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Environmental Impact Assessment in Korea

I. Introduction

In the latter half of the 20th century, rapid industrialization and population growth aggravated environmental problems such as the depletion of resources, global warming, and destruction of the natural environment, giving rise to concerns about the loss of nature's self-purification capacity. However, conventional responses were limited to the regional level, in addition to being both passive and fragmented, and thus insufficient to tackle increasingly complex and diverse environmental problems. More proactive environmental management policies that could address environmental problems in an organized, comprehensive and preventative manner were called for.

Accordingly, the Environmental Impact Assessment (EIA) was adopted as part of the preventative efforts to create harmony between development and conservation and to consider the environmental effects of development activities in advance. Since the introduction of the U.S. National Environmental Policy Act (NEPA) of 1969, the EIA has spread worldwide. Presently, it has been adopted and implemented by about 110 countries. It is also highly recommended by international organizations as an effective environmental policy tool.^{1,2}

Since the OECD Declaration on Environmental Policy of 1974, OECD has recommended EIA as an important policy measure for attaining sustainable development and emphasized the importance of adopting the EIA for various development projects and development aid

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¹ Sang-wook Han, Review of Environmental Impact Assessment, Asia Pacific Environment & Management Institute, 2002
² Yeon-man Jeong, A Study on Establishing an Environmental Impact Assessment Law System, Doctoral dissertation, Dong-A University, 2000

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programs. In accordance with the global environmental conservation philosophy of “environmentally sound and sustainable development (ESSD)”, the United Nations Environment Programme (UNEP) stipulated the “objectives and principles of EIA” in 1987. In addition, an Action Programme on conducting EIA at international, regional and national levels was established. Principle 17 of the Rio Declaration on Environment and Development, adopted at the Earth Summit in Rio de Janeiro in 1992, states that “Environmental Impact Assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority”.

Korea adopted the EIA system, which was then titled “prior consultations”, in 1977 with the enactment of the Environmental Conservation Act. It was then introduced in full scale in 1981 when the “Regulations on Preparing the EIA Report” were legislated. Over the past 25 years since being introduced, EIA has served as an effective program for protecting the environment while inciting awareness of environment-friendly development to development executors (institutions) as well as promoting the importance of environmental conservation to the public. However, apart from such achievements, EIA in Korea has come under criticism for becoming a measure to further validate development activities rather than a measure for environment conservation due to the systematic and operational problems.

This paper seeks to review the achievements and issues of EIA as practiced in Korea and to discuss directions for making improvements to the system.

II. Overview of the Environmental Impact Assessment System

2.1 Objective

The Environment Impact Assessment system in Korea has been perceived as a key element in upholding the principle of prior considerations, a guiding principle in environment law. In other words, while the EIA recognizes the necessity of development, it reviews the impact of a development project on the environment in advance and provides guidance in establishing a development plan that minimizes negative impact on the environment. It is recognized as an environmental management measure that enables sustainable development by harmonizing development and conservation.³

The Environmental Impact Assessment system in Korea played a crucial role in shifting policy making from the past model that focused on project efficiency and economics. The objective of EIA is to promote environmentally sound and sustainable development. Also, it aims to maintain and create a healthy environment by identifying objective measures for win-win solutions as well as blocking and preventing possible environmental destruction and pollution associated with various development programs.

2.2 Evolution of the Environmental Impact Assessment System⁴

1) Introduction Period (1977~1981)

In the 1970s, Korea began to recognize the side effects of growth-oriented national policies, gradually raising the need for balanced development and measures against environmental pollution. Accordingly, the nature of the Pollution Prevention Act shifted from being a public hygiene law to an anti-pollution law in 1971. Article 2 (Applications for Permit for the Construction of Emission Facilities) of the Pollution Prevention Act Enforcement Decree, as revised in 1974, requires the submission of relevant documents when applying for a permit to build facilities that emit pollutants. This may be interpreted as requiring a sort of EIA report. In 1977, the Environmental

Conservation Act was enacted and the basis for the introduction of environment impact assessments was provided in Article 5 of the Act. However, regulations were unclear and the EIA was not precisely defined in Korea.

It was only in the 1980s, when the Environment Administration was established as an administrative authority of the central government and the Regulation on the Drafting of Environmental Impact Assessment Statement were enacted and promulgated, that the EIA system was finally launched. In the 1981 amendment of the Environmental Conservation Act, the scope of evaluators was expanded to include the heads of public organizations and government-invested organizations as well as administrative authorities. Project types subject to EIA were extended to ten categories by adding railway construction, airport construction, land reclamation and development of apartment districts. In addition, EIA became more concrete in the Regulation on the Drafting of Environmental Impact Assessment Statement in 1981 when the assessment areas were defined to cover 19 items in 3 areas.

2) Transition Period (1981~1990)

As industrial and urban development projects were expedited in the 1980s, environmental pollution became aggravated and the damages began to surface. Environment problems were no longer an issue of pollution that affect public health in a narrow sense. It emerged as a critical issue regarding the quality of life. In addition, as the private sector began to lead large-scale development projects, the 1986 amendment of the Environmental Conservation Act expanded the project types subject to the Strategic Environmental Assessment (SEA) to eleven categories by adding tourism complexes. In particular, it became possible to adjust and refine project plans according to the outcome of EIA statement reviews. The heads of the authorities that license, permit or approve projects were requested to incorporate the outcome of EIA consultation to relevant project plans. Unless there were exceptional reasons, they were required to take actions necessary to reflect the

outcomes of such consultation to relevant projects.

In the 1990s, with the national income on the rise and growing interest in improved quality of life, the public began to steadily place emphasis on the importance of a comfortable environment. In order to meet such demands, a complete overhaul of environment-related statutes was required to have consistency through laying down the long-term vision of environmental policies, enhancing coordination between environment-related laws, and raising the effectiveness of EIA.

Accordingly, in 1990, the Environment Administration was elevated to the Ministry of the Environment. In the process of abolishing the Environmental Conservation Act and enacting the Framework Act on Environmental Policy, a separate law mainly governing the philosophy and direction of environmental policies, EIA was transferred to the Framework Act on Environmental Policy and significant rules concerning EIA were added and reinforced. Above all, the types of projects subject to the EIA had increased from 32 project types in 11 areas to 47 project types in 15 areas. Also, it became required to draft a final assessment statement, which reflects the opinions of local residents on a preliminary assessment statement. In addition, a system such as an internal investigation and validation of assessment consultation was introduced. Post management systems such as raising objections to the assessment consultation, re-consultation on revised project plans and monitoring of compliance to the contents of consultation were introduced to assure effective implementation of the assessment consultation. In August 1992, the Enforcement Decree of the Framework Act on Environmental Policy was amended and the EIA on development projects initiated at the local level was delegated to the Provincial Environment Administration to facilitate locally-based environmental review.

3) Implementation Period (1990~1999)

In the 1990s, environmental policy surfaced as a key agenda item of national administration. Efforts toward fundamentally resolving environmental

³ Yeon-man Jeong, Ibid, 2)

⁴ Jun-gyu Choi, (KEI internal data) Review of Environment Impact Assessment, 2003

problems also became visible over time. On the international front, the emergence of a new paradigm called sustainable development urged that environmental considerations be taken when deciding the overall direction of national policies.

Enhanced awareness of the government and public on the importance of the environment brought about substantial changes in the EIA system and its operation. As an effort to improve and address challenging legislative technicalities in defining specific and enforcement-related matters such as the scope of projects, timing and consultation procedures of the EIA under the Framework Act on Environmental Policy, which sets the basic direction of the environment policy, and to deal with other issues revealed in its operation and raise its operational efficiency, the Environmental Impact Assessment Act was enacted in June 1993 as an independent law and placed into force in December of the same year.

In the EIA Act, existing laws and institutional systems were revised and refined, including the revision of procedures and enhancement of post management systems. The Regulation on the Drafting of Environmental Impact Assessment Statement and the details of Review and Consultation of the EIA Statement were amended three times. A presentation or a public hearing to collect the true opinion of local residents became compulsory. Meanwhile, a project approval authority was put in charge of requesting an assessment statement consultation and follow-up measures. In addition, in order to assure the complete execution of consultation details, it became obligatory to keep a registry of managing consultation details and designate a manager for this function. If a project executor, who had been ordered to discontinue construction because of a failure to comply with consultation details, is caught violating the same order again, he/she would be punished with criminal charges. Also, since introducing the local autonomy system, from the perspective of enhancing the autonomous local environment management function of local governments, they were allowed to conduct EIA autonomously on small-scale projects in accordance with municipal and provincial ordinances while considering features unique to the local area. Furthermore, a number

of regulations were newly legislated: the inspection and verification of compliance with EIA consultation details, drafting of an integrated assessment statement on a comprehensive plan comprised of multiple projects subject to the EIA as well as a consultation affairs guideline, a business guideline on managing EIA consultation details, and administrative rules on charges levied for not meeting consultation standards.

In particular, in order to review the EIA statement in a structured and specialized manner, the Korea Environment Institute, an institution specializing in the review of EIA statements, was established with the second amendment of the Environment Impact Assessment Act in the latter part of 1997 and empowered with the responsibility of reviewing assessment statements.

4) Enhancement Period (1999~present)

In the 21st century, a variety of environmental policy programs and systems have been developed and established. Effort to pursue both development and environmental conservation by integrating national land development plans and environmental plans are taking place through, for one example, the establishment of the Construction and Environment Division in the Ministry of Construction and Transportation.

Such a trend is also evident in the EIA, which has been both praised as an environmental safeguard and criticized as an indulgence. As EIA lapsed into an environmental restriction regime, limitations of its preventive functions were perceived. In 1999, the Basic Environmental Policy Act newly legislated a regulation that made the Prior Environmental Performance Review System (PEPRS) compulsory. Under PEPRS, the validity of a site and its harmony with the surrounding environment were reviewed in the cases of high-level master plans that were de facto excluded from or neglected by EIA. With this amendment, the Basic Environmental Policy Act Enforcement Decree added the following to the list of projects subject to PEPRS: designation of an agro-industrial complex, which did not have a legal basis for prior consultation in relevant laws; ten administration plans including development plans for hot springs; and

<Table 1> Regulatory development of the Environmental Impact Assessment Act

	Law	Year	Contents and amendment	Project type	Public Participation	Review EIS
Introduction Period	Environmental Conservation Act	1977	Prior Consultation, Preparation of EIS	3 Areas		Minister of Health and Social Affairs
		1979		6 Areas		
		1980	EIA and Consultation, Preparation of EIS, Procedure of Consultation	10 Areas		Administrator of the Office of Environment
		1981				
		1982	Appointment of Agency			
		1983	Scope of Relevant Project, Period of Consultation Request	11 Areas 30 Unit Projects		
1986	Preparation of EIS, Review of EIS & Opinion Submission, Agency of EIA, Notification of Consultation Result	11 Areas 30 Unit Projects				
Transition Period	Framework Act on Environmental Policy	1990	Preparation of EIS, Review of EIS, Monitoring and Follow-up, Delegation of Authority	15 Areas 47 Unit Projects	Introduction of Public Opinion Survey System, Public Display of Draft EIS (20 days)	
		1991			Introduction of Public Opinion Survey System, Public Display of Draft EIS (20 days)	
Implementation Period	Environmental Assessment Act	1993	Projects subject to EIA, Preparation of EIS, Consultation of EIS, Management of Consultation Contents, Environmental Impact Reassessment, Korea Environment Institute	16 Areas 59 Unit Projects	Public Display of Draft EIS (30 days), Explanatory hearing or Public Hearing	Minister of Environment, Korea Environment Institute, Expert Recommended by Public
		1995		17 Areas 62 Unit Projects		
		1997		17 Areas 63 Unit Projects		
Enhancement Period	Framework Act on Environmental Policy	1999	Projects subject to EIA, Criteria, Methods, and Consultation Period of Preliminary Environment Review	Administration Plan and Development Project		Minister of Environment, Korea Environment Institute, Expert Recommended by Public
	Act on Assessment of Impacts of Works on Environment, Traffic, Disasters, etc.	1999	General provisions, Preparation of EIS, Consultation of EIS, Special Provisions relating to EIA	Projects subject to Environmental Impact Assessment, Population Impact Assessment, Traffic Impact Assessment	Public Display of Draft EIS (30-50 days)	Korea Environment Institute, Local and Central Transportation Committee, Seoul Metropolitan Readjustment Committee, Disaster Impact Assessment Committee

development projects led by the private sector in preservation zones, which was excluded from the Prime Minister decree.

Introduction of PEPRS will serve as a mechanism for effectively supplementing the EIA at the planning stage as it considers environmental impacts, such as site validity and harmony with the surrounding environment, at the initial planning stages in various development plans or programs.

In 1999, the Act on Assessment of Impacts of Works on Environment, Traffic, Disasters, etc. was enacted to integrate impact assessments on the population, transportation and disasters. In addition to the environmental impact assessment, individual forecasting and analysis of negative impacts of various development projects depending on project characteristics and its location are being conducted. Accordingly, in order to address the problems that may arise by integrating impact assessments, such as weakened expertise, and to improve the quality of the EIA, the Act on Assessment of Impacts of Works on Environment, Traffic, Disasters, etc. adjusted the scope of projects subject to assessment, developed a manual on how to draft an integrated assessment statement and unified the assessment statement review functions concerning the procedures of consultation and review of EIA statements. Nonetheless, some regulatory, policy and operational issues are still pending and need to be resolved in the course of implementation.

2.3 Projects subject to EIA

As for projects subject to the EIA, unlike NEPA, which defines comprehensively instead of

enumerating the specific types of projects, Korea maintains a positive list in principle. According to Article 4 of the Impact Assessment Act on Environment, Transportation and Natural Disasters and Article 2 of its Enforcement Decree, a development executor seeking to initiate a project subject to the EIA is required to draft an assessment statement and submit such to the head of an approval authority. Then, the head of the approval authority consults with the Ministry of the Environment. As shown in <Table 2>, projects subject to the EIA are defined as 63 project types in a total of 17 areas. The projects are mostly large projects that are likely to have significant impact on the environment.

2.4 Assessment items

The categories and items of the EIA are stipulated in the assessment statement section of the Article 5 of the EIA Act on Environment, Transportation and Natural Disaster and Article 4 of its Enforcement Decree. In addition, the Regulations on the Preparation of EIA Reports of the Ministry of the Environment define key assessment items by project type and key assessment components of each assessment item. The focused assessment items include: 1) key assessment items stipulated by laws and regulations; 2) assessment items that were requested for focused assessment on reasonable grounds by relevant administrative organizations and local residents when their opinions on a preliminary assessment statement were collected; and 3) assessment items that are judged by a development executor to have significant impact on the environment considering the features unique to a project. The current EIA categories

<Table 2> Type and size of projects subject to EIA⁵

Group	Type and Size of Projects
Urban Development (10)	- Urban Planning, Land Organization, Housing Development, Urban Renewal, School: 300,000 m ² - Distribution Complex, Passenger & Cargo Terminal: 200,000 m ² - Car Parking (200,000 m ²), Wastewater Treatment (100,000 m ³ /day), Market (150,000 m ²)

⁵ Ministry of Environment, Act on Assessment of Impacts of Works on Environment, Traffic, Disasters, etc., 2004

Group	Type and Size of Projects
Formation of Industrial Location and Industrial Complexes (6)	- National Industrial Complex, Local Industrial Complex, Industrial Complex of Rural Area, Small and Medium Industry Area, Free Export Zone: 150,000 m ²
Development of Energy (6)	- Power Development, Electricity Facilities: 10,000 kw - Mining Industry (300,000 m ²), Submarine Mining Industry, Oil pipeline & Oil Storage (100,000 kl)
Construction of Harbors (4)	- Fishing Port, Harbor Facilities, New Harbor: 300 m, 10,000 m ² - Dredge: 100,000 m ³
Construction of Roads (3)	- Road: new road: 4 km, extension: 10 km
Development of Water Resources (2)	- Dam, Reservoir: 2M m ³
Construction of Railroads (including urban railroads) (4)	- Railroad, City Railroad, High-Speed Railroad: 1 km - Cable Railway: 2 km
Construction of Airports (1)	- Airport (Runaway: 500 m)
Utilization and Development of Rivers (1)	- River Works: 10 km
Reclamation Works and Forest or Land Clearing Works (2)	- Filling-Up (300,000 m ³), Reclamation (1M m ²)
Development of Tourist Complexes (6)	- Tourist Industry, Resort, Hot Spring: 300,000 m ² - Park, Resort: 100,000 m ² , Urban Park: 250,000 m ²
Development of Gymnastic Facilities (5)	- Gymnastic Facilities, Cycling Race, Racecourse: 250,000 m ² - Youth Discipline Facilities & district: 300,000 m ²
Development of Mountainous areas (2)	- Public Cemetery (250,000 m ²), Grassland (300,000 m ²), Transforming (200,000 m ²)
Development of Designated Regions (2)	- Urban Planning and Development for balanced development of districts
Installation of Waste and excreta disposal Facilities (2)	- Night-soil Treatment (100 kl/day), Waste Landfill (300,000 m ³)
Construction of Military Facilities (3)	- National Defense Facilities (330,000 m ²), Navy Base Installations (100,000 m ²), Military Air Base (Runaway: 500 m)
Excavation Works (4)	- River (50,000 m ³), Forest (100,000 m ³), Coastal Quartz Sand, Coastal Sand (250,000 m ³)

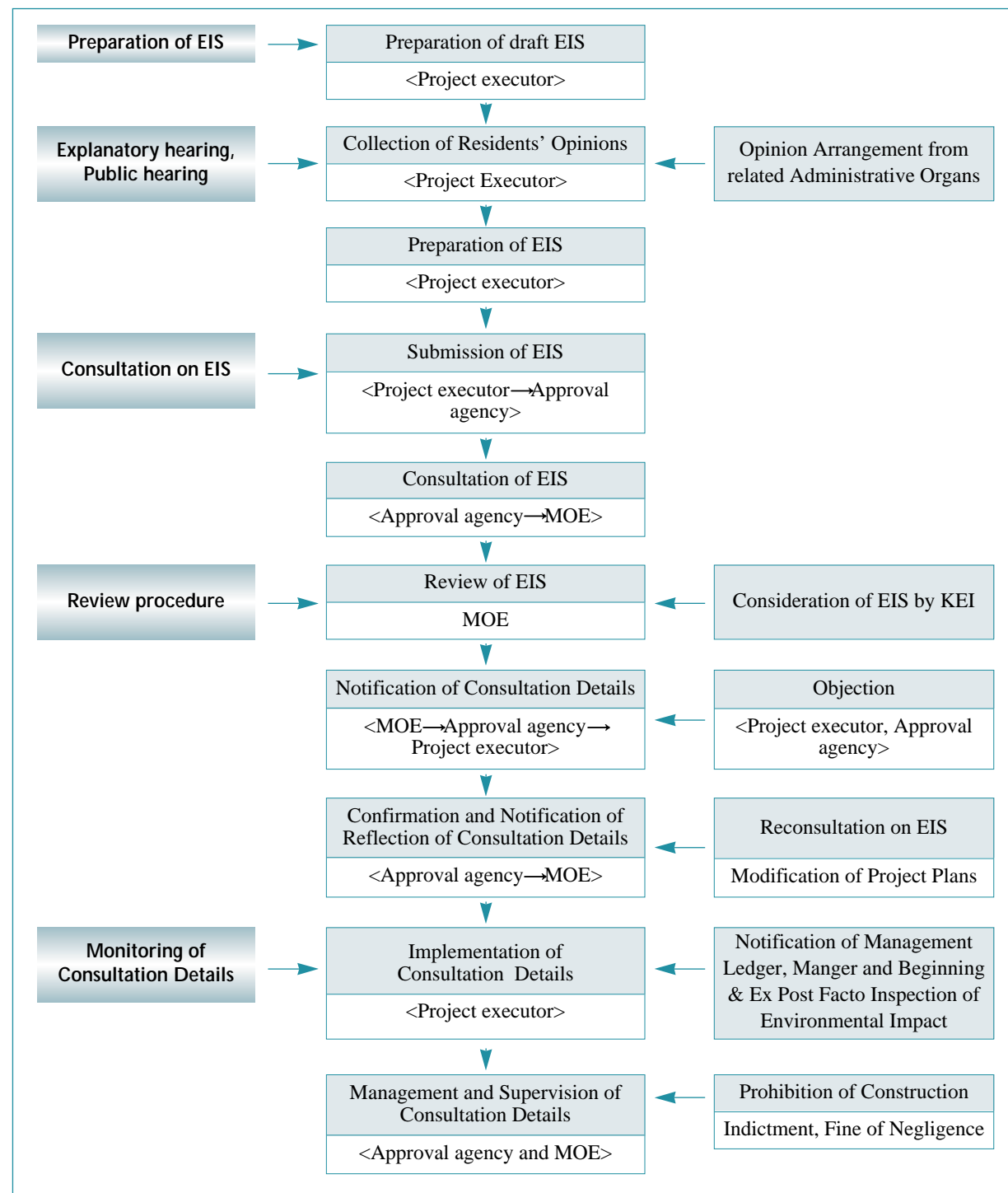
<Table 3> Items and categories stipulated in EIA

Categories	Environmental items
Natural Environment	Atmospheric Environment, Topography & Geology, Flora & Fauna, Marine Environment, Hydrology
Ambient Environment	Land Use, Air Quality, Water Quality, Soil, Solid Wastes, Noise & Vibration, Odor, Electric Wave, Shading, Landscape, Sanitation & Health
Socioeconomic Environment	Population, Residence, Local Industry, Public Facilities, Education, Traffic, Cultural Asset

and items comprise 23 items in 3 categories as shown in <Table 3>.

2.5 Procedures of EIA

The EIA process in Korea is composed of three



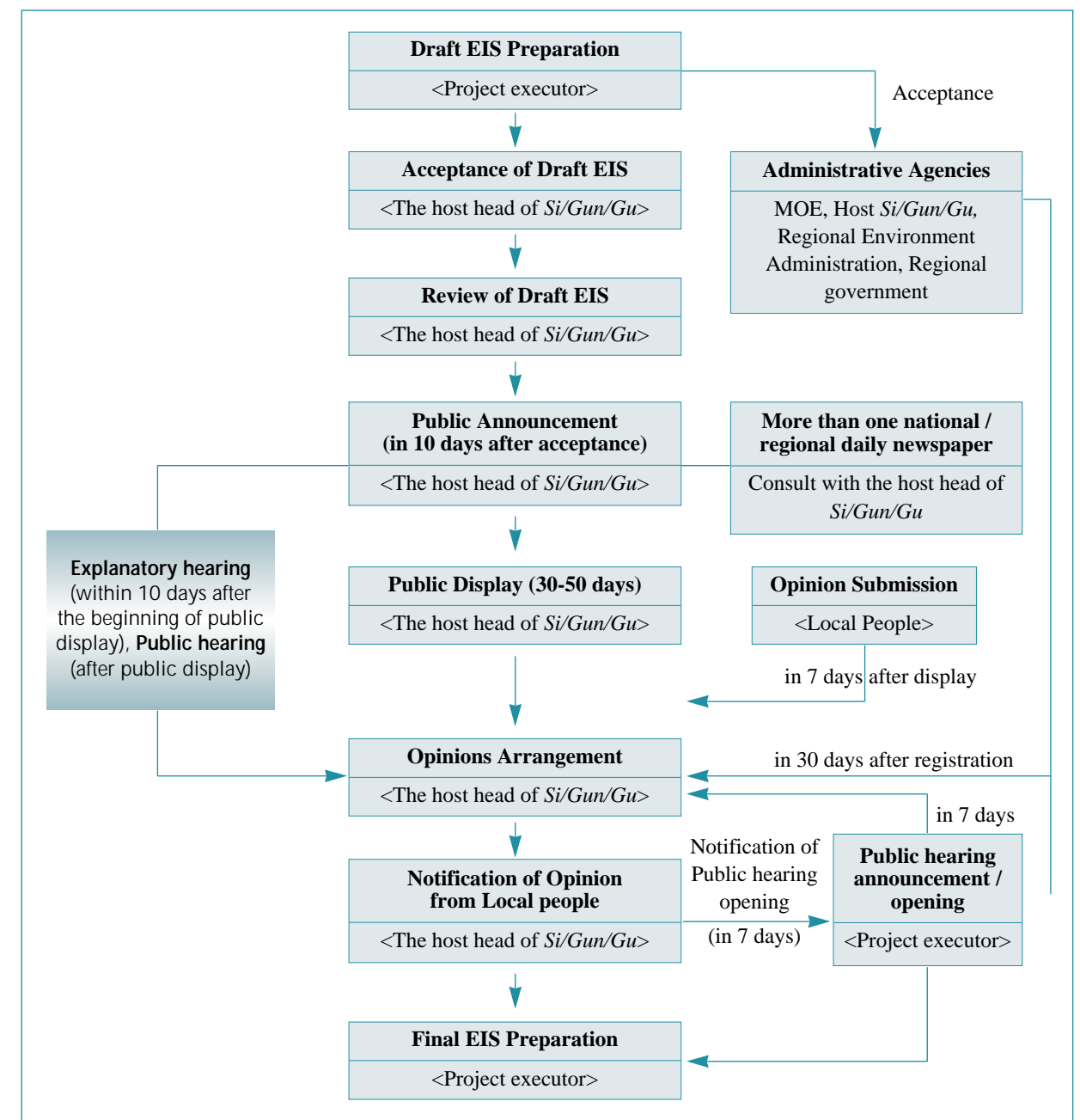
<Figure 1> The procedure of EIA. ⁶

⁶ Dong-wook Kim, Environmental Impact Assessment, GURU, 2004

stages: 1) a commencement stage where a preliminary assessment statement is drafted and displayed, announced or presented to local residents to collect their opinion, 2) a stage when a finalized assessment statement is submitted after collecting the opinions of local residents for approval of the project by the authority concerned and consulting with the Ministry of

Environment; and 3) a stage validating the compliance of consultation details and surveying post-impact assessment. The detailed procedures are described in <Fig. 1>.

① Drafting a preliminary assessment statement and collecting the opinions of local residents
A preliminary EIA statement is drafted wherein a



<Figure 2> Public participation procedure in EIA.

project executor discloses the overall outline of the project to local residents and their opinions are collected prior to finalizing the EIA statement. A preliminary EIA statement should include assessment of 23 items in 3 categories, the current environmental conditions, analysis and assessment of alternative plans, high-level estimation of impact on each item and mitigation plans.

These are delivered to residents in a form of a presentation, a public hearing, or a public notice. The opinions collected through these efforts are included in the EIA statement. Any opinions not incorporated in the statement should be clearly stated, with rationales, in the EIA statement.

② Drafting the final assessment statement and holding consultations

The purpose of the finalized EIA statement is to submit the statement to a consultation authority and obtain the license and approval for the project by surveying the current environmental condition in detail on 23 items in 3 categories, forecasting and analyzing possible environmental impact from the launch and operation of the project as accurately as possible by mobilizing various techniques, in addition to developing appropriate mitigation plans.

The statement prepared by a project executor is submitted to a project approval authority and

forwarded to the Ministry of Environment (or Local Environment Authority) for consultation. In consulting the statement, the Ministry of the Environment notifies the outcome of consultation such as any revision or refinement to the project approval authority, if deemed necessary.

③ Managing consultation outcome and post-EIA review

In order to assure the effectiveness of the EIA, rigorous compliance with consultation details is critical. Naturally, a project executor needs to faithfully comply with consultation details. To this end, the executor has the duty to keep a registry of managing consultation details, designate a supervisor to manage consultation details, and conduct a post-EIA review. In the case that standards on emission concentrations of pollutants, which were finalized as a part of EIA consultation, are violated, charges to meet consultation standards will be levied. Meanwhile, in order to assure rigorous compliance with consultation details, a project approval authority, such as the local Environment Agency, needs to conduct on-site inspections and take such necessary measures as ordering the suspension of construction.

III. Overview of the Practice of Enforcing the EIA

3.1 Performance results

Although the EIA was adopted in 1977, it was in 1981 that EIA came fully into effect when the Regulations on Preparing the EIA Report were developed. In the beginning, only those projects led by the public sector such as administrative authorities and government-invested organizations were subject to EIA and the number of projects under the EIA system was relatively low. However in the 1990s when relevant laws and regulations were amended, the scope of assessment projects was expanded to include the private sector and the overall number of EIAs conducted also increased. As of 2003, EIA was performed on a total of 2,623 projects.

3.2 EIA-driven improvements of the environment

Since the 1970s, various social infrastructure such as roads and ports were built in Korea to spur on industrialization, urbanization and economic development. Also, to keep in pace with the improved standard of living, housing construction projects continued at fast pace. To address the depletion of resources and environmental issues, EIA was enforced in full

scale in the post-1980s, which, among other things, aimed to instill an environment-friendly development mindset among development executors and raise the awareness of local residents as to the importance of preserving the environment.

This paper reviews the environmental aspects that have been taken into account when initiating development projects since the introduction of the EIA, focusing on project types of relatively high volume and impact.

1) Road construction projects

The highest number of EIA consultations was conducted in the category of road construction projects since the introduction of the system. This is because roads are continuously built to accommodate cargo volume that grows along with industrial development and to facilitate inter-regional networking. Roads are no doubt indispensable infrastructure necessary for economic growth and regional development. However, topographical changes caused by road construction trigger a number of environmental problems, including destruction of habitats and social fragmentation.

In Korea where mountainous areas account for almost 70% of all territory and large and small waterways are scattered throughout the nation, the leading environmental impact caused by road construction is the destruction of mountainous areas by cutting off soil dispersal (creation of

<Table 4> The number of projects completing consultation in EIA⁷

Project group	Total	'82-'92	'93	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03
Total	2,623	996	149	115	161	151	151	155	154	121	117	168	185
Urban Development	461	201	21	17	27	6	18	25	23	16	19	24	31
Development of Energy	328	244	4	11	22	15	12	3	3	3	2	2	7
Formation of Industrial Complexes	269	145	14	18	20	16	12	8	7	5	7	11	6
Construction of Roads	591	39	47	29	42	40	39	64	61	57	50	60	63
Development of Gymnastic Facilities	152	104	4	3	-	-	7	6	6	5	4	5	8
Others	822	263	59	37	50	44	63	49	54	35	35	66	70

⁷ Ministry of Environment, The Environment White Paper, 2004

<Table 5> Tunnels and bridges built by year⁸

Years of completion	Total Length of route (km)	Tunnel			Bridge		
		Number	Total Length (m)	Length per km (m/km)	Number	Total Length (m)	Length per km (m/km)
1960s	304	2	287	0.287	119	3,375	10.9
1970s	929	10	4,198	4.5	196	9,334	10.0
1980s	326	14	6,290	19.3	539	46,437	142.2
1990s	482	115	73,601	152.7	2,382	280,278	581.5
2000s	646	127	98,542	152.5	2,237	259,766	402.1
Total	2,687	268	182,918	68.0	5,473	599,100	223.0

⁸ Korea Highway Corporation, Internal data, 2004

slopes) and the destruction of watersheds and habitat fragmentation caused by creating artificial river embankments. In order to overcome environmental issues attributable to such topographical changes, as many tunnels and bridges possible are built in environmentally sensitive areas when the EIA is conducted. Construction of a tunnel or bridge costs 2~3 times more than building a regular road for the same distance. Nonetheless, they are considered a realistic measure for mitigating environmental destruction. In the 1960s~1970s prior to the adoption of the EIA, construction of tunnels and bridges for purposes of mitigating environmental destruction was very rare. However, beginning in the 1980s when the EIA was adopted, the share of tunnels and bridges in road construction increased. Particularly in the 1990s, the number of sites where tunnels and bridges were included in road construction rose considerably compared to the past and in fact tunnels and bridges account for about 65% of total road length.

The growing total length of tunnels and bridges in road construction indicates a shift from an economics-driven mindset in road construction projects to that which takes into account environmental issues. Indeed, EIA has fulfilled its role of making the attainment of such a shift possible.

In addition, from the 1990s onwards, EIA of road construction projects strongly reviews the possibility of building mitigation facilities such as eco-bridges, eco-tunnels and wildlife corridors. In fact, the actual number of these facilities is rising each year.

In addition to adopting various measures for mitigating the destruction of the environment by road construction projects, EIA also contributed significantly to raising the awareness of development executors on the subject of environment conservation. One good example is motivating the Ministry of Construction and Transportation, the authority that approves road construction projects, to conduct "A Study on Environment-Friendly Road Design Techniques" in 2001~2002. Based on this study, guidelines on road design taking environmental features into

consideration are currently being prepared.

2) Housing development projects

Since the 1970s, housing development projects were continually implemented to keep pace with urbanization. Especially since the 1980s, housing development became more common following the enactment of the Housing Land Promotion Act. Consequently, the housing supply rate, which hovered around 70% in the 1980s, soared to 94% as of 2000 thanks to the building and supplying of about 60,000 households each year since 1990. Despite such improvement in the housing supply rate, however, housing development projects are still actively being executed today due to the increasing number of nuclear families as well as single person households.⁹

Housing development projects have mainly focused on economics and quantitative supply of houses to resolve the housing shortage and have thus been lacking with regards to making serious environmental considerations. Housing development projects in Korea are usually undertaken in large spaces. Due to the highly mountainous topography of Korea, hilly regions and riverside and coastal areas were often included as project districts. Also, in the course of urbanization, remote rural areas were occasionally included in housing development projects, which often resulted in discordance with the surrounding natural environment and landscape.

Based on such aspects, common environmental problems faced during the process of initiating housing development projects may be summarized as the fragmentation of natural ecosystems, excessive destruction of forest areas, discordance with the surrounding natural environment and emissions of a large quantity of pollutants caused by population density. Among these, such environmental issues as the fragmentation of natural ecosystems and destruction of forest areas can be somewhat resolved by designating appropriate conservation areas within project districts. However, designation of a conservation area is a factor that

lowers the economics of a project. In fact, it is quite challenging to secure enough space for the designation of a conservation area. Given this, EIA has been applied since the 1980s to address environmental problems caused by housing development projects through a balance of development and conservation as well as the harmony of economics and the environment.

In the case of housing development projects, conservation of an area with sound natural conditions becomes feasible by securing space for parks and greens space. Such areas also serve as an outstanding recreational area for local residents.

In the 1980s, although the EIA was performed on housing development projects, the share of parks and green space as well as the per capita amount of parks and green space were relatively low because resolving the housing shortage remained the policy focus. However, since the 1990s, the share of parks and green space soared tremendously compared to the 1980s. In the 2000s, the average share of parks and green space and per capita amount of parks and green space reached 17.1% and 9.6 m², respectively. Urban ecologist¹⁰ claimed that the share of parks and green space in a housing development project should be at least 30% in order to maintain a sound and comfortable urban

environment from an urban ecological perspective. The City Park Law stipulates that the per capita park area should be at least 6 m². Based on the above, it is indicated that although the share of parks and green space in housing development projects currently falls short of the ideal green space ratio claimed by urban ecologists, it has improved significantly through the EIA when compared to the past. Given the current pace of expansion, it suggests the potential of reaching the ideal level.

A growing share of parks and green space and a rise in per capita parks and green space in housing development project districts are attributable to the awareness of development executors of the importance of environment conservation, which has been largely promoted by EIA since the 1990s.

In addition to considering the natural environment within a project district, efforts to maintain harmony with surrounding areas continued through the EIA. In the EIAs conducted on housing development projects in the 1990s and onward, much discussion took place regarding the securing of continuity of ecosystems and seeking harmony with surrounding areas. Accordingly, rivers imitating natural conditions were created within project districts to prevent disconnection of river flow

<Table 6> Trend of the share of park and green area by years ¹¹

Years	Number of housing development	Share of park & green area (%)	Area of park & green area per capita(m ²)
1980s	79	6.1	4.3
1990s	42	12.6	4.8
2000s	23	17.1	9.6

<Table 7> Environmental improvements by EIA ¹²

Years	Nature close stream	Eco-bridge	Transplantation	Permeable pavement
1995~1999	3 districts	2 districts	16 districts	1 district
2000~2004	15 districts	9 districts	21 districts	17 districts

¹⁰ Hyun-chan Seong, A Study on the Accessibility to City Parks and Improving Resident-Friendliness, Gyeonggi Research Institute, 2004

¹¹ Korea Land Corporation, Internal data, 2004

¹² Korea Land Corporation, Internal data, 2004

⁹ Ministry of Environment, A Study on Development of Environment-Friendly Planning Techniques and peration Plans, Jan. 2003

and streams by development projects. The discussions also contributed to developing project plans creating eco-corridors and facilitating the mobility of wildlife after projects had been completed. In addition, in order to reduce flood damage while supplying water to the soil surface, use of permeable pavement materials was considered in development districts. As described, EIA has contributed to the attainment of environment-friendly housing development projects. These types of environmental considerations were highly promoted since the mid-1990s.

3) Dam construction projects

Since the introduction of the EIA system, the number of EIA consultations on dam construction projects amounts to only about ten. However, dam constructions in Korea are mostly large-scale multi-purpose projects in which the water reserve capacity ranges from tens of millions to hundreds of millions of tons. Their construction sites are often rivers with in-tact ecosystems, giving rise to

much controversy concerning EIAs on dam construction.

In the case of dams built in the 1970~1980s, i.e. before the adoption of the EIA, dam construction projects mostly overlooked environmental aspects. Dams built after the introduction of EIA still did not fully take into account environmental considerations and measures mitigating environmental impact.

However, in the 1990s, building environment-friendly dams was discussed during the process of EIA consulting on dam constructions. Accordingly, mitigation measures such as creating wildlife corridors, artificial wetlands and fish bypass systems in dams were applied.

In the 2000s, in addition to building such mitigation facilities, creation of artificial river was attempted downstream of a dam. As a way to maintain sound water quality in the dams, EIA consultation required the establishment of a full range of sewage treatment facilities before holding water in the dam.

The roles and contribution of EIA were examined above as a measure to address various

environmental problems faced when initiating development projects. EIA contributed notably in steering various development projects, which have been launched in the past to achieve the policy goal of national land development, to a direction of environmentally sound and sustainable development. In particular, it served as an opportunity for development executors to be aware of environment-friendly development and for the public to realize the importance of environment conservation. Apart from such environmental considerations in the process of initiating development projects, EIA also contributed greatly to the evolution of relevant regulations.

EIA, which was adopted to resolve environmental problems at the preventive level, revealed its limitations as it was applied at the stage of initiating development projects. Consequently, it served as a momentum to introduce PEPRS, which assesses environmental impact at an administrative planning stage. PEPRS, which entered into force in 1994, is an environmental policy measure that assesses environmental impact during the administrative planning stage, which affects decision-making on whether to execute a development project at all. In conclusion, EIA contributed to the development of relevant regulations that facilitate more aggressive environmental considerations as well as highlighting the environmental aspects of development projects.

1) Development projects impeded by a prolonged consultation period

EIA is a procedure in which project executors, approval authorities and consultative bodies as well as various stakeholders consult. However, consultations among various stakeholders often do not proceed smoothly as regards environmentally sensitive issues and can result in costly delays to large-scale national projects. Accordingly, project executors tend to view the EIA as an obstacle hindering development projects.

2) Lack of social consensus through the EIA

Owing to the conflict between development and conservation among various interested parties, there are cases when social consensus is not fully built while the EIA is underway or even after consultations have been completed. In addition, when the development of an objectionable or unwelcomed facility is being pursued, serious conflict can arise with differences of opinions between local residents and project executors. Such conflicts can be attributed to the fact that the participation of local residents, citizens and environment groups is not allowed in the policy-making and project planning stage, but is limited to the stage after major decisions have been made, i.e. project plans are disclosed after details have already been set.¹⁴

Although the EIA takes place before on-ground implementation of a development project, it is conducted on projects that have already acquired approval at a higher level (e.g. budget allocation stage). In reality, it is difficult to incorporate such social demands as the termination of a project during the decision-making process. Therefore, institutional improvements are required to address this issue.

IV. Efforts to Improve the EIA

4.1 Background

As reviewed in Chapter III, the EIA system has addressed environmental issues of various development projects over the past 25 years and contributed to the development of relevant systems. Nonetheless, there were many trial and error processes in putting this system into practice and the following issues have been raised:

<Table 8> Current status of mitigation facility by dam construction ¹³

Years	Dam	Mitigation Facility						
		Substitute (㎡)	Eco-bridge	Fishes habitat	Fishway	Nature close stream	Sewage treatment	Slant greening works
1970-1980s	Soyang, Andong, Daecheong, Chungju, Juam, Hapchun, Imha etc.	X	X	X	X	X	X	X
1990s	Boryaeong(91)	X	X	X	X	X	X	O
	Buan(92)	X	X	X	X	X	X	X
	Miryang(92)	X	X	X	X	X	X	X
	Hoengseong(92)	X	1	1	X	X	X	X
	Yongdam (93)	54,890	X	X	X	X	O	X
	Tamjin(97)	158,920	1	14	O	X	O	O
2000s	Daegok(98)	42,350	X	X	X	X	O	O
	Hwabuk(03)	18,000	5	5	X	O	O	O
	Seongdeok(04)	20,000	4	3	X	O	O	X

¹³ Korea Water Resources Corporation, Internal data, 2004

¹⁴ Among (55) laws governing the projects subject to the EIA, only 7 laws (independent laws) stipulate procedures on collecting public opinion. The gathering of opinion is actually performed during the EIA phase.

3) Social perception of the EIA system

○ Perception of local residents and environment groups

Local residents perceive the EIA as a way to resolve such issues as compensation, while environment groups argue that the system is only a perfunctory mechanism that has not yet to result in actual changes in the development project on the basis of an EIA. In addition, environment groups claim that EIA statements lack objectivity and credibility.

○ Perception of project executors and project approval authorities

Project executors view the EIA as an additional administrative procedure that is required to initiate their projects. They argue that the EIA is an arbitrary restriction with complicated procedures and that it is a primary cause of project delay. In addition, they claim that EIA consultations have a built-in tendency toward delay because they are commanded by opposing opinions of environment groups, which hinders the project from moving forward.

4) Implications

The main causes of various EIA-related issues described above can be summarized as the following:

- The inherent limitations of the EIA as it is conducted after the significant approval and momentum to undertake a development project has been acquired
- Passive collection of opinions of local residents during the process of EIA
- Credibility and fairness issues in drafting the EIA

The issues listed above are tasks that need to be

tackled in order to further develop the EIA, which has nevertheless achieved remarkable results to date. Currently, the government is striving in many aspects to resolve these problems and their details are discussed next.

4.2 Details of improvements to the EIA

1) Enhanced environmental assessment of administrative and development plans

In Korea, PEPRS is conducted to predict and assess environmental impact at the planning stage of various administrative programs that affect development projects. PEPRS is meant to overcome the limitations of the EIA, which is conducted in a development project phase, by considering the environmental aspects at the earliest stages of drafting/planning. In concept, PEPRS is similar to the Strategic Environment Assessment (SEA) as it seeks to attain sustainable development. However, PEPRS is different in that its scope more narrow¹⁵, the lack of capacity in collecting opinions of stakeholders¹⁶, and the lack of differentiation from the EIA.

Currently PEPRS is conducted on some administrative plans and development plans. Usually however, the plans are established on the basis of economic and social interests and PEPRS is conducted at the stage when the plan is being finalized. Therefore, various alternative options in environmental aspects are still not being fully examined.¹⁷

The Ministry of Environment conducted studies on the introduction of the SEA in 2000 and 2003. Then, based on these studies, the PEPRS enhancement plan, which mainly aims to review the environmental impact of nearly all

administrative plans that affect development projects, was shaped out in 2004.¹⁸ In addition to working on revising relevant legislation to improve the systems, the Ministry of Environment continues to conduct a number of studies to address possible problems that may surface when this system come fully into effect, especially due to the lack the experience on performing environment assessment on administrative plans. Such studies are scheduled to continue into 2005.

Once the PEPRS is put into practice, the EIA in Korea is expected to be divided into the PEPRS conducted at an administrative planning stage and EIA done at the project development stage. In such case, a decision on whether to execute a development project will be made at the administrative planning stage taking into account environmental concerns, which will reduce the likelihood of major conflicts emerging at the EIA stage.

2) Introduction of the scoping system

Drafting of the EIA statement is led by a project executor, who works based on the Rules on Drafting the EIA Statement released by the Ministry of Environment. Accordingly, most EIA statements tend to be standardized rather than reflecting the special features of a project or the regional features of a project site. In fact, in some cases, environmental issues unique to that particular project may not be revealed in the EIA statement at all. Such practice often raises doubts on the credibility and objectivity of EIA statements, which, in turn, causes delays in EIA

consultations.

As an effort to improve the practice of drafting the statements and preparing the statements with greater expertise, the introduction of the scoping system was discussed at "A Forum on Improving the EIA System 2002". In 2003, based on the outcome of the Forum, relevant laws intended at the introduction of the scoping system were amended. The scoping system has been in effect since July 2004. As of December 2004, there have been no cases of actually performing the scoping, but the system is anticipated to be promoted beginning in 2005. As the scoping system not only resolves the current problems faced in drafting EIA statements, but also enables participation by various stakeholders from the initial stages of drafting, it is expected to be helpful in facilitating EIA consultations.

3) Improvement of the public opinion collection process

As the current EIA system stipulates a step for gathering the opinions of local residents, a presentation or a public hearing must be held after the preliminary EIA statement has been completed in order to collect the opinions of local residents. However, such an opinion collection step is one of many procedures comprising the entire EIA process and opinion gathering is required for a certain period only. Therefore, in reality, it is limited in inducing participation and statement of opinions by various stakeholders.

In order to improve such limitations, Ministry of

<Table 9> Role assignment of PEPRS and EIA

	PEPRS	EIA
Subjects	Administrative plans	Development projects
Assessments	Global sustainability Correspondence with National Environmental Policy Sustainability of the plan objectives	Compliance of environmental criteria Mitigation methods for environmental effects Monitoring Methods

¹⁸ In June 2004, the amendment of "Basic Environment Policy Act", the legal basis of PEPRS, was announced. Amendments include extending the scope of PEPRS to administrative plans, adjusting the timing of PEPRS and plans to collect opinions from residents.

Environment developed "A Plan to Improve the Efficiency and Credibility of the EIA System" in March 2004. The plan features ways to promote proactive participation of local residents at the EIA stage such as setting up a joint survey team, consisting of various stakeholders, to conduct joint surveys from the early stages of the EIA in the case of environmentally sensitive projects. In addition, if necessary, a consultative body that includes stakeholders would be established at the stage when EIA statements are reviewed to resolve any controversies that might arise in the assessment process. As described earlier, the scoping system will be actively utilized to generate a variety of opinions from the beginning stages of the EIA and to facilitate its proceedings.

V. Conclusion

The Environmental Impact Assessment system is an essential policy measure for sustainable development as it forecasts and analyzes the negative impact on the environment in advance and seeks alternatives. The EIA continues to draw much attention as a preventive policy measure addressing environment problems, such as the contamination and destruction of the environment and reckless development of national lands, by promoting harmony between development and conservation to realize environment-friendly development.

For the past 25 years since its introduction in the late 1970s, the EIA in Korea has performed a preventive function by promoting comprehensive and systematic considerations of the environment in various development projects that are likely to destroy the natural environment and degrade the quality of human life. In addition, it has contributed to raising awareness of the importance and necessity of environment conservation in society overall and bringing about institutional and technical improvements in relevant areas by enabling the application of major environment policies and technology to actual development sites.

However, the EIA in Korea has shown some problems in the course of implementation such

as setting and reviewing alternatives and incorporating the assessment outcomes to project plans. Moreover, the EIA has been a primary cause of conflict in some large-scale public projects due to opinions from various stakeholders and a lack of social awareness of the system. The greatest cause of such problems is that the EIA has been performed mostly on development projects that have already been endorsed to a significant extent at a higher administrative level.

Since 2000, the government has been putting together an overall EIA improvement plan. The main feature of the plan includes extending the EIA, which focused on development projects in the past, to the higher-level administrative planning stage that affects decision-making on the execution of development projects. Owing to such improvement efforts an EIA system for administrative plans called PEPRS was established in 2000 to conduct environmental assessment on major administrative plans that generate a significant impact on the environment. In 2004, relevant laws were amended to enable the application of EIAs on administrative plans that affect the majority of projects subject to the EIA. In addition, in 2003, the scoping system was introduced to facilitate the EIA. Moreover, in 2004, a mechanism allowing participation by various stakeholders at the early stages of assessment was established for projects initiated in environmentally sensitive areas.

As a result of such efforts by the government, a well-structured EIA system is expected to soon be actively functioning during each stage, ranging from the high-level administrative planning stage to the project undertaking stage. Such an environmental assessment system is similar to the strategic environmental assessment practiced in the US as well as in the UK and the Netherlands and is expected to significantly eliminate a variety of EIA-related problems we face today.

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