

Chap. 2 : japan's post-second world war environmental problems

著者	星野 芳郎
権利	Copyrights United Nations University
journal or publication title	Industrial Pollution in Japan
page range	64-76
year	1992
URL	http://hdl.handle.net/2344/00051005

Japan's Post-Second World War Environmental Problems

Yoshiro Hoshino

I. Historical Background to Japan's First Experience with High-level Economic Development

There is nothing worse than war for bringing about the destruction of nature, human beings, factories, housing, and transportation systems, and for causing starvation and sickness, the discharge of untreated factory wastes, and the destruction of farm lands. When environmental destruction is understood in its broadest and most fundamental sense, the original culprit is war. During the Second World War, as a continuation of the original military intrusion of Japan into China, the Japanese military machine invaded the Philippines, Burma, and many other Asian nations, killing a great many people, burning down houses, and destroying cities and villages over the vast areas where the war was waged. Japan also suffered destruction at the hands of the American military in air raids not only on major cities but also on medium and small-size cities. In all of this Hiroshima and Nagasaki were instantly demolished by the atomic bombings. Okinawa became a battleground and the area was laid waste. Because of the lack of food, most urban dwellers were undernourished, there was a great rise in the incidence of tuberculosis, and many others suffered from a wide spectrum of diseases. River containment repairs were neglected and the bamboo that was used for bank maintenance was cut down to provide more farmland. As a result the rivers flooded the surrounding areas every time it rained and there was no protection from the destruction wrought in this way. Forty per cent of the railway infrastructure was destroyed and the outer guard rails were not repaired, making the entire system dangerous, even up to the present day.

The first task of the Japanese government, along with the occupation forces from the United States, was recovery from the ravages of war—that is, the restoration of major land areas and the creation of new towns, cities, and villages in land that was to be newly developed.

As a result of the sudden and dramatic rise of Fascism before and during

the Second World War, the occupation authorities attempted to make drastic changes in the political and economic conditions which had underpinned Japan's military machine. For example, labour union activities, which had been completely suppressed during the war, were encouraged. Private possession of over three hectares of land was prohibited by decree. Tenants and poor farmers were allowed to take possession of the land that they worked for a very small sum of money and suddenly 4 million small landowning farmers came into being. Labouring people began to demand higher wages and farmers tried to improve agricultural methods through the introduction of more effective technologies and farm chemicals, so as to improve their income and thereby their landholdings. Compared with all pre-Second World War periods, domestic market-related economic conditions were better than they had ever been in any previous period in Japan's history.

From 1930 to the end of the Second World War, 90 per cent of Japan's industrial production capacity was allocated to military purposes. With Japan's defeat in the war, the military machine was destroyed and Japan's peace constitution was promulgated. Therefore, all industries had to produce for civilian markets rather than for military procurement.

Through the extraordinary efforts of the people, houses and shops were built out of the total and wide-ranging destruction. When food, clothing, and other goods became plentiful after the war, a production and marketing system naturally developed, and this led to Japan's high-economic-growth period. After the First World War in the USA and after the Second World War in Europe and Japan, electricity and related appliances became more common and motorization began to change people's everyday lives. Until the end of the 1950s the production of consumer goods such as washing machines, refrigerators, transistor radios, television sets, tape-recorders, motor bicycles, cars, and the like increased with great rapidity. Because of the intense competition between companies, there was a great deal of investment in installation to increase the efficiency of mass production systems.

Through the application of mass production methods, the costs of individual consumer products declined, the market expanded with increased demand, and mass production became the norm. The mutual interaction of supply and demand expanded the scale of Japan's economy. This growth in industry brought many young people from the rural areas into the industrial cities of Tokyo, Osaka, and Nagoya. Urbanization continued rapidly in a random manner, and by 1970 44 per cent of the population of Japan was concentrated in these urban centres. By way of contrast, the farming areas, which had experienced an oversupply of labour for a very long time, now faced labour shortages, and this resulted in the rapid mechanization of agriculture.

In the pre-Second World War period most of the factories were located in the urban areas of Tokyo, Yokohama, Nagoya, Osaka, Kobe and Kitakyushu. But with changes in the modes of industrialization in the post-war period, pressure on these areas was such that, in 1962, the government set out an Integrated National Development Plan, designating new areas to be

developed as industrial zones. This led to a concentration of industrial activities and population in the Pacific coast belt that starts from the Kanto Plain and runs all the way down to Kitakyushu, passing through the northern rim of the Setonaikai sea. By 1974, the belt area alone accounted for 84.5 per cent of Japan's entire industrial production.

By the late 1960s, labour shortage had become one of the major problems, and automation was extensively introduced in both production as well as administrative branches. By then, motorization of Japan had also substantially progressed. Thus, in a relatively short period of ten years, Japan's industrial modalities, as well as consumer life-styles, underwent major changes.

Along with the increasing distribution of consumer goods, the transportation and communication infrastructures were expanding rapidly. As the number of planned high-rise buildings increased, the demand for iron and steel and other construction- and production-related materials also went up. Table 2.2 shows this amazing increase in industrial products from 1955 onwards.

During the 1960s, Japan's GNP was over 10 per cent, while the growth-rate for European countries was 5 per cent. It is obvious that with this high an economic growth-rate within such a short period, some very difficult social problems were bound to result. Natural resources such as crude oil, iron ore, and high-quality coal were imported and major industries were built very close to human populations, along the Pacific Ocean coast from Tokyo, through Nagoya and on to Osaka. The national development plan was supposed to encourage a more equal distribution of industries throughout the nation, but in fact primary industrial production units were built mainly on the Pacific coastline, concentrated in the clam-producing bay areas of Tokyo, the Ise Peninsula, and along the shores of the Inland Sea.

In the 1970s the production of iron and steel along the shores of the Inland Sea reached 70 million tons, an amount equal to that produced by France and the United Kingdom combined. Daily processing of petroleum reached over 1,600,000 barrels, equal to the production levels of the United Kingdom. Petroleum chemistry brought the production of 1,800,000 tons of ethylene annually, with this also equalling British output. The Inland Sea has an area

Table 2.1. Changes in Distribution Rates for Major Consumer Items (percentages)

Item	1960	1965	1970	1975
Television (black and white)	54.5	95.0	90.1	49.7
Television (colour)	—	—	30.4	90.9
Electric washing machine	45.4	78.1	92.1	97.3
Electric refrigerator	15.7	68.7	92.5	97.3
Private automobile	—	10.5	22.6	37.4

Source: Economic Planning Agency.

Table 2.2. Primary Product Production and Importation

Product	Designation	Units	1955	1960	1965	1970	1975
Cars	Produced	1,000	13	165	696	3,179	4,568
Iron and steel	Produced	1,000 t.	9,408	22,138	41,161	93,322	107,399
Vinyl chloride	Produced	1,000 t.	32	258	483	1,151	1,625
Electricity	Maximum output	1,000 kw	14,512	23,657	68,262	112,285	116,871
Petroleum	Imported	1,000 kl	9,271	31,116	83,280	195,725	268,588

Source: Ministry of International Trade and Industry.

of about 17,000 square kilometres, which is about the same size as Lake Ontario, the smallest of the five great lakes in the USA. All of this production capacity was concentrated in this area and, in the 1960s, pollution-prevention technologies were very little used; as a result the problems of air and water pollution were serious in the extreme. In the case of Tokyo Bay, an area which is one-tenth the size of the Inland Sea, the production of ethylene from the concentrated petrochemical industries was 1,500,000 tons annually, which is very close to the total production in and around the Inland Sea.

The Japanese people have attempted to recover from the total destruction of war, and in the process have produced a completely different urban and rural environment. But because of a total lack of understanding of the realities of nature on the part of government and industry, a new type of industrially induced environmental destruction has reared its ugly head. In this manner, Japan has come to be known worldwide as the nation with the worst environmental problems.

II. Environmental Characteristics of Post-Second World War Japan: From Visible to Invisible Pollution

During the first phase of high economic growth in the 1950s, the greatest environmental pollution problem was caused by dust and other airborne particulate matter. The main source of energy at that time was coal. Dust-collectors and other methods of particulate-matter control were either not provided or not working, and all of the chimneys belched forth black smoke. This situation continued into the next decade, so that by 1961 a major iron and steel complex in Yahata, northern Kyushu, was pouring 27 tons of particulate matter per day into the city's air, and in Kawasaki City, situated in the Tokyo Bay industrial area, the amount was 23 tons. Along with the black smoke there was also a great amount of red smoke that spread over the sky. After the close of the Second World War, production technologies changed and the oxygen blast furnace was introduced. This made it possible to produce a better quality steel, but the reaction by-products included a great deal of particulate iron oxide, which was scattered far and wide. Soon after that the LD oxygen blast furnace was invented in Austria, and this produced even better quality steel by blowing oxygen into the furnace. However, this method also caused the release of a large amount of red smoke and iron oxide particulates, but Japanese industrial applications of the furnace did not include the use of dust-collectors. Because of this the amount of pollution from red smoke particulate matter greatly increased.

Many industrial workers were exposed to the industrial dusts in the atmosphere, and as a result developed various lung disorders. These problems were found most widely among mine workers and those who were involved in tunnel construction. In 1955, the government was forced to devise special

protective measures in order to protect the miners from such occupational hazards. In the same year the Tokyo Metropolitan Government issued orders that made it mandatory to control heavy smoke and dust production. This was the first such ordinance related to airborne particulate matter since the end of the Second World War.

In the 1960s, basic energy source changes from coal to heavy oil were instituted. As a result, the heavy smoke of coal combustion was replaced with invisible stack gases, but pollution problems were not thereby solved. Like coal, oil also contains sulphur which, when burned, results in sulphurous acid gases being discharged into the atmosphere. When coal was the main energy source, sulphurous acid gases were also a problem, but with the use of heavy oil in an expanding industrial economy, the problem became very serious.

A one-million-kilowatt, oil-fired, electric-power generation plant uses 1,300,000 tons of heavy oil per year. Since this fuel contains on average 2 per cent natural sulphur, 52,000 tons of sulphurous acid gases are released into the air annually from the power plant. Oil refineries and petrochemical complexes also release great amounts of such gases. The fact that a great many patients developed respiratory diseases in areas where these complexes were located, especially along the Pacific Ocean coastline, became a very great social problem in the 1960s. The Yokkaichi petrochemical complex came into being in 1959 along the coast of Ise Bay, and in just one or two years respiratory diseases in the general population became painfully noticeable. At that time, without knowing the cause of this health problem, people called the ailment the "beach salt disease." In 1953, the central government was obliged to send a research group to the area in order to discover the cause of the problem. A report on the research findings was presented to the National Diet the following year. In spite of the report's existence, the government failed to act with specific policies and countermeasures. The petrochemical complex was expanded in size and output and, in 1965, Yokkaichi City officials were forced to create a medical research team in an attempt to provide countermeasures for a disease problem of epidemic proportions.

Sulphurous acid gases are invisible and take their toll in silence, but black smoke can easily be seen and therefore everybody recognizes it as a health hazard. This fact is symbolic of the characteristics of post-Second World War environmental problems. The effluents from sulphuric-acid-based pulp-processing industries are the same in this regard, that is, they are not directly and immediately apparent as the cause of environmental problems. A rayon-from-pulp textile production facility uses 38 per cent of the raw material by weight for the end-product, but 62 per cent of the post-process pulp is discharged as an effluent into the environment, usually without the application of pollution-prevention measures. If annual production levels reach 100,000 tons, over 160,000 tons of waste are produced. These red and black wastes discharged from the pulp-using production units found their way into natural waterways such as rivers and then into ocean systems. In this manner rivers and ocean estuaries were visibly polluted, and this destroyed fish resources,

thereby compromising the viability of the fishing industry. Because of all of this destruction, legislation was enacted in 1958 governing water quality and industrial effluents and containing effluent-discharge regulations.

However, wastes from new technologies developed during the high-economic-growth period were invisible to the naked eye but were very effective in destroying the natural viability of the human environmental support system. These characteristics were most evident in regard to the Minamata disease, even more than with Yokkaichi asthma. Once the Minamata-disease-causing organic mercury is introduced into aquatic environments, it spreads over wide areas and is at the same time concentrated in individual organisms through the interactions involved in the natural food chain. When the food chain reaches the level at which human consumption begins, mercury concentration levels are very high. The actual amount of mercury discharged into natural waterways in this particular case was relatively small, in contrast to the amounts of sulphurous acid gas discharged into the air and the wastes discharged from pulp-processing installations. Mercury was used as a catalyst in the production of acetaldehyde and as such was discharged into the Shiranui Sea along with a number of other wastes.

Further, since there was only one manufacturing facility in Minamata City, the water did not look as bad as that in Tokyo Bay or the Inland Sea. There were still plenty of fish to catch, and by this route organic mercury invaded the bodies of those who made their livelihood from the sea. When they finally became aware of the problem, the damage to their brains and central nervous systems had already gone too far.

The cadmium which caused Itai-itai disease was derived from the effluents of the Kamioka mine on the upper reaches of the Jintsu River; this was detected in 1967, but at first the absorption of cadmium into people's bones had produced few or no symptoms. The villagers living along the Jintsu River used the river water for washing vegetables, servicing farm equipment, washing clothes, and for cooking and drinking; because in spite of the cadmium content it looked clean.

In 1968, PCB (polychlorinated biphenyl) poisoning was discovered in an area in and around Kitakyushu. These PCBs were used as a heat-transfer medium in the smell-elimination process used in the production of cooking oils. The PCBs leaked through heat-transfer-pipe pinholes into the rice-derived raw materials used in oil production. In like manner cadmium accumulated in human bones and in the bodies of chicken.

Pollution problems derived from the intrusion of chemical substances into the biosphere are usually beyond solution by the time they cause noticeable health problems. Therefore, when new technologies are introduced, it is essential that environmental impact research be carried out to discover the degree to which various substances compromise the viability of the environment, the human body, and other living organisms. It is also prudent to avoid the use of materials and substances that cannot be proven absolutely safe. The Japanese government acted too late when it halted PCB production and limited the uses of mercury to certain closed-system processes. In other

words, corporations, local and national governments, and city administrators lacked the wisdom and understanding necessary to prevent serious environmental problems. During the high-economic-growth period, production efficiency was the primary concern in the uncritical and rapid adaptation of new technologies. This stance resulted in unprecedented damage to natural ecosystems and to human health and well-being.

Another characteristic of Japan's environmental destruction during the post-war period is the concentration in limited land areas of manufacturing plants much larger in scale than similar factories found in Western countries. With this came a very rapid increase in the pressures for urbanization, which resulted both in conglomerate urban concentrations and massive amounts of both industrial and life-sustenance-derived wastes. This brought about further destruction of the natural environment.

Along the coastline of Tokyo Bay, land reclamation has taken place at such a rapid pace that the original coastline is no longer discernible. Twenty per cent of the total Inland Sea coast is occupied by factories and manufacturing conglomerates. With the seacoasts being covered by ever-increasing amounts of concrete in such a short span of time, it is inevitable that the condition of the coastal waters should change for the worse.

In the seaweed-producing areas along the Inland Sea coast, huge amounts of concrete were brought to unprecedentedly large construction projects, resulting in massive destruction of the biosphere. Fish can no longer find areas to lay their eggs. The total ecology of these areas has changed. Sea bream, prawn, and octopus have decreased in number, while sardine and squid, which have greater resistance to pollution, have still remained, but to a lesser extent.

By way of contrast, when land was reclaimed for farming, sea-water was drained and as a result seaweed beds were destroyed. But the damage did not extend beyond the immediate area, and when sand and soil were dumped into the sea, the seaweed was still able to grow back beyond the boundaries of the reclaimed land area. In this case the natural environment was destroyed but the ecological balance was still maintained. However, if a 20-metre deep concrete wall is built for berthing gigantic oil tankers, the sea is no longer able to recover its ecological balance.

From the beginning of the seventeenth century estuaries were gradually built along the shores of the Inland Sea for wharfs and factories, but the speed of land reclamation was not excessively rapid. In these situations, there were some changes in the natural environment but the ecological balance was maintained and fishing was not compromised to such a drastic extent.

However, as figure 2.1 indicates, from 1945 the situation changed. It is said that 19,000 hectares of land were reclaimed from the sea for farming purposes during the 300 years of the Tokugawa era, but in the 28 years after the end of the Second World War, 18,000 hectares were reclaimed.

When factories are built on reclaimed land, large amounts of wastes are produced from the industrial activity, and as a result the ecological balance is compromised because of the many effluents being discharged. Not only does

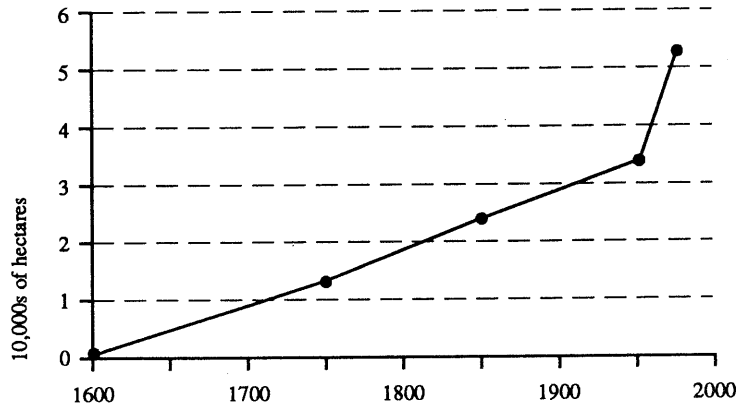


Fig. 2.1. Inland Sea Land Reclamation Expansion (after Yoshiro Haraguchi, "Setonaikai ni okeru umetateno genjo to mondaiten," *Ao to midori* (September 1974).

the sea close to these industrial areas around the Inland Sea die biologically, but there is no life even in the open sea away from the enlarged manufacturing zones.

With the expansion of industrial areas came environmental destruction, while aggravated urbanization increased even more the seriousness of these environmental problems. Besides the amount of noise produced, and the continuous spewing forth of exhaust gases from the ubiquitous automobile, urbanization also brought with it the production of excessive amounts of garbage. In 1960 the daily per capita garbage wastes produced amounted to 400 grams. By 1970 this had risen to 1 kilogram, and by 1977 it stood at 1.7 kilograms. Most of these discarded materials are made up of supermarket-derived food-packaging materials, cans, and bottles. The great increase in the number of automatic vending machines has also added to the severity of the problem. During the 1970s, Tokyo had to dispose of 16,000 tons of garbage each day. In order that these materials can be disposed of properly, plans are being made to use them for the creation of more reclaimed land.

At the beginning of the 1970s, the highest economic growth period so far in the post-war era came to an abrupt end with the saturation of the consumer market with too many unsold products. Through the negative-feedback circuits created by this incessant economic activity, the environment was saturated with pollutants of every conceivable variety. This degree of destruction has slowed down to some extent, but the recovery of nature has been very, very slow.

Once the health of the human body has been compromised by the polluted environment, it is exceedingly difficult to return bodily functions to normal levels again. The number of government-recognized pollution victims found in the most severely poisoned areas stood at 81,222 persons as of 1980. Among the major pollution-related health problems, 1,893 persons were

recognized by the government as victims of Minamata disease, 42 as victims of Itai-itai disease, and 121 as victims of chronic arsenic poisoning. The excessive use of the untested but marketed intestinal antibacterial drug Chinoform caused what came to be well known as SMON (subacute myelo-optico-neuropathy) disease, with the number of patients rising to 11,007. Further, more than 13,000 PCB (polychlorinated biphenyl) victims applied for recognition as pollution-disease patients.

Badly poisoned patients are very easily recognizable by the severe symptoms, but less affected cases are less easily identified as pollution victims. Not only do patients with this disease endure periods of involuntary convulsions, but in everyday life they enjoy no respite from their sufferings. Since pollution victims' symptoms are similar to those seen in other illnesses, it is very difficult to identify pollution poisoning as the cause of many types of pathological problems. Unless doctors are willing to delve into the patient's family situation and working conditions, it is not very likely that they will be able to pin down the cause with any certainty. This is another characteristic of the pollution problems that have come about in Japan's post-war period.

As a result of this, a great number of actual Minamata disease victims have not been designated as such by the government. These people continue to make applications for recognition and designation as pollution victims. Again, there are many other people who are not aware that their health problems are related to a poisoned environment, and therefore do not apply for government designation and financial aid.

At the present time there are twelve atomic-powered generation plants in operation in Japan producing 1,550,000 kilowatts of electricity. However, more than a small amount of radiation is leaking all the time into the biosphere at various points in the nuclear fuel cycle. With the half-lives of these poisons being longer than those of any other materials produced in the history of the human enterprise, and with their ability to linger and concentrate in the biosphere as well as in the human body, there is a very great possibility that radioactive materials in the environment will result in radiation sicknesses, which again will be very difficult to distinguish from ordinary health problems.

Poisonous chemicals used in insecticides are becoming less lethal than those used in the 1960s, but these materials are employed on a nationwide basis. There is a real possibility that these materials are involved in complex chemical reactions within the human body and the biosphere. Also, detergents are used almost universally and daily disposed of in the environment; no one has any way of knowing what detergents mean in the long run for human life. The overuse of many kinds of food additives and of innumerable medicines continues apace. The pollution problems that have been made visible through the suffering of poison victims have, to a certain degree, been controlled through active pressure from citizens' movements and through the belated response of government legislation and administrative guidance, but there is no telling the extent to which invisible pollution will bring about serious problems for future generations.

III. Citizen and Administrative Response to Environmental Problems

Environmental pollution problems in Japan were greatly exacerbated in the post-Second World War period. This came about not only through the irresponsibility of corporate entities and administrative bodies, which together sought greatly increased profits through the overexpansion of production, but also through the citizenry as a whole, which, in its obsession with modern life-styles, had an almost total lack of concern for human rights. In the 1960s it was not difficult for governments and corporations to take land and sea areas from farmers and fishermen. Complaints from this quarter were suppressed by the argument that land and ocean viability had to be sacrificed in the interests of national and community prosperity. In spite of the problems arising from the operation of innumerable factories, corporate entities, central governmental bodies, and local administrative units either turned their backs on the problems or refused at first to see the writing on the wall. When the fact of extreme environmental degradation could no longer be ignored, all levels of government were more interested in saving the corporations than in saving the people. As a result, compromises were worked out on the basis of economic and political security, rather than on the basis of human rights. Although corporations and the government pay lip-service to democratic institutions and human relations, the style of thinking has not changed from that which formed the basis for Japan's era of Fascist militarism.

However, even if democracy is only a surface formality in Japan, it can form the basis for human rights struggles originating from the people. In 1951, when the United States of America was experimenting with H-bomb tests in the Pacific, there was greatly increased opposition, nationwide, to the H-bomb and to nuclear destruction.

In the 1960s, with the expansion of industrial output, environmental destruction became greatly exacerbated. The mass media reported on Minamata disease and Yokkaichi asthma, and people organized movements to discover the causes of these various problems and to ensure that compensation was paid. Movements resisted corporations that continued to poison the biosphere by refusing to process their wastes. In 1964, citizens' movements were able to stop the planned construction of large petrochemical complexes in the cities of Mishima and Numazu on the Pacific coast.

By the end of the 1960s, anti-pollution movements had become strong nationwide. The diligent work done by supporters and Minamata disease victims, as well as by the farmers' resistance movement against the construction of Narita Airport, provided a great deal of encouragement to local citizens' movements all over Japan.

Pollution problems became serious political issues. In the 1970s the National Diet passed 149 laws relating to pollution issues such as the Revised Standard Laws on Pollution Policy and the Criminal Codes related to environmental destruction. In 1971, the government's Environmental Agency was formed.

People began to have second thoughts about unconditional modernization at the expense of environmental viability.

The high-speed bullet trains in Japan produce a great deal of noise and excessive vibration. People began to ask why faster trains should be considered better than slower trains. Who needs such a train service anyway? The industrial and consumer life-style began to be reappraised from the standpoint of basic human rights.

In 1868, the political changes of the Meiji Restoration, to a limited extent at least, came to fruition through the pressures exerted by farmers on their lower-class feudal lords, but the real political changes were imposed from the top down as a result of pressure from these same lower-class *bushi* samurai warriors. Therefore, citizens' awareness, relative to involvement in the processes of political change, is only a surface phenomenon. In 1945 the period of Japanese imperialism ended with the defeat of Fascist militarism at the end of the Second World War, and democracy was instituted thereafter. However, this democracy was imposed by the occupation forces under the pressure of world opinion, which at that time was very anti-Fascist.

Though there was democratization of labour as well as land reform, concepts pertaining to human rights were still weak and required more time for maturation. During the 1960s, the anti-pollution movements were successful in strengthening these basic concepts of human rights. As seen in the Minamata disease situation, the pollution victims assumed leading roles in the movements instead of waiting for others to take the initiative, and by taking on these leadership positions they were able to greatly influence the people at large.

Strengthened by the support of the citizens' movement, the victims of the four major pollution episodes—the Kumamoto Minamata disease, the Niigata Minamata disease, Itai-itai disease, and Yokkaichi asthma—took their cases to court and through concerted legal action were able to receive compensation for the damage that had been done to them. But even with all this compensation, the pain suffered by the victims did not go away. What was accomplished by all of this was the creation of a greater sense of priority in relation to preventive measures that could preclude such massive destruction in the future. From the 1970s onward, not only was there relative success in terms of winning compensation for the pollution damage, but through the court battles the victims of pollution diseases were able to make some headway in stopping the operations of manufacturing complexes and power plants that were destroying the environment. But such demands require for their implementation a total change of direction in the basic policies and decision-making orientations of industry and government. In this respect it is difficult, indeed almost impossible, to change the course of the economic and political currents of the times. The court battles are still beset with problems.

Nevertheless, the government, which was intent on policies to encourage high rates of economic growth, was forced to make certain policy changes. In 1969, the government announced a new general development plan for the

nation, but in the 1970s opposition mounted because it was understood to be only more of the same high economic growth. A complete re-evaluation of the environmental situation was forced upon the government because of the paralysis that was being felt in relation to water, electricity, and garbage in the three major urban centres of the country. Therefore, in 1977, a third general development plan was created with three major emphases—housing, land use and land protection, and a shift to a new kind of economic growth. In the final, “countermeasures” section of this 1977 proposal, one reads that the Japanese economy, which has seen unprecedented growth over the past quarter-century, is now entering a new phase, brought about by changes in both the domestic and international arenas. The multiplicity of viewpoints has led to a great deal of interactional complexity in the planning process. What was now hoped for was a life-support environment that would ensure security, quality, and the possibility of high cultural achievement. Instead of stressing land uses that favour a high-speed information society, the plan calls for living conditions that will enhance individual creativity within the context of peaceful land use. However, in this regard there has been no real change in the attitude of the government administration, which is still preoccupied with a high-economic-growth vision. We are still a very long way from solving the problems of environmental destruction in Japan.

Bibliography

- Ariyoshi, S. *Fukugo osen* [Combined Pollution].
 Hoshino, Y. *Han kogai no ronri*. Keiso Shobo, 1972.
 ——. *Setonaikai osen* [The Pollution of Setonaikai]. Iwanami Shoten, 1972.
 Kankyo-cho. *Kankyo hakusho* [Environmental White Paper].
 Miyamoto, K. *Chiiki kaihatsuha korede yoika* [Regional Development—On the Right Course?]. Iwanami Shoten, 1973.
 Miyawaki, A. *Shokubutsu to ningen—seibutsu shakai no baransu* [Plants and Human Beings—The Balance of the Biological World]. Nihon Hoso Shuppan Kyokai, 1970.
 Nakanishi, J. *Toshi no saisei to gesuido* [The Sewer System and the Regeneration of Cities]. Nihon Hyoronsha, 1979.
 Saeki, K. *Sangyo haikibutsu* [Industrial Waste]. Asakura Shoten, 1980.
 Tajiri, M. *Yokkaichi. Shi no umi to tatakau* [Yokkaichi: Struggle against the Dead Sea]. Iwanami Shoten, 1972.
 Ui, J. *Kogai genron* [The Theory of Pollution], vol. 3. Aki Shobo, 1971.