Environmental Management in South Korea: Origin, Policy, Program, Win-Win Strategy*

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Introduction

Seoul, Korea, hosted the Summer Olympics in 1988. During the Olympics NBC television showed features of Seoul that included high-rise buildings, the Han River, air pollution and crowds. The Han River was very polluted even in the 1960s and the 1970s, and strange-looking fishes have been caught by anglers. Now, the environmental degradation of Seoul is worse by millions of cars, and the source of drinking water for 20 million people in Seoul and its vicinity is getting worse due to untreated wastewater and non-point sources of pollutants flowing into the Han river.

Korea designated 1990 Environment Year and the 1990s Environment Decade. 1990 public opinion polls showed that Koreans perceived the environmental problem as the second most urgent national issue (41.5 per cent) after law and order (47.3 per cent), and as the most urgent issue for the year 2000 and after (63.7 per cent). The 1990 polls were contrasted with the 1982 and 1987 polls, which showed the environment as only of marginal interest (5.7 per cent and 17.1 per cent) (Yu, 1991). Korea is now facing financial and economic crisis which now overshadows the environmental crisis.

Korean newspapers are taking a great interest in environmental issues: reports on the environmental degradation from 1 January 1991 to 30 September 1991 numbered more than for the whole of 1980-90.(Yu, 1991). Environmental issues that made major news in Korea included Dusan Electronics's accidental release of phenol into the Nakdong River, reviews of the environmental impact of the construction of golf courses, new town development, land-use policy and housing supply. These days, major daily newspapers and television newscasters seriously report almost everyday environmental degradation cases, and a couple of environmental daily, weekly environmental newspapers, monthly magazines devoted to environmental affairs and researches are emerging as influential newspapers and magazines.

Korea's Environmental Protection Agency was established in January 1980, its six regional offices were set up in December 1986 and it became a cabinet-level department on 1 January 1990. Korea is vigorously seeking to protect and conserve its natural resources.

This paper attempts to review (1) the political, economic and social conditions that created environmentalism in Korea in the 1970s and 1980s in comparison with the US in the 1960s and 1970s; (2) Korea's current environmental policies and programs; (3) its environmental questions; and (4) win-win strategy to solve the environmental questions. Korea may provide an interesting case of a semi-industrialized nation's environmental management for a comparative study with Asia's other semi-industrialized nations, such as Taiwan, Malaysia, Indonesia, the Philippines, and with South American, and African nations. This paper suggests a win-win strategy for solving environmental problems for conflicting parties, e.g., environmentalists and developers and one nation and another. Win-win strategy in this paper can be defined as handling policy problems by finding solutions that exceed the best initial expectations of government managers, environmentalists, industries, and the public, or whoever are the major groups, sides, or viewpoints in the policy dispute. Win-win is also called super-optimizing or doing better than the previous best of all major groups (Nagel, 2001). In the Korean setting, conservatives and liberals cannot find the middle ground in the environmental policy and administration. Conservatives want to continue economic growth from $10,000 per capita income to $30,000, while liberals want the conservation and consumer price hike to protect environment and nature conservation. The breakdown of policy debate in South Korea is becoming a serious issue to policy failure (Choi, 2001). The government and civil engineers want to build more dams and nuclear power plants for more water and electric power, but environmentalists confront them with violent opposition. Confrontational politics between market ideology and government regulation, riskless society and no risk society, the best practicable technology and the best available technology, and more generous tax policy to technology investment and less generous tax policy are seen in the environmental policy and administration.

Table 1. ECONOMIC DEVELOPMENT VS A CLEAN ENVIRONMENT

GOALS ALTERNATIVES	C Rapid economic development	L Clean environment
C Unregulated economic development	+	-

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L Anti-pollution regulations	-	+
N Compromise regulations	**0**	**0**
SOS OR WIN-WIN 1. Improved manufacturing 2. Agricultural processes	++	++

Source: Stuart Nagel, Environmental Win-Win Strategy

The Origin of Environmental Movement

We can see similar political, economic and social events leading to and creating environmentalism in the US in the 1960s and in Korea in the early 1980s. In the 1960s, the US environmental movement emerged as part of the political protest movement against the establishment, capitalism or industrial power, and the Vietnam War. In the 1980s, Korea's environmental movement emerged as part of the political protest movement against the establishment, authoritarian government, export-oriented economic development and industrial power.

In the US in the 1960s highly idealistic students protested against US involvement in the Vietnam War, the military-industrial complex, injustice and inequity in American society and exploitation of the environment by American industrialists. The group Students for Democratic Action was later to disappear--Utopianism was not able to survive for long, but it did create and nurture environmentalism.

The protest movement in the US was probably made possible by the country's remarkable economic progress in the 1960s. Per capita GNP reached $2801 in 1960, $3541 in 1965 and $4795 in 1970 (US Department of Commerce Bureau of Census, 1976), and affluence freed people to concentrate on environment and other concerns. The 1960s saw the creation of a new US culture, which favored land stewardship over land ownership, compassion for those less fortunate, the need to provide for future generations, concerns for other species, plans to avoid risk, limits to growth, fundamental changes and a new political culture.

The publication of Rachel Carson's Silent Spring in 1962, the dying Great Lakes, polluted air and water in urban areas, the Santa Barbara oil spill and the beautiful picture of the Earth from the Apollo spacecraft provided the impetus for the National Environmental Policy Act of 1969. Since then, preexisting air and water acts have been amended, and the National Land Management Policy Act and other environmental policy acts have been introduced.

In contrast, in the 1960s Korea was a poor nation still suffering from the effects of the Korean War in 1950-1953. Its per capita GNP was a mere $87 in 1962 and $142 in 1967. (Bank of Korea, 1962, 1967). Korea was almost blindly committed to economic development, and it achieved some progress in the 1970s. Per capita GNP rose to $306 in 1972, $966 in 1977 and $1607 in 1981.(Bank of Korea, 1972, 1977, 1981). The authoritarian government-industrial complex under former army general Park Chung-Hee paid little attention to political reform, human rights and environmental protection, but the general public, who had experienced hunger, at first accepted the government's policies.

Economic development meant a declining agricultural/forestry/fishing sector and a rising mining and manufacturing sector, as shown in Table 2.

Table 2. The industrial and GNP(in percent)

	1962	1967	1972	1977	1981	1989	1996
Agriculture, Forestry and Fishing	53	30.6	27.8	22.2	18.3	10.2	6.6
Mining and Manufacturing	11.1	21.0	22.3	30.6	35.9	35.9	27.2
Service	45.6	48.4	49.9	47.2	45.8	52.8	66.2

Source : Bank of Korea Income in Korea, selected years.

The average annual rate of growth in the index of manufacturing output was 11 per cent between 1955 and 1965 but it rose to 24 per cent from 1965 to 1975. Growth in manufacturing output--which was nil in 1955--rose from

roughly 6 per cent in 1965 to almost 25 per cent in 1975. In the decade 1965-1975, the share in GNP of the manufacturing sector more than doubled. (Westphal, Lee, Pursell, 1981).

Manufactured goods became increasingly diversified, and in 1975 Korea was a major exporter of footwear, transport equipment, electrical machinery and appliances, and various manufactures of metal and non-metallic minerals--these in addition to the textiles, clothing, and plywood, that had led the initial growth of export.(Lee, Larson, Pursell, 1984). The larger the manufacturing sector the more environmental management is required. Many developing countries have neglected to provide adequate environmental management and Korea was no exception.

In the midst of the so-called modernization campaign, Korean college students and dissident leaders made strong calls for political reforms and a welfare state. The widening gap between rich and the poor, urban and rural was a side effect of the blind ambition for economic development in all developing nations. Political democracy means freedom of the press, civil rights and direct presidential elections. The welfare state means an equitable distribution of wealth. None of these were available in Korea. The workers protested their meager income, and launched a series of violent demonstrations against the strong authoritarian government-big business(chaebols) alliance.

In the following poem Korea's dissident poet Kim Chi-Ha showed his anger at the nation's modernization.(Kim, 1974). His anger grew out of an idealistic aspiration for democracy and concern for the general welfare of the people. His poems sent him to the prison. The court delivered a death sentence to him.

> Modernization! Nation-building!
> Nicknames for foreign power's yoke.
> Korea's treaty with Japan
> Swung wide the door of treason.
> Foreign capital seduces us;
> Our economy was raped.
> A privileged few acquire wealth,
> Corruption surpassing that of old.
> Ceaseless progress! The law was scrapped
> For a dynasty's perpetuation.
> Development's main purpose:
> To rationalize dictatorship;
> 'Abundant Seventies' never found
> Except in propaganda's prattle.

Poets may not know how to read all the economic indicators, but most Korean people were pleased with the economic development and growing affluence of the 1970s and early 1980s. Despite this, dissidents continued to call for political reforms and express their concern about the environment. In 1987, the authoritarian government at last submitted to pressure for direct presidential elections, and the new democratic Korea is showing more interest in environmental matters.

Policy, Programs, Budgets

In 1990, the Environmental Protection Agency (EPA) became a cabinet-level department with a mandate to integrate the existing environmental programs of the EPA. the Department of Interior, and the Department of Construction and Forestry Administration, showing Korea's determination to improve environmental management. The new Department of Environmental Affairs has become a symbol of the Korean government.

The Korea Herald (December 28, 1989, p.8) expressed its opinion as follows:

Birth of Environment Ministry

The nation has reached the stage where much greater attention should be paid to environmental conservation, especially in light of rapid industrial growth and its undesirable aftermath of pollution and ecological imbalances. A before-the-fact preventive approach, rather than an after-the-fact remedial one, is required for long-range care; it needs stronger governmental commitments with similarly active participation on a broad, grass-roots level.

It is good to learn that the government will elevate the status of the Environmental Administration to that of a ministry beginning with the new year, thereby enabling it to encompass the entire spectrum of administrative matters concerned with nature and environmental preservation. These matters are now being handled by various government agencies, often causing conflict and incoherence in the conduct of the government's environmental policies. For example, the Ministry of Home Affairs is directly involved with various preservation projects and the Ministry of Construction has the primary responsibility for national parks, while the Forestry Administration

is concerned with the conservation of forestry resources.

The new ministry should be prompt in absorbing and consolidating all the environmental business scattered throughout the government so that it can better complete its tasks.

At this juncture, we cannot be remiss in reminding the government that the new ministry should not be handicapped by the perennial excuse of limited financial resources. The Economic Planning Board trimmed the new ministry's budgetary requirements for next year in the course of finalizing the government plan for 1990. One may suspect that was due to a lack of understanding of the fact that preservation and ecological balance are vital elements in the better quality of life all humans seek. Mere ostentatious sloganeering is not enough. More efforts and money should be invested to insure an optimum environment for all to live in.

Korea's environmental budgets have gradually expanded over the years, as shown in Table 3, and the environmental budget in 1997 was 0.58 percent of GNP, and in 1999 0.64 percent.

Table 3. Environmental budgets, 1971-97

(Unit : One million won)

	Environmental Budget(A)	Total Government Budget(B)	A/B
1971	0.5	5553	0.009
1972	0.9	7093	0.012
1973	0.9	6594	0.014
1974	1.1	10383	0.011
1975	10.6	15864	0.067
1976	13.3	22585	0.059
1977	22.1	28699	0.077
1978	25.1	35170	0.071
1979	51.1	52134	0.1
1980	120.5	64785	0.086
1981	152.2	80400	0.189
1982	207.7	95955	0.216
1983	206.9	104167	0.199
1984	343.1	103867	0.33
1985	420.5	125324	0.336
1986	433	138005	0.31
1987	670.8	160596	0.42
1988	772.9	184291	0.42
1989	644.9	192284	0.335
1990	902.1	274557	0.325
1991	4570	373669	1.16
1992	5819	438421	1.33
1993	6919	511879	1.35
1994	11232	644575	1.74
1995	17394	745344	2.33
1996	21979	850383	2.58
1997	2535	985933	2.57
1998	2730	1110323	2.24
1999	2753	1164552	2.15

Notes:
1. As part of Health and Human Services Ministry
2. EPA.
Source : Ministry of Environment White Paper, 1999

The Organization of Economic Cooperation and Development nations allocated 0.5 per cent to 1.7 per cent for

the same year. (Ministry of Environment, White Paper, 1999). Korea became the member nation of the OECD, then fell to the financial and economic crisis in 1999. Environmental improvement targets are shown in Table 4, and investment plans for 1997-2001 are presented in Table 5-12.

Table 4. Major Environmental Improvement Targets

(Unit : One million won)

Field	1997	1998-2001	Sum
Environmental Technology	537	2,837	3,374
Nature Conservation	15	1,005	1,020
Air	20,330	81,711	102,041
Water Quality	26,341	106,658	132,999
Drinking Water	4,928	28,764	33,692
Waste Management	6,116	43,406	49,522
Soil Conservation	147	954	1,101
Ocean Conservation	335	2,024	2,359
Total	58,749	267,359	326,108

Table 5. Environmental Technology

(Unit : One million won)

	Budget	97	96- 99	2000-2001	Total
Research and Development	National	33,000	107,100	97,700	237,800
	Private	20,700	46,800	32,100	99,600
	Total	53,700	153,900	129,800	337,400

Table 6. Nature Conservation

(Unit : One million won)

	Budget	97	96- 99	2000-2001	Total
Theme Park construction	National	366	14,506	15,000	29,872
	Local	366	14,506	15,000	29,872
	Private	-	2,000	2,000	4,000
Demilitarized Zone(DMZ) Monument Construction, etc.	National	826	11,500	26,000	38,326
Total	National	1,192	26,006	41,000	68,198
	Local	366	14,506	15,000	29,872
	Private	-	2,000	2000	4,000

Table 7. Cleaning Air

(Unit : One million won)

	Budget	97	98- 99	2000-2001	Total
Automobile Emission	National	5,000	497,900	216,200	719,100
	Local	17,000	27,500	22,500	67,000
	Private sector	1,297,300	3,992,100	1,077,100	6,336,500

SO2	National	-	-	-	-
	Local	3,200	5,600	800	9,600
	Private sector	710,500	1,350,800	980,600	3,041,900
Total	National	5,000	497,900	216,200	719,100
	Local	20,200	33,100	23,300	76,600
	Private sector	2,007,800	5,342,900	2,057,700	9,408,400

Table 8. Waste Water Management

(Unit : One million won)

	Budget	'97	'98-'99	2000-2001	Total
Waste Water Treatment Facility	National	1,207,600	2,337,600	2,222,072	5,767,300
	Local	1,179,000	2,447,500	2,082,328	6,428,800
Human Waste Treatment Facility	National	125,292	150,568	178,010	382,082
	Local	21,655	64,343	75,902	161,900
	Private sector	50,133	116,376	130,649	297,158
River Cleaning	National	24,668	55,000	61,800	141,468
	Local	25,790	44,900	50,500	121,190
Total	National	1,357,560	2,543,168	2,461,882	6,290,850
	Local	1,226,445	2,556,743	2,928,730	6,711,890
	Private sector	50,133	116,376	130,649	297,158

Table 9. Drinking Water Management

(Unit : One million won)

	Budget	97	98- 99	2000-2001	Total
Small and Medium Cities	National	190,000	647,106	664,744	1,501,850
	Local	196,989	548,276	570,639	1,315,904
High Level Purification Facility	National	43,909	63,751	62,395	170,055
	Local	35,311	37,351	36,655	109,317
Discharge Facility	National	30,000	104,000	104,000	272,100
	Local	-	-	-	-
Total	National	263,909	814,857	831,139	1,944,005
	Local	232,300	585,627	607,294	1,425,221

Table 10. Waste Management

(Unit : One million won)

	Budget	97	98- 99	2000-2001	Total
Solid Waste	National	122,400	453,000	630,000	1,205,400
	Local	310,100	889,600	918,100	2,117,800
Hazardous Waste	National	21,700	118,600	49,400	189,700
	Local	-	-	-	-
Recycling Facility	National	30,700	111,900	42,700	185,300
	Local	-	-	-	-
Food Waste	National	3,900	231,900	391,100	626,900

	Local	4,000	232,100	391,100	627,100
Total	National	168,700	905,400	1,113,200	2,187,300
	Local	324,100	1,131,700	1,309,100	2,764,900

Total 11. Soil Conservation

(Unit : One million won)

	Budget	97	98- 99	2000-2001	Total
Soil Conservation	National	9,571	27,457	29,945	66,073
	Local	4,809	17,201	17,736	42,746
Soil Survey	National	145	500	800	1,445
	Local	-	-	-	-
Total	National	9,716	27,957	30,745	67,518
	Local	41,809	17,201	17,736	42,746

Total 12. Ocean Conservation

(Unit : One million won)

	Budget	97	98- 99	2000-2001	Total
Ocean Environment Survey Ship Construction	National	13,376	43,424	24,360	81,160
	Local	-	-	-	-
Cleaning Fishery Farm	National	19,154	53,018	61,841	134,013
	Local	1,009	6,522	13,217	20,748
Total	National	32,890	96,442	86,201	215,173
	Local	1,009	6,522	13,217	20,748

Source : Ministry of Environment, The Second Environmental Improvement Comprehensive Plan(1998), pp. 184-189.

Korea will invest 32 trillion won during the 1997-2001 period--improving air quality 10 trillion won, water quality management 13 trillion won, drinking water management 3 trillion won, and waste management 5 trillion won. Central government, local governments and the private sector will finance these programs 11 trillion won, 11 trillion won and 10 trillion won respectively, almost equally. (Ministry of Environment, Comprehensive Plan, 1999). The fifth five-year development plan (1993-1997) showed a dramatic growth and then downturn. Per capita GNP rose to $10,548 in 1996, and downed to the financial crisis in 1997, and plunged to negative economic growth in the first half of 1998, and recovered to the pre-crisis situation in the second half of 1999.

In 1997, the Department of Environmental Affairs employed 392 people at its headquarters; its research centers had 214 employees and its regional offices had 699 employees; its training center had 37 faculty and staffs; and the environmental dispute resolution court had 18. (Ministry of Environment, White Paper, 1997). The government, under the economic crisis, forced to cut the manpower across the board. The Department of Environmental Affairs is no exception.

Korea's environmental policy is based on two principles--the 'polluter pays principle' and the 'pollution-prevention principle.' Financial control and environmental education are therefore two strong program measures. Fines and penalties are relatively stiff.

Environmental impact statements are first reviewed by the regional environmental managers of the Ministry of Environmental Affairs and by the Korea Environmental Institute, a think-tank of the Ministry of Environmental Affairs. The Environmental Fund which is made up of fines and penalties, government money and private donations, allows small and medium-sized industries to acquire non-polluting technologies and facilities at a low interest rate. Loans are up to 20 billion won at 7 per cent interest for a 10-year term. The fund was created on 1 September 1983 and by 1988, it had absorbed 822 billion won. But the fund became part of the Environmental Improvement Accounts in 1994. The Environmental Improvement Accounts are complex: local governments

have low-interest loan (3-5 per cent for 5-10 years' return) for their wastewater plant construction, solid waste incineration projects, and drinking water plant improvement projects, and the private sector organizations have shorter term (3-5 years' return) low interest loan (6.5 per cent to 8 percent). The 1996 Environmental Improvement Accounts are 982 billion won. (Ministry of Environment, Environmental Loan Program, 1998).

Environmental Questions

An industrial economy inevitably suffers air and water pollution, toxic wastes, occupational accidents and disease, and some unsafe products. Environmental consciousness is more scientific than political, and environmental difficulties are more political than scientific. The fundamental problems are human ignorance, limited scientific knowledge and technology, public attitudes and the efficacy of government regulation. The US and Korea face the same kind of environmental difficulties. In the 1980s in Korea, houses were the major source of pollution---70 per cent of water pollution, 60 per cent of sulfur dioxide and 70 per cent of solid waste (Environmental Protection Agency, 1989). Households still burned coal, which generated sulfur dioxide, and led to acid rain. Expanding industry and an increase in automobile ownership is making environmental management an even more formidable task. The number of automobiles has increased 13 per cent annually since the early 1980s, and in 1996 ownership reached 9,563,092 and now more than 10 million. CO, HC, NOx, PM are threatening pollutants to human health and ecosystems of major cities. Korean cars are burning leaded gas in order to cut the energy cost that hurt air pollution worse. Seoul alone has reached 2.25 million cars in 1998, and it is the second worst air polluted city next to Mexico City on Earth (Ministry of Environment, White Paper, 1998). Industrial wastewater is increasing 20 per cent annually, whereas residential wastewater is rising by 7 per cent.

The current US environmental program focuses on chemical and nuclear-waste management. Korea's main environmental concern is clean water, quality and quantity, but it will have to tackle chemical and nuclear-waste management sooner and later. Nuclear power generated 53.1 percent of Korea's electric power in 1997 and will generate more in the future, and thus nuclear waste management will certainly become a serious matter to Koreans. Selecting waste-dumping sites is not easy in Korea, a small country with 45 million inhabitants. The preliminary sites proposed by the government invited violent protests from the environmental group members and residents. The government withdrew the proposed sites. Not in my backyard is powerful in Korea (Choi, 1998).

The single most important step for environmental management is a clarification of the environmental goals of the nation. It is impossible to make the environment pristine or reduce environmental risk to zero. Goals such as eliminating all polluting discharges into a nation's waterways by a certain year is unrealistic and environmental goals should be set reasonably against economic trade-off. Idealistic goals are just pies in the sky.

The prevailing trend towards environmental litigation and confrontation in the US has not been seen in Korea. Korean culture does not like litigation and government bureaucrats are highly esteemed. Korea's Department of Environmental Affairs regulates and protects industries by acting as a mediator or judge between plaintiffs (environmentalists, for example) and defendants (industries, for example). Korea has set up US-like environmental laws and regulations, but does not enforce them faithfully. Enforcement is an area of serious difficulties. Small and medium industries cannot afford to install modern environmental technologies, or the best available technology available. Sympathy and compassion is really harmful to the general societal interest. The serious economic crisis in the 1997-1998 years bankrupted many small chemical waste management companies. They abandoned their waste, and went to the bankruptcy declaration. This is becoming a serious issue. Korea needs the Superfund-like comprehensive law which can governs the post-bankruptcy period.

The Korean National Assembly in 1991 enacted a law aimed at resolving environmental conflicts. A new organization in the Environment Ministry is supposed to ensure speedy and fair resolution of disputes between environmental offenders and victims, although victims have so far not won many cases because of their limited resources. Skilled investigators and mediators are badly needed in Korea. Major daily newspaper and television reporters act as the prosecutors to bring environmental deterioration to the general public.

Environmental crises require immediate political action, while permanent problems require planning analysis in all nations. Korea's Department of Environmental Affairs in Seoul is engaged in planning and analysis, and its regional offices are engaged in action-oriented programs. But Korea is a political society. National politics prevails over regional and local environmental affairs. Everything is seen from the national perspective. Environmental groups are all national. They are all idealistic in demanding no nuclear power, no more dams. Korea relies heavily on nuclear power and needs more water stored for dry seasons. Korea has the summer heavy rain, and dry nine dry months. The US is a continental country with 50 states. Korea is a unitary state of Indiana-size, so all environmental issues can be national. However, environmental issues have not yet emerged as presidential election issues. Still the economy dominates national politics. Environmental issues are not imminent compared to the economic crisis.

The scientific basis of environmental management is relatively weak in Korea, where environmental science and its related technologies are comparatively new. However, the transfer of technology has been rapid and impressive

in the last few years. For example, differential regional air-quality standards and enforcement are modeled after the US and telemetry systems, and computer links between stack monitors and regional control centers have been established. Technologies are mainly imported from the US and West European nations. Foreign technologies are troublesome; for example, Korea's solid waste is generally food waste that contains high moisture so that foreign incinerators are not most effective.

Training, education and international exchange of information are emphasized in Korea. Korea has initiated an international environmental conference with Japan, China, Taiwan and North Korea, which will result in more cooperative joint research projects such as acid rain, oil spill, the Yellow Sea environment, migratory birds, long distance travelling air pollution, endangered species, wet land protection among ideologically conflicting nations. And in 1992, in Vladivostok, at a UN Environmental Program (UNEP) meeting, Korea, Japan, China, and Russia agreed to form a regional cooperative body to protect the common environment of the North-West Pacific. Each country has submitted its national reports. Russia's dumping of its nuclear wastes in waters near Japan and Korea caused a serious concern, and Taiwan's exporting plan of its nuclear waste to North Korea and elsewhere has become a grave issue to South Koreans. Russia was in violation of the international moratorium on dumping radioactive wastes at sea. Who really knows how much of what radioactive substances were thrown where in the ocean during the years of Soviet secrecy? No one really knows what the impact of using the ocean for disposal of nuclear waste has been (Earle, 1995).

The People's Republic of China has set up 18 industrial development districts in the coastal areas of the Yellow Sea, which Korea shares with China. Once China has fully industrialized Dalian, Jinxi, Beijing, Tianjin, Yantai, Qingdao, Lianyunggang, Nantong, Shanghai, Hangzhou, Wenzhou and Fuzhou, it is possible that Korea may be affected by China's pollution through the air and in sea waters. The Yellow Sea is only 100-meter deep waters. The tragedy of commons are clearly in the Yellow Sea. Acid rain falling in the Korean Peninsula and the East Sea are originated from China's coal-burning industries and modernization programs. Korea is a small country to register its environmental complaint to the China court. The UN environmental organizations should be involved in international environmental problem-solving.

Associated Press reported Asian air pollution reached the US West Coast in March 1999. American researchers detected CO, radon, aerosols, HC and other chemicals in air arriving at Cheeka Peak Observatory in the Washington State. Dan Jaffe and his research team published in the March 15 issue of Geophysical Research letters that 146 parts per trillion (ppt) of peroxylacetyl nitrate in air samples arriving from Asia, jumping to 201 ppt on the strongest day. By comparison, air samples not containing Asian air had just 71 ppt. They concluded that 22 percent of the CO arriving at Cheeka Peak originated in East Asian emissions. It is a small world. In this small world, scientists are able to tell the difference between coal sulfur dust from Shanghai and typical industrial pollution from Manchurian smelters. (Korea Times, March 6, 1999, p.1)

Korea is a victim of yellow dust (or yellow sand) in early spring, sometimes even in January. Yellow sandy dust originated from the desert in Hubei and the upper part of China's Yellow River and Mongolian highland arrives on the Korean Peninsula via strong westerly wind and can be observed in Seoul, Inchon, Suwon and inland, as well as in eastern Kangwon province, Cholwon and Kangrung on the East Coast. In the southern area, it is also spotted in Pusan and western coastal cities, Sosan and Kunsan and even in Huksan Island off Mokpo. Korea as a whole is victimized by this troublesome dusty wind which reduces visibility to only three to five kilometer in Seoul and other cities. Children and the elderly are advised to stay inside the house and to rinse out their throats and wash their hands right after exposure to the yellow dust. (The Korea Times, January 26, 1999, p.3) Yellow sand dust comes with rain in spring. This yellow dust does not care the national boundary line. China should not be blameable for this sand dust. However, the dust wind and rain contains harmful elements to human health.

President Kim Dae-jung visited China in November 1998, and besides other geopolitical issues of the region, he also took part in a three-nation meeting designed to discuss ways of working together to reduce air pollution and other types of environmental hazards in the region. He is a win-win strategist for China, Japan and South Korea. The first ministerial talks among South Korea, China and Japan were held in Seoul in January 1999. Seoul's stance at this meeting was to ask China to prevent its pollutants from reaching the Korean Peninsula via pathways in or over the Yellow Sea. At the same time, Seoul asked Tokyo to allow the transfer of advanced technology into Korea to combat with rising pollutants in the country.

China's Social Science Research Institute research team reported in 1998 that the Yellow Sea was the Death Sea. Industrial waste caused eutrophication which caused red algae that caused the reduction of harvest from the sea. (Chosun Ilbo editorial, April 10, 1998, p.3) Fishing in the Yellow Sea may be futile in the near future, because humans cannot consume the fishes from the polluted sea. South Korea's rivers carry the pollutants to the sea, but

the China's Yangtze River and other rivers carry far more toxic pollutants to the sea. The Yellow Sea also pollutes the South Sea and the East Sea. China's water resources management is just horrible compared to South Korea's at this present time. Point sources and non-point sources should be controlled by higher standards with much higher investments in water resources management in China and Korea. Overall China's environmental management score is deplorable (Lam and Tao, 1996).

The Yellow Sea deserves care as much as the North Sea and the Mediterranean. The Yellow Sea experiences the oil pollution, destruction of coal reefs and mangrove swamps, siltation, threats to public health and fisheries. Coastal areas consisting of coral reefs and mangrove swamps represent a particular environmental concern not only because such ecosystems serve as a significant source of food supplies, but also because they contain a number of rare species of flora and fauna unique to this region. The Yellow Sea conservation is a tragedy of the commons. Without a win-win strategy for China, Japan and Korea, the sea cannot be preserved.

The East Asian nations have not yet made an orchestrated effort environmentally. Therefore, Nagelian win-win strategy is badly needed. Rhetoric so far at the international environmental conferences have prevailed. A small step toward the East Asian environmental cooperation was taken at a meeting in Seoul before the end of 1999. 21 environmental experts from China, Japan, Mongolia, Russia and South Korea, the UN Economic and Social Commission for Asia and Pacific (ESCAP), the Asian Development Bank, and the UN Development Program. The focus of the conference was on the operation of the Northeast Asian Subregional Program of Environmental Cooperation (NEASPEC) and the Northwest Pacific Action Plan (NOWAP).

NEASPEC was launched in 1993 by China, Japan, Mongolia, Russia, North Korea and South Korea. So far, the organization has adopted a framework on cooperation in the fields of energy and atmospheric pollution, eco-system management and capacity building. NEASPEC's projects have been funded by the Asian Development Bank. Among these were such projects on pollution reduction in coal-burning power plants, environmental monitoring and improvement of efficiency of electrostatic precipitators. ESCAP is acting as the organization's secretariat. The organization has not made its own fund yet. Transboundary air pollution can be curbed by mutually beneficial win-win strategy and its implementation.

NOWAP, on the other hand, was established in 1994 by China, Japan, Russia and South Korea with the purpose of dealing with ocean pollution and the environment. At the outset, it decided to raise $500,000 yearly for its trust fund, but the target has yet to be met. UNEP is its secretariat. North Korea attended some of the preliminary meetings held before its launch, but has failed to join, citing financial difficulty in contributing to the fund. Four regional centers are designed for the win-win strategy:

The Data and Information Network: Beijing, China
The Pollution Monitoring: Vladivostok, Russia
The Marine Environmental Emergency Preparedness and Response: Taejon, South Korea
Special Monitoring Coastal Assessment: Toyama, Japan

South Korea and Japan have established the regional activity centers in Pusan and Niigata. Two neighboring nations will host WorldCup 2002. The two nations are seeking a win-win strategy in marine environmental protection and soccer sports. China, North Korea, Mongol, and Russia are not yet ready to join the win-win strategy on equal footing because their economic conditions are not ready. However, the latter should make the win-win strategy success for themselves and for regional peace and environmental care. Gobi Desert and Siberian wasteland can be offered for potential hazardous waste disposal sites for China, Japan, South Korea, and Taiwan. All those nations are heavily relying on nuclear power for electricity. None has had permanent nuclear waste disposal sites. Siberian timber and natural gas can be piped to China and Korea.

East Asian nations are seeking a win-win strategy, and created five demonstration projects in three areas as following:

(1) Energy and air pollution: 2 projects
    -Reducing SO2 from coal burning power plant and operation, and training for this project
    -Clean burning coal
(2) Ecosystem management: 2 projects
    -Regional bio-diversity management plan
    -Deforestation and desertification
(3) Capacity building: 1 project

-Collection and analysis of pollution data and comparability data presentation

China, Japan and South Korea are making division of work for regional environmental management and care. Yellow dust cannot be handled without adequate care of desertification. Acid rain cannot be handled without adequate care of bio-diversity. Planting trees in the Mongolian desert land has been done by South Korean civic environmental organizations. Environmental problems cannot be solved by individual nations alone. That is well recognized. That is the beginning of the win-win strategy. Climate change, sustainable development, environmental information networking, and international cooperation all come from the win-win strategy for regional environmental management.

Lawyers, environmental scientists and engineers, and bureaucrats are working as a team in Korea. They should seek a win-win strategy for the nation's environmental protection and nature conservation. Lawyers do not usually understand the nature of scientific and technological data. Scientists do not usually understand regulatory processes and politics. The resulting environmental regulations are often arbitrary, uninformed and inefficient; they are costly and do not accomplish their goals effectively. Whilst this is often the case in the US, Korea and many other nations adopted the US regulations.

Win-Win Strategy

Korea is a small country in the throes of urbanization and industrialization. Korean economy has maintained high growth over the last three decades. As a result, Korean environmental quality has been deteriorated. Korean media has been highlighting environmental problems and many Korean consumers are concerned about the use of soaps,

shampoos and detergents. But the public and private funds that are being made available are still insufficient to meet the urgent environmental tasks, despite a large increase in recent years.
The present environmental problem is drinking water. The main source of drinking water for 20 million Koreas in Seoul and its vicinity is deteriorating seriously: nitrogen and phosphorous in the Paldang reservoir are at the unacceptable level. The farmland's excessive fertilizer, pesticide and herbicides are flowing into the reservoir by the rain, and the wastewater treatment system is available at 70 per cent of the homes and offices, and 30 per cent are flowing into the reservoir without treatment. More importantly, the treatment system is not working at 100 per cent. More serious threats to the water are from untreated cows, pigs, and chicken wastes. The Korean Ministry of Environment has been wastefully spending 440 billion won to clean up the reservoir since 1990. The water quality is deteriorating, not improving, despite an enormous investment. The point and non-point sources of pollutants should be stopped in order to restore the water quality.
The present financial crisis does not help environmental management. However, the wise investment in environmental management may cure economic illness. This writer proposed a creation of the US Peace Corps-like Korean environmental corps, and young college graduates join the environmental corps to educate farmers, small businessmen and women, industrialists on man-nature relationships and basic environmental regulations, to participate in civil works to improve the drinking water and wastewater plants and distributive systems, pipelines every 5 meter is leaking in Seoul's underground, and to cleanup and dredging the river. 8 billion won was set aside for unemployment compensation. Such a money can be invested more wisely in the environmental campaign.

This researcher hopes all developing nations see the dark side of economic development as Norman Eder described in his Poisoned Prosperity (Eder, 1996). The dark side may make the economic development a meaningless achievement. A good economy should not ignore green quality of life, environmentally sound and sustainable development, preventive policies and regulations. A win-win strategy is useful for South Korea's environmental problem-solving. The win-win strategy will bring up a comprehensive environmental outlook. Specifically, water right legislation as a win-win strategy will reduce the water consumption and control water needs/wants under limited available water resources. Clean river protection and water conservation are two sides of one coin. Deciding water rights according to the expected available resources divided by the present water use by each province along the river basin will settle the water conflicts among the provinces, and the Central and Provincial Governments. The Central and Provincial Governments will jointly make a forecasting model each year based upon the last 30 years' rainfall data---above the average, average and below the average, and then allocate the maximum water use by provinces. Water trade concept will also be useful between among the provinces like the states along the Colorado River. Energy-efficiency legislation raising gasoline tax while retarding individual car ownership as a win-win strategy will make energy resource-poor Korea and East Asian nations to conserve energy and to award energy efficient house, office, and industry. Coal-burning power plants and industries and gasoline burning cars are the major causes of air pollution, acid rain and global warming. Energy efficient strategy itself is a good environmental policy. Construction of more nuclear power plant is strongly opposed by the environmentalists in Korea and East Asia. No more construction of nuclear power plant can be a precondition to bring environmentalists to the negotiation table for searching for nuclear waste disposal site. Searching for a disposal site of radioactive waste is becoming a serious problem in South Korea. Landfill, and incinerators for solid waste and chemical waste are not easy, because violent oppositions with a slogan, "Not in My Backyard!" Therefore, a win-win strategy can be acceptable to the environmentalists and energy industry-government. South Korea's generous economic and humanitarian aids to North Korea in the midst of its financial and economic troubles will be compensated by North Korea's offer to the South a possible radioactive waste disposal site. Regionally, Siberia and Gobi Desert can be potential sites of radioactive waste disposal site for China, Japan and Korea as a compensation of Japan and South Korea's economic aids and technology transfer to China and Mongol. A win-win strategy for economy and environment, for the Central Government and Provincial Government, for consumers and producers, and for one nation and region/subregion is desirable.

Environmental management in Korea is very closely related to the East Asian regional eco-system. Therefore, it should not be seen just one national environmental management, but a part of an international environmental policy and management. It is a small world. It is One Earth.

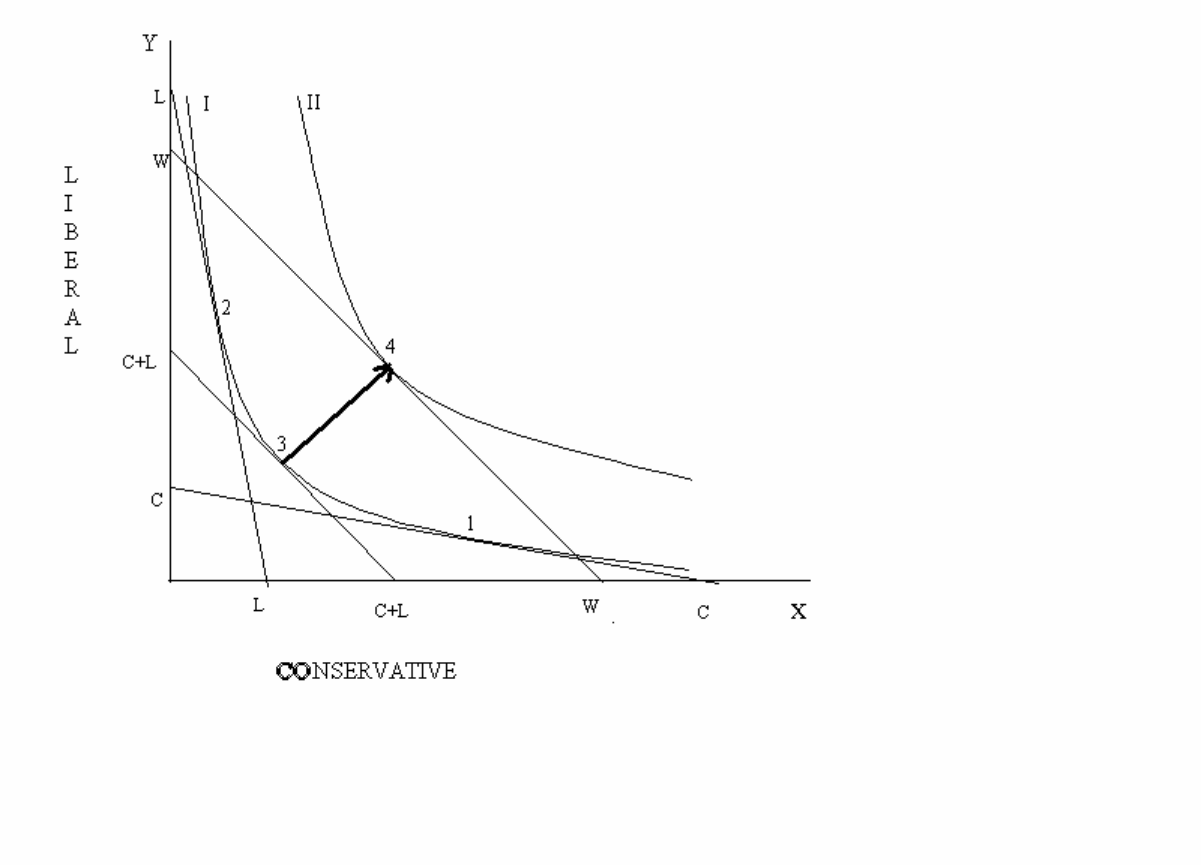
Table 13. Win-Win Strategy for Korean Environmental Policy: Nuclear Waste Management

GOALS ALTERNATIVES	Nuclear Industry	Environmental Conservation
Government Siting of Radioactive Waste	+	-

Disposal Facilities		
Environmentalist No Nuclear Power	-	+
Alternative Strategy Remuneration for the volunteering local government	**0**	**0**
Win-Win Policy No more nuclear power plant, and the best scientifically proven site; a possible radioactive site in North Korea with economic and humanitarian aids; Siberia and Gobi Desert site with economic aids/technology transfer.	++	++

Graphic Illustration of Win-Win Strategy

The win-win strategy of Korean environmental policies yields a super-optimal solution which would produce much higher utility to the nation (or society), as illustrated in the following graph:



The concave curve I-I refers an indifference curve of the social (or national) utility, any point of which shows the same utility to the society (or nation) under consideration on the curve of any combination of policies depicted in X-axis and Y-axis.

The straight line C-C indicates a strategy of the conservative policy, while the straight line L-L a

strategy of the liberal policy. And C+L line indicates some combination of both conservative and liberal policies.

When the C-C strategy is pursued, the optimal point is reached at the point 1, which produces a positive output leading to the conservative goal, while producing a negative output leading to the liberal goal. But as the L-L strategy is pursued, the optimal point is reached at the point 2 which generates a positive output to the liberal goal, while generating a negative result to the conservative goal. If, as a compromising skim, some kind of combination strategy of the conservative and liberal policies C+L is pursued, it reaches at the optimal point 3, which gives no preference to the conservative goal nor to the liberal goal. At any event, the optimal points, 1, 2, and 3, are located at the same indifference curve of the national utility, which indicates that any policy, C-C, L-L, or C+L, does not improve the national utility at all.

However, when a win-win strategy W-W is pursued, the optimal point is reached at the point 4, which is located in the higher indifference curve II-II of the national utility. It means that the win-win strategy produces more utility to the nation (or the society) under consideration. The W-W strategy is more than the combination of the conservative and liberal strategies and includes the enhanced policy choices and creative ideas under the consideration of national perspectives. 1, 2, and 3 are the local optimal solutions, while 4 are said to be the super optimal solution.

Notes and References

Bank of Korea(1962, 1967), National Income in Korea(1972, 1977, 1981).

Earle Sylvia A(1995), Sea Change: A Message of the Oceans, New York: Fawcett Columbine, pp.304-5.

Eder Norman(1996), Poisoned Prosperity: Development, Modernization, and the Environment in South Korea, New York: M.E. Sharpe.

Environmental Protection Agency(1989), Environmental Protection Policy in the 1980s. pp 192-3.

Kim Chi-Ha(1974), Cry of People and Other Poems, Japan: Autumn Press, p.92

Lam Kin-che and Tao Shu(1996), Environmental Quality and Pollution Control," Shanghai: Transformation and Modernization under China's Open Policy. Hong Kong: The Chinese University Press.

Lee Yung Whee, Bruce Ross-Larson and Carry Pursell(1984), Korea's Competitive Edge: Managing the Entry into World Markets, Baltimore: the Johns Hopkins University Press.

Ministry of Environment(1997), The Second Environmental Improvement Comprehensive Plan, 1997-2001, p. 185.

Ministry of Environment(1997), White Paper, p. 340-7, p. 627

Ministry of Environment, White Paper(1998), pp.35-56

Ministry of Environment(1998), Environmental Loan Programs.

Ministry of Environment(1999), White Paper.

Nagel Stuart(2001), Win-Win Policy for Developing and Industrial Nations: Six Examples, International Journal of Urban Sciences, Vol. 4, No.2

US Department of Commerce Bureau of Census(1976), Bicentennial Statistics, Table 614, p.393. 4.

Rachel Carson, Silent Spring, Boston: Houghton Mifflin, 1962.

Westphal Larry , Lee Yung Whee and Carry Pursell(1981), "Korean Industrial Competence: Where It Came from," World Bank Staff Working Paper No. 469.

Yearn Hong Choi(1999), Conflict Resolution Nuclear Waste Disposal Site Selection: Lessons from the US to Korea, Korean Society and Public Administration, Vol.10, No.2, pp. 235～251.

Yearn Hong Choi(1999), Korean NIMBY Syndrome of the Radioactive Waste Disposal site, Journal of Environmental Policy and Administration, Vol. 7, No.2, pp.175-203.

Yearn Hong Choi(2001), Cooperative Environmental Efforts in East Asia: the Past and Future, a paper delivered to the Woodrow Wilson Center on February 2, 200l.

Yu Suk-Hyun(1991), "Citizens' Interest and Environmental Policy," The World (in Korean), December , p.228～229