

## THE ENVIRONMENTAL PROBLEMS IN URBAN COMMUNITIES AND THE PROTECTION OF THE ENVIRONMENT IN KOREA\*

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*This paper examines the current state of air and water pollution in Korean urban communities. Then, this paper describes the policies of the Korean government in protecting the environment from pollution. This paper also discusses the types and activities of the non-government organizations (NGOs). Specifically, this paper emphasizes the role of the NGOs in protecting the environment and educating the importance of the environment to the public.*

### INTRODUCTION

Korean government has consecutively adopted five-year economic development plans since 1962. Due to the continuous adoption of economic development plans, Korea has experienced very rapid processes of both urbanization and industrialization. Before the first five-year economic development plan, both urbanization rate and GNP (Gross National Product) per capita were very low. The proportion of the population living in cities was only 28% in 1961. Since then, the proportion has continuously increased, reaching to 74% in 1990. The proportion of the population living in cities and of that living in rural areas have reversed in 30 years. In 1961, GNP per capita was as low as US\$ 82. But within 30 years, it increased to US\$ 5,569 in 1990.

Korea has traditionally been an agrarian country. In 1961, 44.1% of the GNP was in agriculture. But in 1990, the proportion of GNP in agriculture dropped to just about 9.1%. During the several five-year economic development plans, most of the economic growth has been due to the growth of the manufacturing industry (Kim, I. 1991). In 1961, the proportion of the manufacturing industry in GNP was only 13.4%. By 1990 it increased to 29.2%. Before industrialization, Korea was free from any kind of pollution. But since the acceleration of the industrialization process, the country has continuously been contaminated with pollution. The processes of

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both urbanization and industrialization have contributed to the deterioration of the urban environment.

In urban communities in Korea, the levels of some measures in both air and water pollution are over the tolerance limits (Kim, K. 1991; Kim, I. 1994). Contamination with these kinds of pollution has brought about serious worries among Korean people. According to a survey on the health status of inhabitants in several industrial complex areas, many inhabitants have worried about the deterioration of health due to the various kinds of environmental pollutants. In Ulsan Industrial Complex Area, the proportions of the respondents who complained about problems with eyes, cardiovascular system, and skin were 31.0%, 22.7% and 67%, respectively (Suh *et al.* 1981). The proportions were significantly higher than those of the residents in control areas. Thus, in some townships all of the people had to evacuate because of severe damages on health and wealth. Tens of thousands of natives gave up their hometown and occupation, which caused a serious social problem.

The first anti-pollution law in Korea was established in 1963, one year after the initiation of the first five-year economic development plan. At that time there was no immediate worry about pollution at all. So, the law had not been enforced for a long period of time. As industrialization has accelerated since the 1970s, however, the environmental problems have increased in attention. As a positive response to environmental problems, the 'Environment Protection Law' was established in 1977. But the enforcement of the law has not been strict and the general public were not allowed to protest against or participate in governmental policies until 1987 (Kim, J. 1991). Since the "declaration of democratization" in 1987, numerous non-government organizations (NGOs) have been established. The role of these NGOs has been very critical in protecting the environment.

This paper describes the environmental problems in urban communities, specifically focusing on air and water pollution. Then, this paper discusses the policies of the Korean government in protecting the environment from pollution. Finally, this paper deals with the activities of the non-government organizations in protecting the environment and educating the public of the importance of the environment.

## ENVIRONMENTAL PROBLEMS IN URBAN COMMUNITIES

As rapid industrialization and urbanization proceed, Korea has experienced drastic changes in number and volume of environment-related factors. Table 1 compares some of the environment-related factors in Korea

during the years of 1961 to 1985. In 1961, the number of factories having more than five employees was 15,204, but it increased to 44,037 in 1985. The number of automobiles in 1961 was only 29,234, but in 1985 it increased to 1,113,430, which is 38.1 times of that in 1961. The use of chemical materials has also continuously increased over time. The use volume of chemical materials was 4.1 million tons in 1961, but it increased to 6.8 million tons in 1985. The use volume of both chemical fertilizer and agricultural chemicals has drastically increased from 1961 to 1985 by 3.1 times and 10.1 times, respectively. The volume of wastes has also steadily increased over time. The volume of household wastes in cities increased from 26,831 tons per day in 1978 to 61,072 tons per day in 1985. The volume of industrial wastes increased from 13,130 tons per day in 1981 to 33,349 tons per day in 1985.

The absolute increase of these environment-related factors has directly affected various kinds of pollution in Korea. This paper deals with the pollution in urban communities, specifically focusing on air and water pollution.

### *Air Pollution*

Two factory workers in Seoul recently (May 1991) died of pollution-related health problems. These deaths prompted a series of demonstrations not only by factory workers but also by several anti-pollution organizations. Pollution-related chemical materials bring about many kinds of diseases. For example, sulphur dioxide (SO<sub>2</sub>) causes many kinds of respiratory diseases, sometimes leading to pulmonary emphysema. Sulphur dioxide is exhausted mainly because of the combustion of coal briquets, which are used by most Koreans for cooking and heating.

TABLE 1. COMPARISON OF ENVIRONMENT-RELATED FACTORS IN KOREA BETWEEN 1961 AND 1985

| Environment-related factors                   | 1961 (A)         | 1985 (B)  | B/A  |
|---|------------------|-----------|------|
| Number of factories (over 5 people)           | 15,204           | 444,037   | 2.9  |
| Number of automobiles                         | 29,234           | 1,113,430 | 38.1 |
| Use volume of chemical materials (ton)        | 4,132,634        | 6,799,959 | 1.7  |
| Use volume of agricultural chemicals(ton)     | 1,807            | 18,047    | 10.1 |
| Use volume of chemical fertilizer(ton)        | 261,995          | 803,000   | 3.1  |
| Volume of household wastes in cities(ton/day) | 26,831<br>(1978) | 61,072    | 2.3  |
| Volume of industrial wastes (ton/day)         | 13,130<br>(1981) | 33,349    | 2.5  |

Source: Kim, I. (1991).

Nitrogen dioxide ( $\text{NO}_2$ ) brings about asthma, bronchitis, pulmonary emphysema, and even lung cancer. Nitrogen dioxide originates mostly from the exhaust fumes from automobiles and air discharge facilities.

Carbon monoxide (CO) from the coal briquets also causes many kinds of respiratory diseases including stenocardia. Dust from cement manufacturing factories and the many kinds of combustion apparatus and exhaust fumes could also possibly lead to pneumoconiosis. Oxidants affect eye and respiratory diseases.

Besides the specific diseases due to the chemical particles in the air, the so called 'building syndrome' is arising as a new pollution-related problem in big cities. The 'building syndrome' is due mainly to indoor air pollution, especially in closed rooms. Chemical particles affecting indoor air pollution are radon, asbestos, various kinds of combustion gas, cigarette smoke, fungus and bacteria. Those who live in closed rooms and are affected by the 'building syndrome' have headaches, dizziness, nausea, bronchitis, and asthma.

Then, what is the current state of air pollution in cities? Table 2 illustrates the levels and volumes of chemical materials which bring about air pollution in six big cities. The population size of each city is over 1 million. Seoul is the biggest city in Korea, with the population of 10.6 million. Both the levels and volumes of air pollution as indicated by some measures of chemical materials are mostly much higher in Seoul than in other cities. The level of  $\text{SO}_2$  (sulphur dioxide) in Seoul (0.051 ppm) is slightly over the tolerance limit of Korean standard. The levels of  $\text{SO}_2$  in other cities range from 0.044 ppm (Daejun) to 0.017 ppm (Kwangju). The level of TSP in Seoul is equal to the tolerance limit. The level in Daejun is much higher than the tolerance limit. However, the levels in other cities are somewhat lower than the tolerance limit. Table 2 indicates that the levels of CO (carbon monoxide) are much lower than the tolerance limit in all the big cities. The levels of  $\text{NO}_2$  (nitrogen dioxide) in all the cities also appear lower than the tolerance limit. Considering that the tolerance limits of air pollution in Korea are much higher than those in other developed countries (Chang 1991), however, it is hard to evaluate exactly the current state of air pollution in Korea.

Table 2 shows that the current state of air pollution in Seoul was more problematic than in other big cities. Then, let's look at the trends of the levels of air pollution in Seoul. Table 3 indicates the trends of air pollution in Seoul. Since 1980,  $\text{SO}_2$  (Sulphur dioxide) has been consistently over the tolerance limit (Korean standard). Dust (TSP) has also been over the tolerance limit. But during the Olympic period in 1988, the average levels of

SO<sub>2</sub> and dust were much lower than the tolerance limit. At that time the Korean government ordered many pollution-making shops such as public baths to close for two weeks. This was the main reason why the levels of SO<sub>2</sub> and dust sharply dropped during the Olympic period. The level of NO<sub>2</sub> (Nitrogen dioxide) has steadily increased. It was only 0.018 ppm in 1975, but in 1990 it increased to 0.068 ppm, which is greater than the tolerance limit.

The level of CO (carbon monoxide) was very high in 1975, but since then it has decreased to the normal condition. The level of HC (hydrogen carbon) was a little lower than the tolerance limit in 1980, but in 1985 it increased to 4.13 ppm, which is greater than the tolerance limit. Since then, no data on this item has been available. The situation of oxidants in 1990 was very bad. The level (0.102 ppm) was five times greater than the tolerance limit.

The levels of air pollution mentioned above are the average scores for the year. But the level of the pollution fluctuates depending on the time and the place. The air pollution situation gets worse during the winter. In Korea, most people in households use coal briquets for heating and cooking. In recent years, many people have changed their heating system from coal

**TABLE 2. THE LEVELS AND VOLUMES OF AIR POLLUTION IN SIX BIG CITIES (1990)**

|         | population<br>(1,000) | SO <sub>2</sub> |                   | TSP                           |                 | CO             |                 | NO <sub>2</sub> |                    |
|---------|-----------------------|-----------------|-------------------|-------------------------------|-----------------|----------------|-----------------|-----------------|--------------------|
|         |                       | level<br>(ppm)  | volume<br>(ton/y) | level<br>(Mg/m <sup>3</sup> ) | volume<br>(t/y) | level<br>(ppm) | volume<br>(t/y) | level<br>(ppm)  | volume<br>(t/year) |
| Seoul   | 10,628                | 0.051           | 138,035           | 150                           | 48,947          | 2.6            | 639,600         | 0.030           | 128,423            |
| Pusan   | 3,798                 | 0.038           | 90,112            | 140                           | 24,765          | 1.5            | 183,492         | 0.019           | 113,281            |
| Daegu   | 2,229                 | 0.041           | 40,453            | 134                           | 11,931          | 1.9            | 113,972         | 0.018           | 28,130             |
| Kwangju | 1,145                 | 0.017           | 86,456            | 109                           | 13,873          | 1.5            | 93,218          | 0.014           | 55,361             |
| Inchon  | 1,818                 | 0.029           | 15,628            | 115                           | 6,070           | 2.2            | 63,506          | 0.019           | 13,692             |
| Daejon  | 1,062                 | 0.044           | 16,742            | 170                           | 4,980           | 3.2            | 52,892          | 0.021           | 13,150             |

Notes: Tolerance limit (Korean Standard); SO<sub>2</sub>(0.05 ppm), TSP(150 ug/m<sup>3</sup>), CO(8 ppm), NO<sub>2</sub>(0.05 ppm).  
Source: Ministry of Environment (1991a).

**TABLE 3. TRENDS OF THE LEVELS OF AIR POLLUTION IN SEOUL, 1975~1990**

| Item            | Tolerance limit<br>(Korean Standard) | 1975  | 1980  | 1985  | 1988             |  | 1990  |
|-----------------|--------------------------------------|-------|-------|-------|------------------|--|-------|
|                 |                                      |       |       |       | (Olympic period) |  |       |
| SO <sub>2</sub> | 0.05 ppm                             | -     | 0.094 | 0.056 | 0.015            |  | 0.051 |
| Dust(TSP)       | 150 Ug/m <sup>3</sup>                | -     | 161   | 200   | 63               |  | 150   |
| NO <sub>2</sub> | 0.05 ppm                             | 0.018 | 0.03  | 0.034 | -                |  | 0.030 |
| CO              | 8 ppm/(month)                        | 8.5   | 2.8   | 2.7   | -                |  | 2.6   |
| HC              | 3 ppm/(year)                         | -     | 2.4   | 4.3   | -                |  | -     |
| Oxidants        | 0.02 ppm/(year)                      | 0.013 | -     | -     | -                |  | 0.102 |

Source: City of Seoul (1976, 1990a, 1990b).

briquets to gas boilers. But the use of coal briquets is still the most popular means of heating in Korea, especially in poor communities.

A survey of the living conditions of the lower class people in Seoul (Chun *et al.* 1989) indicates that 41.7% of the poor in Seoul use pure coal briquets for heating and 57% of the people in poor communities use boilers using coal briquets for heating. The remainder (1.3%) use other methods (gas boiler, oil boiler, etc).

### Water Pollution

As industrialization proceeds, the water quality in Korea has become a serious problem. In accordance with industrialization, both the number of factories and the volume of industrial waste water have greatly increased. Table 4 shows that the number of factories that produce industrial waste water was 3,984 in 1980, but it increased to 13,504 in 1990. The volume of industrial waste water was 1.9 million m<sup>3</sup>/day in 1980, but it increased to 7.3 million m<sup>3</sup>/day in 1990, which is almost 4 times of that in 1980.

The volume of waste water from factories is the most important factor affecting water pollution in the industrial complex areas. The volume of the industrial waste water in Pusan (which has a big industrial complex) is about 6 times of that in Seoul, although the population size is one-third of that of Seoul. In the case of Seoul, however, the most important factor influencing water pollution seems to be the population size. According to a study (Cho 1990), the drained water from residences composes 64.3% of the polluted water in Seoul. The next important factor in polluting the water is the waste water from factories, which composes 35.2% of the polluted water.

Another important factor influencing water pollution is the drainage from livestock. The volume of the drainage from livestock composes only 0.5% of the polluted water. But in terms of the volume of chemical materials, it composes 36.3% of the polluted water. The pollution of upstream water due

**TABLE 4.** TRENDS OF THE NUMBER OF FACTORIES THAT PRODUCE INDUSTRIAL WASTE WATER AND THE VOLUME OF INDUSTRIAL WASTE WATER, 1980-90

(Unit: 1,000m<sup>3</sup>/day)

| Year                            | 1980  | '81   | '82   | '83   | '84   | '85   | '86   | '87   | '88   | '89    | '90    |
|---------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|
| Number of factories             | 3,984 | 4,720 | 5,671 | 5,924 | 6,422 | 7,375 | 7,900 | 8,570 | 9,522 | 11,203 | 13,504 |
| Volume of industrial wastewater | 1,962 | 2,209 | 2,760 | 2,538 | 2,792 | 3,109 | 4,487 | 4,603 | 5,783 | 6,497  | 7,280  |

Source: Ministry of Environment (1991c).

to the waste from the livestock and agricultural chemicals is also a serious problem.

At present, many inhabitants in Seoul do not trust the quality of the drinking water in spite of the assertion by the government that it is safe (Kim, I. 1991). Most of Seoul residents boil water first, then drink it. The proportion of people who buy clean water has steadily increased.

Table 5 shows the trends of B.O.D.(Biological Oxygen Demand) in water filtration plants alongside the Han River, which flows through the center of Seoul. The level of B.O.D. may be used as an indirect measure of the quality of the drinking water. The levels of B.O.D. in Kuwi and Tookdo have steadily increased up to 1975, then decreased somewhat thereafter. The levels of B.O.D. in Noryangjin and Bokwang showed their highest points in 1970, then have sharply decreased. In other water filtration plants, the levels of B.O.D. have continuously decreased since the construction of the plants. Nevertheless, the levels of B.O.D. in all the water filtration plants have exceeded the tolerance limit all through the years.

Many materials affecting water pollution also cause many kinds of pollution-related diseases. Various kinds of chemical materials have recently been found in water reservoirs in Seoul. Those materials are phosphorus, nitrogen, mercury, cadmium, copper, lead, arsenic, and phenol. These kinds of chemical materials do not immediately affect health. However, accumulation and combination of these materials have interaction effects, thus eventually deteriorating the health of those who are contaminated.

TABLE 5. TRENDS OF B.O.D. IN WATER FILTRATION PLANTS ALONGSIDE THE HAN RIVER, 1965-89

| Region       | B.O.D. (ppm) |      |      |      |      |      |
|--------------|--------------|------|------|------|------|------|
|              | 1965         | 1970 | 1975 | 1980 | 1985 | 1989 |
| Kuwi         | 0.5          | 2.0  | 2.2  | 1.6  | 1.7  | 1.6  |
| Tookdo       | 0.6          | 2.5  | 2.6  | 2.2  | -    | -    |
| Noryangjin   | 2.2          | 11   | 6.3  | 3.9  | 4.7  | 3.4  |
| Bokwang      | 7.0          | 13   | 7.4  | 3.9  | -    | -    |
| Youngdeungpo | -            | -    | 8.5  | 5.7  | -    | -    |
| Kayang       | -            | -    | -    | 11.7 | -    | -    |
| Shinju       | -            | -    | -    | -    | 11.4 | 7.6  |

Notes: Tolerance limit in Korea; 0.5 ppm.

Source: City of Seoul, *City Administration of Seoul*, each year.

## THE ENVIRONMENTAL POLICIES OF THE KOREAN GOVERNMENT

Even after the establishment of the first anti-pollution law in 1963, there had been no concrete action of the Korean government until the 1970s. It was only in 1970 that money for the environment was first employed in the national budget. At that time the portion of the money for the environment was only 0.005% (Nishina *et al.* 1989). In 1972, the Korean government launched the first anti-pollution plan and first measured the level of pollution.

During the regime of the late president Park (1962-1979), environmental activities were strictly prohibited and thus environmentalists were harshly treated. Those who publicized pollution issues were interrogated or sometimes forced to leave their positions. Since public demonstrations were not allowed, victims owing to the pollution had to quietly negotiate with the industrial firms. The government used to mediate the negotiations, and most of the negotiations resulted in favoring the industrial firms.

The environmental policy of the government did not change much even after former president Chun took power. The "Environmental Preservation Law" was promulgated in 1979 and the Office of Environment was established in 1980. The Office of Environment was later promoted to the Ministry of Environment. However, there had been no institutional arrangements for public participation. Public participation was limited only to claims for compensations for the damages owing to the pollution in industrial areas. But, even in this case such activity was not noticeable because of the tight control of the government.

As industrialization and urbanization have accelerated, however, the government have realized the seriousness of environmental problems. Thus, the government revised the law regarding environmental impact assessment so that the general public were able to participate in the environment-related decision making. Also, the government put more money for the protection of the environment.

According to Table 6, the proportion of the budget on environment to the national budget in 1980 was 0.186%, which is tremendously higher than that in 1970. Since 1980, the proportion of the budget for environment has continuously increased until the Olympic period in 1988. But it dropped again. The budget for environment in Korea for any year was considerably lower than that in the other industrialized countries (Kim, J. 1991).

Despite the efforts of the government, the urban environment in Korea has not been improved. Instead, it has worsened. It is because the

TABLE 6. BUDGET ON ENVIRONMENT, 1980-89

(Unit: billion won)

| Year | Total Government Budget | Budget for Environment | (B)/(A) |
|------|-------------------------|------------------------|---------|
|      | (A)                     | (B)                    |         |
| 1980 | 6,479                   | 12.1                   | 0.186   |
| 1981 | 8,040                   | 15.2                   | 0.189   |
| 1982 | 9,596                   | 20.8                   | 0.216   |
| 1983 | 10,417                  | 20.7                   | 0.199   |
| 1984 | 10,387                  | 34.3                   | 0.330   |
| 1985 | 12,532                  | 42.1                   | 0.336   |
| 1986 | 13,801                  | 43.3                   | 0.310   |
| 1987 | 16,060                  | 67.1                   | 0.420   |
| 1988 | 18,429                  | 77.3                   | 0.420   |
| 1989 | 19,228                  | 64.2                   | 0.335   |

Source: Kim, J. (1991).

governmental policies have been too weak to keep up with rapid industrialization. Another point is that public participation or demonstration for the protection of the environment have been strongly controlled by the government at least until 1987. Before the declaration of democratization, the government has identified the environmental movement as an anti-governmental movement or anti-establishmental activity, thus the environmental organizations were considered dangerous. This labelling is still somewhat prevalent. Under this circumstance, the general public has mostly refused to join environmental organizations, although they recognize the necessity of the environmental movement.

#### ACTIVITIES OF NON-GOVERNMENT ORGANIZATIONS

Public participation in protecting the environment in Korea has been implicitly permitted after the declaration of democratization in 1987. Since then, numerous non-government organizations (NGOs) have been established.

The NGOs have provided many programs for protecting the environment such as environmental education, environmental monitoring, resource recycling, and many forms of public campaigns. They have been the major pressure groups for urging the government to be more concerned about the environment. Due to the dynamic activities of the NGOs, the government has eventually tried to enact stricter environmental regulations, improve some environmental facilities, and release more environment-related information to the public. Then, what are the characteristics of the NGOs and their roles and activities in protecting the environment?

Milbrath (1984) argues that in the U.S. the environmental movement has

undergone some transformation with time. According to him, the modern-day environmental movement has its roots in a conservation movement. As human degradation of the environment advanced, the movement began transforming to an environmental protection movement. Beginning in the late 60s environmentalists have urged people to question proposed technological advances. Then, fear of nuclear power intensified and spread widely through the population of industrial societies over the decade of the 1970s and continues to increase into the 1980s. Increasing numbers of environmentalists began to recognize that in order to effectively deal with environmental problems, they had to challenge the very foundations of modern industrial society.

In Korea, the environmental movement directed by the NGOs has not been transformed with time as in the case of the U.S. (Milbrath 1984). Most of the non-government environmental organizations have appeared almost at the same time. However, the NGOs are categorized into two groups: one is the government-registered NGOs (registered with the Ministry of Environment) and the other one is the independent NGOs. At present there are about 45 each of government-registered NGOs and independent NGOs (Kim, J. 1991). The main function of the government-registered NGOs has been that of a conservation movement, whereas that of the independent NGOs has been basically an environmental protection movement.

#### *Government-Registered Organizations*

The government-registered NGOs were mostly organized by the government and are thus financially supported by the government. The main activities of these organizations are environmental education, campaign for cleaning up litters in streets and parks, doing research sponsored by the government or industries, coordination among industries in dealing with environmental problems, and promoting friendship among experts in environment (Kim, J. 1991). They rarely engage in anti-pollution activities or opposing environmental policies of the government. Instead, they support environmental policies of the government. Thus, their activities have not often attracted the public attention and trust.

#### *Independent Non-Government Organizations*

Independent NGOs are classified into several groups depending on the sociopolitical characteristics of the organizations (Koo 1991). Among the 45 organizations, 33 organizations were established after 1987. The other 12 organizations were mostly religious groups, women's groups, or consumer

groups, which later extended their activities into the environmental movement. Since these organizations are not recognized by the government, they are financially very weak. However, they have dynamically acted and attracted a lot of public attention. Now, let us look at the characteristics and activities of each group.

### 1. Consumer Groups

The members of the consumer groups are mostly housewives. Their activities with respect to the environmental movement mainly focus on the practical matters in everyday life rather than on the structural problems. They have been involved in environmental education for housewives and children. They have also been engaged in such campaigns as dispelling smoke from automobiles and disposing wastes separately, etc.

### 2. Religious Groups

The main focus of religious groups such as the YMCA, the YWCA and the 'Committee on Justice and Peace' (Catholic) is the balance between man and nature based on their religious ideologies. The members of these groups have raised the seriousness of environmental problems and then urged the government to legislate environment-related laws. The activities of these groups are usually environmental education, survey on the environment of everyday life and consulting on environmental problems, etc.

### 3. Resident Movement Groups

Most of these groups are not permanent organizations but more likely to be ad hoc committees on specific environmental problems in specific residential areas. Thus, the main activity of these groups is to oppose certain development projects such as construction of nuclear power plants, golf courses, industrial waste reclamation plants, and nuclear waste disposal sites in specific areas. This movement is a kind of protest directly related to the health and wealth of the residents so that it could be very violent. Let's take an example of this movement.

In 1990, the government announced a plan to establish a nuclear research complex on a remote island (Anmyundo) on the West Coast. Hearing this announcement, the islanders attacked the county police station and government offices as a sign of protest to it. It ended up in a violent riot. Many government buildings were burnt down and many people were injured. As a result, the Minister of Science and Technology who was in charge of the project was discharged from position and the project was cancelled. At that time fifteen environmental groups participated in the

protest in coalition but later disbanded.

#### 4. Democratization-Oriented Environmental Groups

Members of these groups deal with environmental problems in the perspective of political economy. They argue that environmental problems in Korea take place because of industries' close union with the government. Thus, for them, the democratization movement is a necessary condition for the protection of the environment. These groups are sometimes connected with the anti-nuclear movement, anti-war movement, or peace movement. The activities of these groups are public education about environmental problems, investigation of pollution-related damages, supporting the damaged residents, protest against the construction of nuclear power plants and golf courses, etc.

These groups may be classified as the reform environmentalists, the vanguard, who are proposing a new environmentally-oriented societal paradigm that challenges the old dominant social paradigm defended by the rearguard (Milbrath 1984). Thus, although they are not violent, the members of these groups have been often perceived as anti-governmentalists or anti-establishmentals. At present, most of the members are college students and highly-educated youngsters.

### CONCLUSION

The rapid process of industrialization in conjunction with urbanization has contributed to the deterioration of the environment in Korea to a great extent. Some measures indicated as ppm and B.O.D. illustrate that both air and water pollution have reached beyond the tolerance limits. Considering that the tolerance limits of the chemical materials in Korea are much higher than those in other industrialized countries, we can imagine that Koreans have been suffering from serious environmental problems. Owing to the deteriorated environment, many people have complained about their health problems. In some industrial complex areas, residents have had to move to other residential areas because of environmental problems.

The "Anti-pollution Law" and "Environment Protection Law" were established in 1963 and 1977, respectively. But the former law had not been enforced for a long period of time and the latter law has not been strictly enforced. And, the general public were not allowed to participate in the environment-related decision making. Nor, were they allowed to protest against the environmental policies of the government. This is because the main concern of the government has not been on environment but on

economic growth itself. The extremely low budget for environment is a sign of the meager efforts of the government for protecting the environment.

Under these circumstances, the roles of the non-government environmental organizations have been very important. The roles of the NGOs have been highly evaluated, especially in urging the government to be more seriously concerned about the environment and thus to more strictly regulate environment-related crimes. However, the establishment of the NGOs has been a recent phenomenon. Most of the NGOs have been established after the declaration of democratization in 1987.

The NGOs are categorized into two groups: government-registered NGOs and independent NGOs. But it is obvious that the independent NGOs have been much more effective in building awareness of the public and the government. Also, the activities of the independent NGOs have been much more dynamic and powerful in protecting the environment. The independent NGOs are again categorized into four groups depending on the sociopolitical characteristics. The activities of the independent NGOs as a whole may be summarized as follows: public education about environmental problems, investigation of pollution damages, supporting the damaged residents, protest against the construction of nuclear power plants and golf courses, monitoring environmental qualities in polluted areas, launching campaigns for environmental protection, and pressing the government and industries for better environmental policies, etc.

Public participation is very important for conserving clean environment and protecting the environment from pollution. Public participation is not possible without public education to those who are lacking the knowledge on environment. Although the environmental movement directed by the NGOs has a short history in Korea, it has been very effective. The education programs of the NGOs were evaluated to be much better than those of the government. Protecting the environment is not possible by the sole effort of any one specific organization, either the Government or NGO. It can be accomplished by the joint efforts of all the relevant organizations.

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