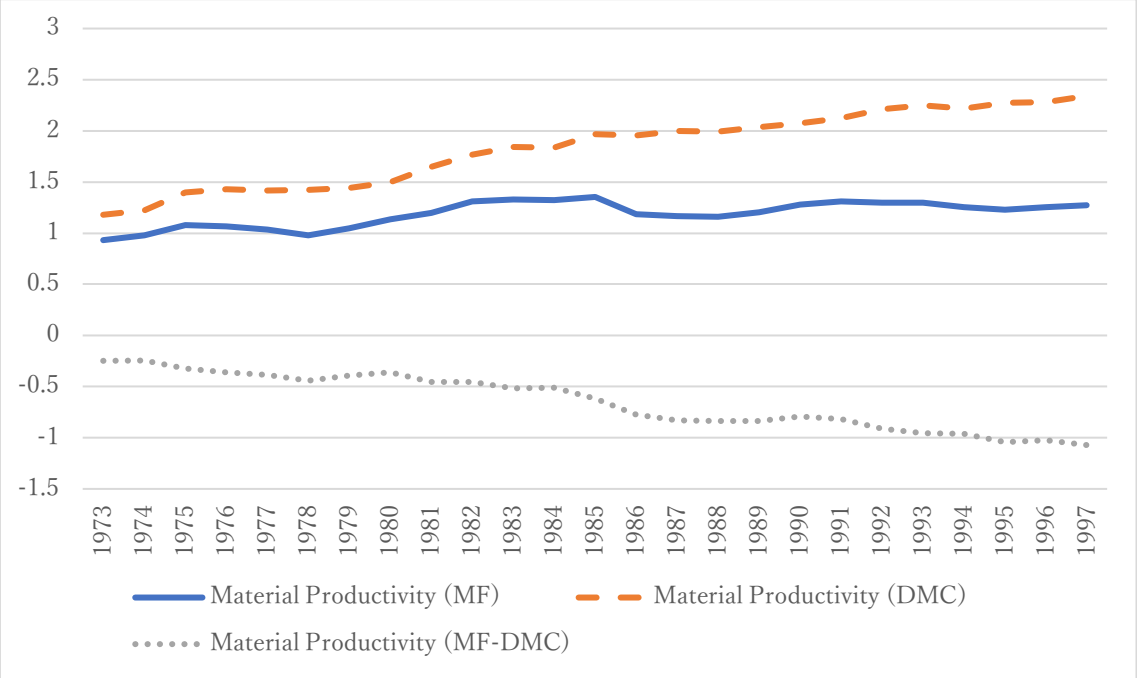


(Source) GMFD

Both DMC and MF data show a high dependence of Japanese society and economy on overseas resources, while a major difference between DMC and MF is mainly in the treatment of extraction of resources in other countries used for local consumption. When domestically consumed products (goods and services) are produced abroad, the MF fully accounts for the resources used to produce them, while the DMC only accounts for the physical imports of goods and services.

We can obtain material productivity in terms of total material input, not only imported oil, by dividing output by either DMC or MF. Using DMC as the denominator shows continuous improvement in material productivity from 1973 to 1997. Using MF shows a more nuanced picture: improvement from 1973 to 1985, followed by stagnation from the second half of the 1980s through 1997 (Figure 5).

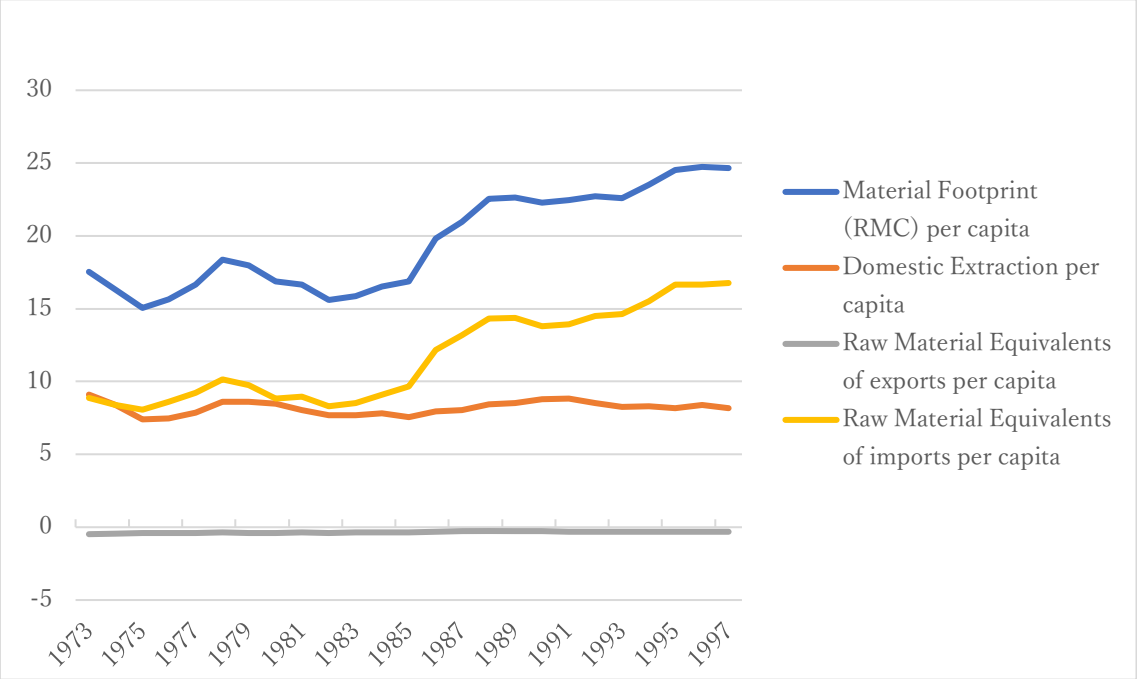
Figure 5. Material Productivity (USD/kg)



(Source) GMFD

The difference in material productivity between DMC and MF is largely due to the raw material equivalents of imports. The raw material equivalent of imports per capita increased from 9.1 tons in 1984 to 14.4 tons in 1989 during the second half of the 1980s (Figure 6). This increase is consistent with Japan's macroeconomic transition from export-oriented growth to domestic demand-led growth and the outsourcing of production sites to emerging Asian economies.

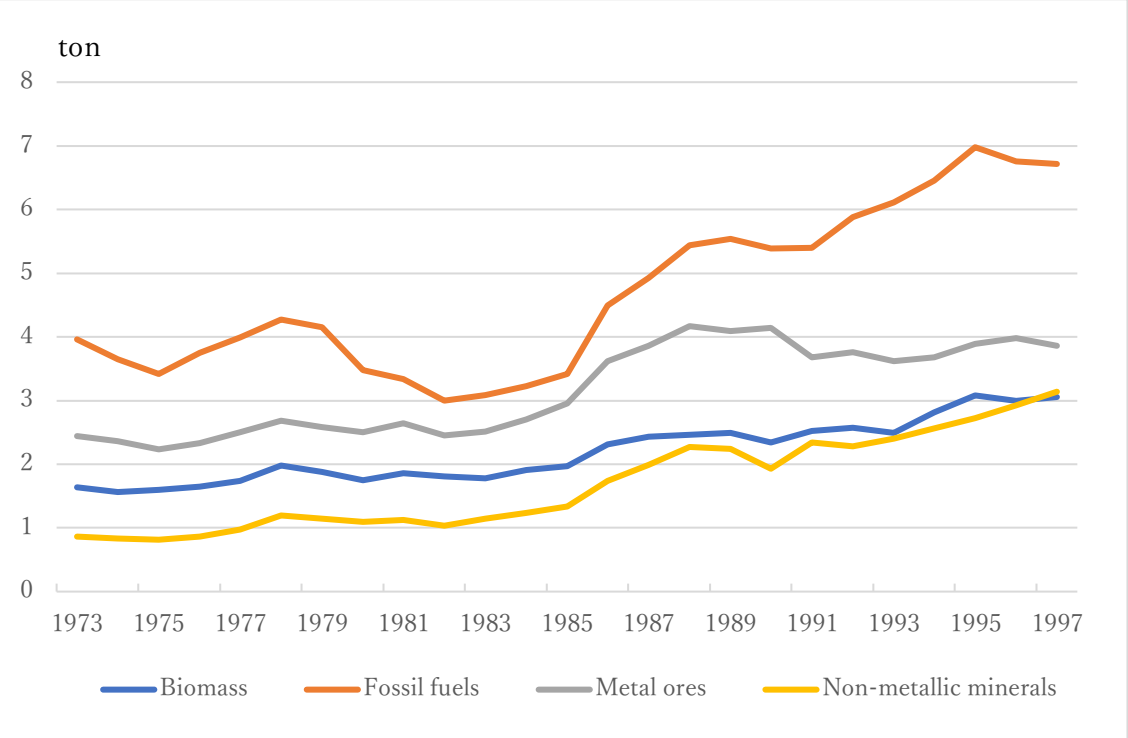
Figure 6. Breakdown of Material Footprint per capita



(Source) GMFD

Figure 7 shows the breakdown of per capita commodity equivalents of imports. The fossil fuel equivalent of imports remained at a level of 3-4 tons during the 1970s and early 1980s, with a low of 3.0 tons in 1882, increased steadily during the second half of the 1980s and the first half of the 1990s, reaching a peak of 7.0 tons in 1995.

Figure 7. Breakdown of Raw Material Equivalents of Imports



(Source) GMFD

The GMFD data show that Japan has been on a path towards a resource-saving society, which has been challenged by external shocks such as two oil crises and ongoing globalization. The data suggest that Japanese society and economy adapted to the oil crises by reducing domestic consumption and imports of fossil fuels.

The transformation was a combination of Japanese industries' reactions to external shocks and their deliberate efforts toward saving natural resources and preserving the environment. As we have seen, during the 1970s and 1980s, industries mainly reacted to external shocks, such as oil crises, through the market mechanism. Starting in the 1990s, the government introduced environmental regulations and facilities to promote sustainable development (Arimura and Hibiki 2023, 107-239).

4. Japan's Leadership in Global Environmental Policy

According to the conventional view, Japan's environmental policy was set back in the 1970s and 1980s due to two oil crises. In 1978, the Environment Agency relaxed its regulations on nitrogen dioxide. Then, in 1983, the long-awaited Environmental Impact Assessment Bill was withdrawn (Ōtsuka 2020: 14–15). However, Kitagawa (2022) challenges this view, arguing that Japan began to demonstrate leadership in global environmental policy on the international stage. He emphasizes the roles of Ōkita and Tanaka as key figures.

In the 1980s, Ōkita was deeply involved in a series of events and influential commissions on both the international and domestic fronts. Throughout his later career, he pursued the preservation of the global environment and the improvement of people's quality of life. His activities included President of the Overseas Economic Cooperation Fund (1973-77), Chairman of the Integrated Research Group of the Pacific Rim under Prime Minister Masayoshi Ōhira (1979), Foreign Minister

in the Ōhira Cabinet (1979-1980), Government Representative for Foreign Economic Relations (1980-81), member of the World Commission on Environment and Development (WCED, 1983-1987), and member of the Research Group on Economic Framework Adjustment for International Cooperation under Prime Minister Yasuhiro Nakasone (1985-1986).

After the Stockholm conference, Ōkita continued to promote the issue of the global environment and people's quality of life. He tried to pass the baton to his successors as well as published articles in magazines, journals, and newspapers, appeared on television programs, and gave speeches on various occasions.

In the 1970s, Japan's presence on the international stage appeared to stagnate. However, the seeds that Ōkita planted grew steadily. In 1974, he proposed that Kaya succeed him on the executive committee of the Club of Rome. Kaya expressed the limitations of the organization's capacity as an NGO, noting that "the role of the Club of Rome has ended, and we need further research on a global scale."[10] Later, Kaya introduced the concept of Kaya Identity, an equation that explains how to control global carbon dioxide emissions (Kaya 1990; Kaya 2018c; Intergovernmental Panel on Climate Change 2007). Tanaka was in Paris as First Secretary and Counselor of the Japanese delegation to the OECD from 1972 to 1976. Ōshima served as the Director for Science, Technology and Industry at the OECD from 1974 to 1976. Ōkita regularly met with Tanaka and Ōshima when visiting Paris on business trips (Kitagawa 2022: 117).

In the early 1980s, the Japanese government began taking the lead on environmental issues in the international arena, and Tanaka played a key rule within the government. In 1979, he was transferred to the Environment Agency as Director of the International Affairs Division in the Director General's Secretariat. Inspired by *The Global 2000 Report* to the U.S. President Jimmy Carter of 1980, he determined that the Environment Agency should act to address global environmental problems and sought the support of the Director General Hyōsuke Kujiraoka and Prime Minister Zenkō Suzuki. Following the prime minister's instructions, Tanaka successfully established "the Ad Hoc Group on Environmental Problems on A Global Scale," which would become the driving force behind Japan's leadership on this issue (Kitagawa 2022: 118-122).

The Ad Hoc Group operated under the strong influence of Ōkita and Tanaka. Tanaka invited Ōkita to be the chairperson and their colleagues from the Japanese working group of the Club of Rome to be members. These colleagues included Ōshima, Kaya, and Tange. Yūjirō Hayashi was also invited; he was Ōkita's subordinate at the Ministry of Great East Asia and the Economic Stabilization Board in the 1940s (Hayashi 1994: 347-348).

In December 1980, the Ad Hoc Group submitted its first report entitled "Basic Directions in Coping with Global Environmental Problems" to Kujiraoka. The report was presented at the OECD as *the Okita Report* and distributed at the United Nations. In April 1982, the group submitted its second report entitled "International Cooperation in Coping with Global Environmental Problems: Commemorating the 10th Anniversary of the UN Conference on the Human Environment" in April 1982 to Bunbei Hara, Kujiraoka's successor as Director General of the Agency. The reports called for global action and urged the Japanese government to take the lead in the international arena (Kitagawa 2022: 123-126).

Kitagawa (2022: 126) argues that January 14, 1982, was a turning point for the Ad Hoc Group. On that day, Mostafa Torba, the Executive Director of the UNEP, visited Tokyo and delivered a speech at an Ad Hoc Group meeting. At this meeting, Hara requested that the Ad Hoc Group prepare the second report. In May 1982, at a special UNEP meeting in Nairobi, Hara proposed establishing a commission corresponding to "a top-level international forum for research and consultation." With the cooperation of other countries, this forum was realized as the UN Special Commission on the Environment, WCED. The Japanese government expressed its willingness to send a Japanese representative to the commission and to cover its costs.

After being appointed chairperson of the Ad Hoc Group, Ōkita actively addressed environmental issues on the domestic and international fronts. He maintained his connections with key members of the Club of Rome, including Peccei and King. In November 1980, he met with

[10] Kaya's remark at a regular meeting of working group of the Club of Rome in Japan dated April 11, 1978 (Ōkita Documents, No.155: Loose-Leaf).

Amartya Sen, a leading economist in welfare economics. In June 1981, he met Lester Brown, a prominent environmentalist. In July 1981, he met Gerald Barney, the principal author of *the Global 2000 Report*. In November 1981, he met James Macniel, the Director of Environment at the OECD. In his speeches at domestic and international conferences, he emphasized the importance of global action. In August 1981, he delivered speeches in international conferences held in Kobe and Seoul. In January 1982, he attended the Davos Forum to promote this idea. In October 1982, the Club of Rome held a conference in Tokyo at which he delivered the keynote address.[11] Meanwhile, he met with Prince Philip of the United Kingdom (Duke of Edinburgh, the husband of Queen Elizabeth II, a co-founder of World Wildlife Fund established in 1961 and the President of it from 1981-1996) in October 1984 and became the President of WWF Japan until his death.[12]

In 1983, at Japan's suggestion, the United Nations established the WCED. Gro Harlem Brundtland, the prime minister of Norway, chaired the commission. Naturally, Ōkita participated in the commission as one of 22 members and attended most sessions and fieldwork travels around the world. The last meeting to prepare for the report was held in Tokyo in February 1987. The Commission published an official report, *Our Common Future*, in March 1987, which established the concept of "sustainable development".

In 1988, the Intergovernmental Panel on Climate Change (IPCC) was established jointly by the World Meteorological Organization (WMO) and UNEP. The IPCC formed three working groups: Working Group I (WG I) assesses available scientific information on climate change; Working Group II (WG II) assesses the environmental and socioeconomic impacts of climate change; and Working Group III (WG III) formulates response strategies.

In 1989, Kaya attended the first meeting of the IPCC in Washington, D.C., where he and a Chinese representative co-chaired WG III (Kaya 2018b). At the next WG III meeting, he presented the concept of "Kaya Identity," an equation that explains how to control global carbon dioxide emissions (Kaya 1989; Kaya 2018c). Kaya Identity is formulated as follows:

$CO_2 = CO_2/E * E/Q * Q/L * L,$

where CO_2 stands for carbon dioxide emissions, CO_2/E stands for carbon dioxide emissions per unit of energy, E/Q stands for energy per unit of output, Q/L stands for output per capita, and L stands for population (IPCC 1995: 27). To reduce greenhouse gas emissions while continuing to grow per capita output and population, we must improve energy efficiency per output (E/Q) and/or reduce the carbon intensity of energy through fuel switching, etc. (CO_2/E). Since then, the Kaya identity has been used as the standard framework for analyzing the impacts of and policy responses to greenhouse gas emissions. For instance, the IPCC's fifth assessment report decomposed total CO_2 emissions from 1970 to 2010 into four components using Kaya's formula: the carbon intensity of energy, the energy intensity of GDP, GDP per capita, and population (IPCC 2014: 9).

In 1992, on the 20th anniversary of the Stockholm Conference, the UN Conference on Environment and Development in Rio de Janeiro (also known as the "Earth Summit") adopted the United Nations Framework Convention on Climate Change, which led to the 1997 Kyoto Protocol and the 2015 Paris Agreement.[13] Mcneill (2000) argues that the end of the Cold War opened a new policy window for the global environmental issues instead of the international conflict and the national security issues.

In terms of domestic policy, the Japanese government submitted the Basic Environment Law to the Diet in March 1993, and the Diet approved it in November of that year. The law outlines the principles of the national environmental policy to promote sustainable development from a global perspective. Article 1 defines the law's purpose as "to comprehensively and systematically promote policies for environmental conservation to ensure healthy and cultured living for both the present and future generations of the nation as well as to contribute to the welfare of mankind, through articulating

[11] Ōkita Documents, No. 168 (Loose-leaf, November 1980-July 1981), No. 169 (Diary, 1981), No. 170 (Loose-leaf, November 1981-December 1985), No. 173 (Loose-leaf, November 1981-October 1986), No. 174 (Diary, 1982), No. 176 (Loose-leaf, May-October 1982).
[12] Ōkita Documents, No. 181 (Diary, 1984).
[13] UN website: https://www.un.org/en/conferences/environment/rio1992 (accessed on January 10, 2025).

the basic principles, clarifying the responsibilities of the State, local governments, corporations and citizens, and prescribing the basic policy considerations for environmental conservation." The law replaced the Basic Law for Environmental Pollution Control and a part of the Nature Conservation Law.[14]

5. Conclusion

In this paper, I explored the origins of environmental policy in Japan, focusing on the contributions of Saburō Ōkita (1914-1993) and his followers.

The year 1972 marked a watershed in global environmental policy with two major events: the publication of the seminal work The Limits to Growth, sponsored by the Club of Rome, and the United Nations Conference on the Human Environment in Stockholm. The biggest contribution of the Club of Rome to the whole world was to successfully visualize the future of the global ecosystem and set the agenda for global discussions. The Stockholm Conference was the first world conference to focus on the environment. The "unofficial" report contained progressive ideas on environmental issues such as global warming and ozone depletion. One of the major outcomes of the Stockholm Conference was the establishment of UNEP.

In response to the two oil crises, Japan transformed its economy and society from heavily-oil-dependent and energy-consuming to less-oil-dependent and energy-efficient through the 1980s. In the early 1980s, the Japanese government began taking the lead on environmental issues in the international arena. Japan initiated the formation of the WCED, which published the official report *Our Common Future* in March 1987 and established the concept of "sustainable development." At the IPCC meeting, Yōichi Kaya, one of Ōkita's followers, presented the concept of the "Kaya Identity," an equation that explains how to control global carbon dioxide emissions.

From his early career in government, Ōkita sought to make the quality of people's lives through economic development. His participation in the Club of Rome sharpened his focus on the global environment, and he promoted environmental policies both internationally and domestically, leading to sustainable development. In the 1980s, Ōkita's followers, including Tsutomu Tanaka and Yōichi Kaya, took a lead in the domestic and international policy arena.

In what broader historical context can we situate Japan's experience in the 1970s and 1980s? First, despite a temporary retreat in domestic regulations, the shift in the conceptual framework of environmental policy during this period had a far greater impact on Japan's transformation from a focus on material growth to a focus on the quality of people's lives. Second, personal networks among leading figures, such as Ōkita and his followers, played a pivotal role in policy initiatives in both the national and global arenas. Third, Japan's experience in the 1970s and 1980s highlights the importance of addressing challenges requiring structural changes to the domestic economy and society rather than avoiding them.

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