# National Assessment Report on the Implementation of Sustainable Development

May 2012

Republic of Korea

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# I. Introduction

## 1. Overview of ROK's Sustainable Development for the Past 20 Years

The Republic of Korea has continually implemented national strategies for sustainable development since Rio Declaration, the basic principles for sustainable development, and Agenda 21, the action plan of the declaration, were adopted at the 1992 United Nations Conference on Environment and Development. 4

The basis of the implementation has been found through the expansion of institutions and organizations related to sustainable development pursued by individual ministries as well as institutional development including the function of adjusting and integrating policies among ministries. With such institutions serving as a foundation, ROK decided to establish national action plan at the Environmental Ministers' Meeting to Respond to Global Environmental Issues in 1994 and the Ministry of Environment was designated as a lead organization for implementing Agenda 21. Ministry of Environment established and implemented national action plan of Agenda 21 with relevant ministries, in March 1996, and declared the National Environmental Vision for the New Millennium as a new strategic master plan on June 5, 2000.

Presidential Commission on Sustainable Development (PCSD) was established in September 2000 under the implementation plan of Agenda 21, which was adopted at Special Session of the General Assembly of the United Nations in 1997 (Rio+5), and national strategy for sustainable development, which presents national target and policy direction for sustainable development related to economy, society and environment was established.

In the meantime, the world presented sustainable development as an urgent issue in Johannesburg Plan of Implementation (JPOI) in 2002 and Kyoto

protocol for reducing greenhouse gas emissions took effect in February 2005.

ROK declared National Vision for Sustainable Development ("Advanced nation where economy, society and environment are developed in a balanced manner.") at ceremony on World Environment Day in June 5, 2005 according to Johannesburg Plan of Implementation. Based on this, ROK determined and announced the First National Strategy for Sustainable Development (2006-2010), which is the first strategy and action plan for managing economy, society and environment from comprehensive point of view in October 2006 and submitted it to United Nations Commission on Sustainable Development in 2007.

As the period of the First National Strategy for Sustainable Development was expired, the Second National Strategy for Sustainable Development (2011-2015) focusing on sustainability of social equity and environmental resources has been established and implemented since August 2011.

President LEE MYUNG-BAK declared **Low Carbon, Green Growth** as the new national vision in his congratulatory address to mark the 60th Anniversary of the Foundation of the Republic of Korea in August 2008 and established National Strategy for Green Growth and Five-Year Plan (2009-2013) in July 2009 as the national plan at the highest level to pursue Low Carbon Green Growth. ROK has allocated more than 2% of its GDP to green budget every year.

Thanks to theses efforts to achieve sustainable development, the Environmental Performance Index ranking of ROK improved by 51 places from 94$^{th}$ in 2010 to 43$^{rd}$, in January 2012. In particular, ROK was ranked 13th in terms of Trend EPI, which shows the trend of environmental improvement.

**Table 1 2012 Trend EPI Ranking for Each Indicator**

| Objectives | Policy Categories | Indicators | Trend EPI Ranking |
|---|---|---|---|
| Environmental Health | Environmental Burden of Disease | Child Mortality | 25 |
| | Air (Effects on Human Health) | Indoor Air Pollution | 64 |
| | | Particulate Matter(PM2.5) | 18 |
| | Water (Effects on Human Health) | Access to Drinking Water | 1 |
| | | Access to Sanitation | 64 |
| Ecosystem Vitality | Air (Ecosystem Effects) | $SO_2$ Per Capita | 1 |
| | | $SO_2$ per $GDP | 8 |
| | Water Resources (Ecosystem Effects) | Change in Water Quantity | 84 |
| | Biodiversity & Habitat | Biome Protection | 18 |
| | | Marine Protected Areas | 40 |
| | | Critical Habitat Protection | N.A* |
| | Forests | Forest Growing Stock | 1 |
| | | Change in Forest Cover | 79 |
| | | Forest Loss | 53 |
| | Fisheries | Coastal Shelf Fishing Pressure | 32 |
| | | Fish Stock Overexploited | 25 |
| | Agriculture | Agricultural Subsidies | 42 |
| | | Pesticides Regulation | 29 |
| | Climate Change & Energy | $CO_2$ per Capita | 106 |
| | | $CO_2$ per KWH | 108 |
| | | $CO_2$ per $GDP | 57 |
| | | Renewable Electricity | 84 |
| Total | | | 13 |

This report reviewed the outcome of sustainable development implementation efforts of ROK, the First National Strategy for Sustainable Development and assessment result on sustainable development indicator as international community makes an effort to review the outcome of the efforts to achieve sustainable development for the past 20 years and present the future directions at Rio+20 meeting to be held in June, 2012. The the result is presented and evaluated by categorizing it into institutional effort and outcome, major considerations, participation of major groups, continued efforts of the government. This report also presented the major contents of the Second National Strategy for Sustainable Development, which is underway.

## 2. Status of the Economy, Society and Environment in ROK

Table 2 gives an overview of the ROK's social, economic and environmental conditions. The ROK's population is about 49 million as of 2010 and population density is 489 persons per square kilometer. In particular, Seoul is the second most densely-populated city in the world. The GDP per unit area as an index for potential environmental pressure increased two times from USD 4.62 million per square kilometer in 2000 to USD 10.14 million per square kilometer. This figures indicate that ROK's GDP per unit area is very high compared to its per capital GDP meaning that the environmental pressure on ROK is almost the same as that on advanced countries.

**Table 2 Summary of Socioeconomic and Environmental State of ROK in 2010**

| Population (million people) | Population Density (person/ $km^2$) | GDP (billion USD) | Per Capita GNP(USD) | GDP/Area (USD) |
|---|---|---|---|---|
| 2010 48.87<br>Prospects for 2015 49.28 | 489 | 1,014.7 | 20,562 | 10,143.8 |

Source : Bank of Korea (2012), *National Account.*

The Korean economy is the 10th largest among OECD countries and shows relatively good macroeconomic indicators including economic growth rate and current account balance despite high inflation rate as it could respond effectively to the global economic crisis. The ROK's GDP grew at a rapid pace in the 2000s but the growth slowed in 2008 due to financial crisis coming from the US. ROK's GDP, however, has begun to grow again since 2010.

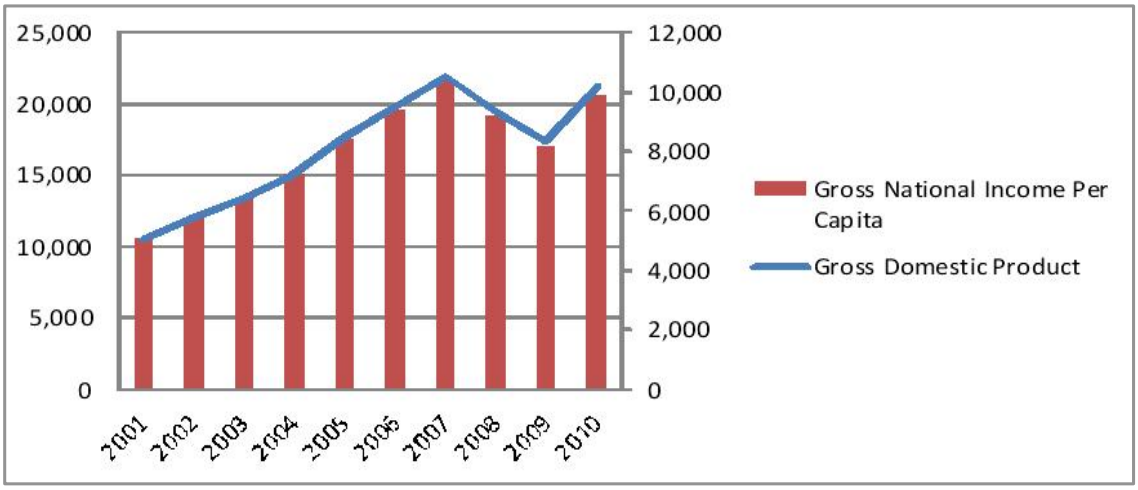


**Figure 1 Trend in National Account**

Source : Bank of Korea (2012), *National Account.*

It is found that ROK is well equipped with quantitative conditions for productivity improvement including high informatization rate, investment in education and R&D, but the condition of labor-management relations and labor market flexibility is not good enough requiring qualitative improvement of regulations.

$CO_2$ emissions of ROK is higher than those of advanced countries but ROK is one of the best countries in managing pollutants and has high potential for environmental improvement. ROK has economic structure heavily dependant on carbon. It has high energy intensity and carbon emissions growth rate per capita. The lack of renewable energy use compared to the use of fossil fuel is the subject to improvement in the future. ROK shows excellent performances in water-related infrastructure and strength in the management of waste with low per capital waste discharge amount and high recycling rate.

It is judged that high ratio of government spending on environmental protection, high ratio of environment tax and efforts on green growth and environmental improvement at the government level are positive aspects. In addition, wide forest area is expected to have positive impact.

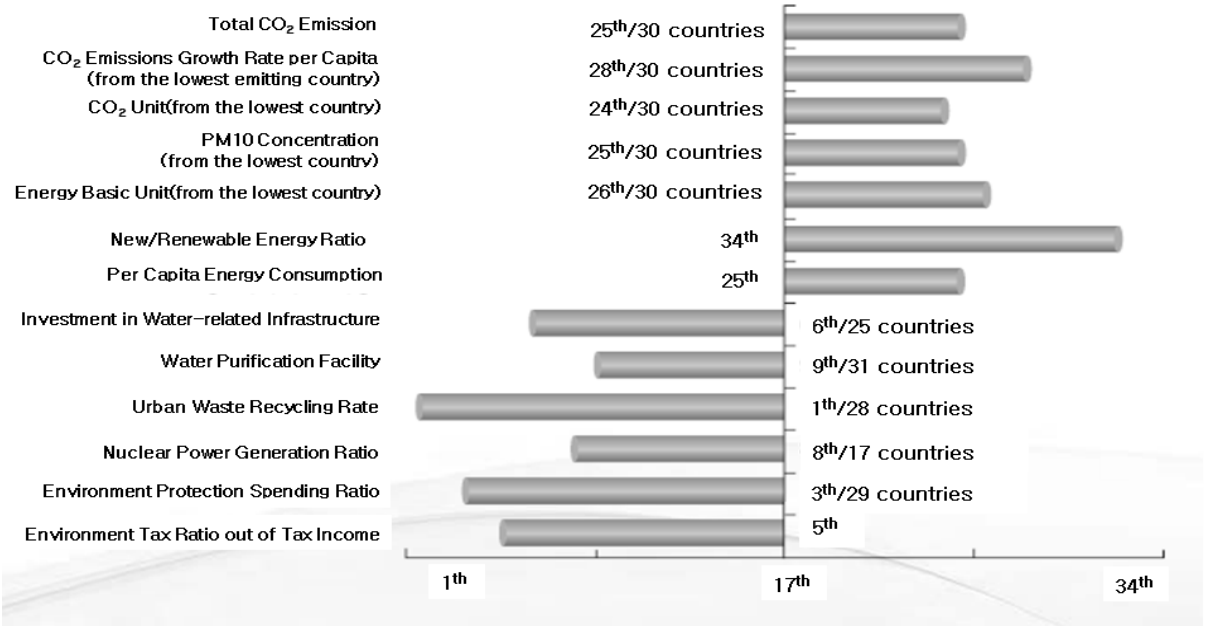


**Figure 2 2011 National Competitiveness Analysis on Environment Area**

Source : Ministry of Strategy and Finance (2011), *2011 National Competitiveness of Korea.*

# II. Review of National Strategy for Sustainable Development

## 1. Structure and Achievement of the First National Strategy for Sustainable Development

### 1.1 Structure

The sustainable development pursued by ROK is to take a strategy to nurture eco-friendly growth engine and growth of economy and society at the same time based on the understanding of relations among economy, society and environment. The sustainable development was presented as a paradigm for national development to preserve environment for the future generations and secure competitiveness of the current generation.

The First National Strategy for Sustainable Development is based on National Vision for Sustainable Development ("Advanced nation where economy, society and environment are developed in a balanced manner.") integrating and specifying policies on economy, society and environment implemented at each ministry level within the framework of sustainable development. The strategy for implementation is as follows. 1) Sustainable management of natural resources, 2) improvement of social cohesion and public health, 3) sustainable economic development and 4) response to climate change and environment preservation. These major 4 categories are divided into 48 implementation tasks and 238 specific tasks.

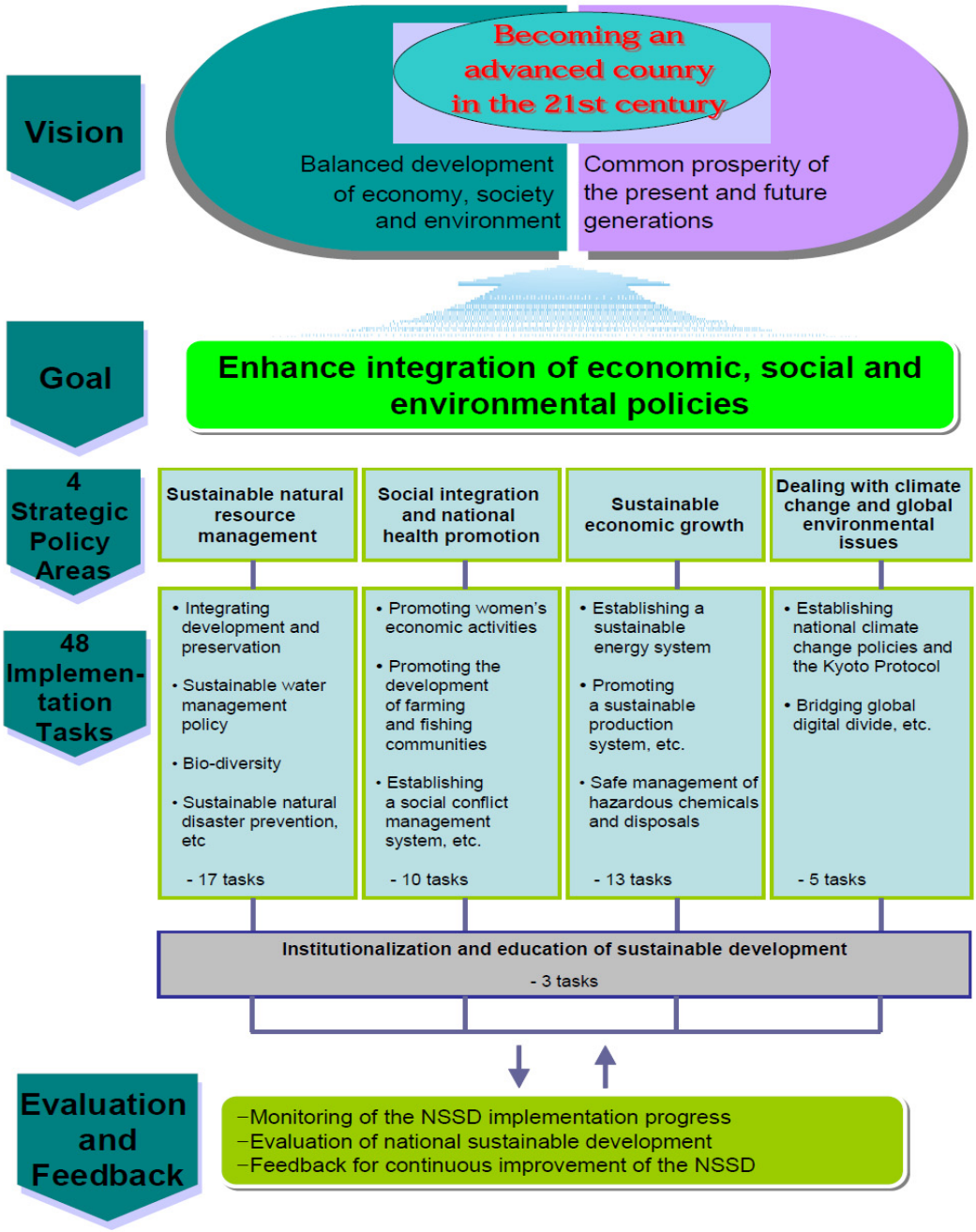


**Figure 3 Structure of the First National Strategy for Sustainable Development**

Source: Presidential Commission on Sustainable Development (2006) *Sustainable Development Strategy & Implementation Plan.*

## 1.2 Selection of the National Sustainable Development Indicators

(1) Composition of Indicators

In the late 1990s, UNCSD, EU, and OECD began to present indicator system to evaluate the level of sustainable development and they recommended the establishment of implementation plan for sustainable development and evaluation of implementation progress using indicators at World Summit on Sustainable Development (WSSD) held in Johannesburg in 2002. As of 2009, 106 countries in the world established national strategies and implementation plan for sustainable development to respect the international consensus.

**Table 3 National Sustainable Development Indicators**

| Organization | Release Year | Composition of the Indicators |
|---|---|---|
| UNCSD | 1996<br>2001 | Composed of 57 indicators in 4 areas: society, environment, economy and institution |
| EU | 1997<br>2001 | Composed of 64 indicators by adding 7 indicators and making partial changes to UNCSD indicators |
| OECD | 1998<br>2006 | Present 33 indicators as environmental indicators(including 15 indicators in society and economy area)<br>Present 123 indicators as composite indicators for economy, society and environment (OECD Fact Book) |
| Korea | 2006 | Present 77 indicators with 33 items in 14 areas related to society, economy and environment |

Source : Presidential Commission on Sustainable Development (2006), *Strategy and Implementation Plan for Sustainable Development.*

ROK has selected and presented 77 national sustainable development indicators suitable to the situation in ROK to diagnose the level of sustainable development in ROK with objective indicators since it established the First National Strategy for Sustainable Development in October 2006.

The national sustainable development indicators are composed of 4 tiers: sector (3), area (14), item (33) and indicator (77), similar to international indicator system. In October 2006, 77 national sustainable development

indicators were determined based on research on international and domestic indicators, expert review, public discussion and discussion among relevant ministries under the leadership of Presidential Commission on Sustainable Development.

Evaluation method and system were established through pilot launch in 2007 and the result was released in the issue No. 2008-5 of the Presidential Commission on Sustainable Development publication under the title of *National Sustainable Development Indicator Evaluation Report for the Happiness of Current and Future Generations*.

### (2) Overall Assessment on the Implementation of Strategies

Despite internal and external difficulties in executing tasks, most of the 48 tasks in 4 strategic areas presented in the First National Strategy for Sustainable Development are recognized as the tasks that achieved their target on schedule.

The global economic downturn resulting from international financial crisis in 2008 served as a negative constraining factors in sustainable development of ROK, which is heavily dependant on export. Internally, green growth was presented as the new paradigm for national development and the harmonization and relationship with sustainable development were reviewed as an important task in the process of proposing new policy agenda including the establishment of the Presidential Committee on Green Growth, adoption of 5-year Plan on Green Growth and enactment of the Framework Act on Low Carbon, Green Growth.

Out of 238 specific tasks, 54 tasks or 23% of the tasks have been completed and 176 tasks or 74% of the total have been processed on schedule and 7 tasks or 3% of the total are behind the schedule. It is analyzed that 4 out of the delayed cases are due to external condition changes including inter-Korean relationship.

2 tasks of enacting conflict management laws in relation to social cohesion

and the establishment of "Conflict Management Center" have not been implemented and 1 task of "Coming up with Reasonable Water Price System through Realistic Water charge" was delayed due to deteriorated economic conditions after global financial crisis.

**Table 4 Evaluation Result of Implementing Tasks of National Strategy**

| Name of Strategy | Unit | Total | Completed | On Schedule | Behind the Schedule | Others |
|---|---|---|---|---|---|---|
| Total | (No.)<br>(%) | 238 | 54<br>(23%) | 176<br>(74%) | 7<br>(3%) | 1<br>(0%) |
| Sustainable Management of Natural Resources | (No.) | 93 | 22 | 67 | 4 | 0 |
| | (%) | | 24% | 72% | 4% | 0% |
| Social Cohesion and Public Health Improvement | (No.) | 39 | 7 | 30 | 2 | 0 |
| | (%) | | 18% | 79% | 5% | 0% |
| Sustainable Economic Development | (No.) | 76 | 22 | 53 | 0 | 1 |
| | (%) | | 29% | 71% | 0% | 1% |
| Responses to Climate Change and Environment Preservation | (No.) | 20 | 0 | 19 | 1 | 0 |
| | (%) | | 0% | 95% | 5% | 0% |
| Strengthening the Foundation for Implementation Plan | (No.) | 10 | 3 | 7 | 0 | 0 |
| | (%) | | 30% | 70% | 0% | 0% |

Source: Ministry of Environment, et al. (2011), *Evaluation on the Implementation of the First National Strategy for Sustainable Development.*

## 2. Sectoral Achievement

## 2.1 National Land Use Management and Human Settlement

ROK has witnessed deepening imbalances of national land as it pursued national land and land policies focusing on economic development and national environment has been deteriorated due to maldevelopment. Even though conflicts between the increased demand for development as a result of balanced development and decentralization policies and the use and conservation of national land began to increase, the sustainable land management strategies and institutes were not sufficient.

Against this backdrop, the government deployed two strategies: one is to implement comprehensive national development plan and the other is to operate land use plan system. Under the First National Strategy for Sustainable Development, the focus of national land use management is to "implement national land management system with which human and nature can coexist in a sustainable manner."

### (1) Comprehensive National Land Development Plan

Comprehensive National Land Development Plan is the highest level national plan with 20-year interval to present basic strategies and ways to implement them to use, develop and preserve land. The plan was first established in 1962 and has been revised four times. It serves as the foundation to apply sustainable development strategies at the national level by presenting and adjusting various policies and project directions scattered across various government ministries.

The fourth comprehensive national land development set the goal of integrating development and environment for the period between 2000 and 2020 and has implemented related policies. In 2008, national land management sustainability indicators (a total of 30) were developed to establish national land management evaluation system by revising the Framework Act on National Land.

In January 2007, Management of Mountainous Districts Act was revised to manage mountainous districts in the nation classifying them strictly into preservation mountainous districts and quasi preservation mountainous districts. As a result, the preservation mountainous districts account for 4.947 million ha, or 77% of the total mountainous area of 6.433 million ha between 2006 and 2010. This data is expected to be used as a way to measure and evaluate sustainability performance on a regular basis at the local government level.

The national spacial information project has been implemented to link national land information and environmental information for the establishment of sustainable national land management system since 2006 and detailed national stock map was made. In 2007 the first revision of land cover map was completed and in 2009, the second revision of land cover map was done using Arirang 2 Satellite imagery data for metropolitan area and inner land of Chungchung-do, where significant changes were made as a result of multi-functional administrative city establishment and new city construction.

**Table 5 Achievement of Information System Establishment Project for Preservation**

| Year | Achievement |
|---|---|
| 2008 | 1/5000 Map of Forest Type 1,400 Partition, Coastal Information Map 1,007 Partition Established |
| 2009 | 1/5000 Map of Forest Type 1,218 Partition, Coastal Information Map 316 Partition Established |
| 2010 | 1/5000 Map of Forest Type 4,523 Partition, Coastal Information Map 385 Partition Established |

Source: Ministry of Environment, et al. (2011), *Evaluation on the Implementation of the First National Strategy for Sustainable Development.*

The first phase of the "National Spacial Information Integration Project" is to link 11 systems in 6 ministries including Ministry of Land, Transportation and Maritime Affairs and Ministry of Environment making workers receive spatial information and service more conveniently.

In the second phase, mountainous district classification map, map of forest type, and coastal information map were established, information system of Forest Service for preservation purpose and 59 spacial information systems of local governments were linked and "the Council on the Establishment of Integrated System for National Spacial Information" was established. The

development of integrated national spacial system made it possible to manage regional development project in a systemic manner and to improve administrative efficiency as all processes were automated from writing-up business plan, to application and to monitoring.

**Table 6 National Spacial Information System Project**

| Year | Achievement |
|---|---|
| 2008 | Basic spacial information and geographic DB 839㎢ established<br>Cultural asset DB established (725 plot plans, 1,260 preservation map DB)<br>Administration service developed based on spacial information in 8 administrative areas<br>- (Administration for city and province) environment, public health and hygiene, economy and trade, internal adminstration (public property)<br>- (Administration for city, and lower level district) environment, hygiene, regional industry, internal administration (public property) |
| 2009 | Basic spacial information and geographic DB 2,933㎢ established<br>Cultural asset DB established (446 plot plans)<br>Administration service developed based on spacial information in 4 administrative areas<br>- (Administration for city and province) culture and tourism, fishery<br>- (Administration for city, and lower level district) culture and sports, fishery |
| 2010 | Basic spacial information and geographic DB 209㎢ established<br>Cultural asset DB established (893 plot plans, 1,281 preservation map DB)<br>Administration service developed based on spacial information in 7 administrative areas<br>- (Administration for city and province) agriculture, road, transportation, health<br>- (Administration for city, and lower level district) agriculture, road and transportation, health<br>11 systems in 6 Ministries (Ministry of Land, Transportation and Maritime Affairs, Ministry of Environment, Ministry for Food, Agriculture, Forestry and Fisheries, Forest Service, Cultural Heritage Administration, National Emergency Management Agency) linked |

Source: Ministry of Environment, et al. (2011), *Evaluation on the Implementation of the First National Strategy for Sustainable Development.*

## (2) Land Use Plan

ROK gives basic order for national land use and management at the national level through national land use planning system to preserve the area necessary to preserve and develop the area efficiently if the area requires development.

ROK has improved excessive and unreasonable regulations related to land use and expanded the land supply capacity for city and industry by establishing Measures for Efficient Land Use in 2008.

ROK made the land use flexible in urban area so that planned development like complex and compact development is possible and differentiated criteria on permission for development acts to prevent maldevelopment of non-urbanized area.

In addition, ROK enacted the Act on the Management and Use of Livestock Excreta in September 2006 to install and operate public treatment facility for livestock excreta and promote the use of livestock excreta as fertilizer instead of using chemical one. It is an effort to establish environment-friendly livestock industry base considering environmental capacity of a region resolving livestock excreta treatment issues.

In March 2006, ROK enacted the Act on the National Trust of Cultural Heritages and Natural Environment Assets to raise fund voluntarily from citizens and establish natural environment public trust corporation in an aim to acquire cultural heritage and natural environment assets worth preservation and make them to be preserved and managed improving the condition for preservation and management of environment assets.

In 2008, coastal zoning system was adopted to prevent development in preservation coastal area and give priority for the costal development area to prevent reckless development. It means that 76 coastal area owned by local governments were classified into 4 purposes: Use, Preservation, Management and Special. Under this classification, each area was given purpose considering current state of use, characteristics and future use so that the areas could be managed properly inducing sustainable development of coastal area.

Private-public partnership was strengthened by establishing national land environment management governance with expanded participation of civil representatives in major review agency related to development including central and local urban planning commission.

### (3) Human Settlement

The ROK's action plan for human settlement is to expand support for urban people in the low income bracket including improving their livelihood. In particular, ROK intended to support self-reliance of the people vulnerable to housing by securing right to housing, health and helping them find jobs.

ROK has removed the instability of housing of those in low income bracket and encouraged those without a house to own house by establishing 1.5 million affordable houses in green-belt area known as "Bogeum Jari" housing and 1 million public and rental housing. As a result a total of 411,782 rental houses have been established between 2006 and 2011 and the share of long-term rental housing out of total housing increased from 3.0% in 2006 to 5.0% in 2011.

Even though the quantity of public and rental housing supply increased significantly, the project is evaluated as less efficient as those in the low income bracket should pay relatively high rental fee compared to their income level. Therefore, additional measures and continued efforts are required to this issue.

**Table 7 Construction of Public Rental Housing**

| Year | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | Total |
|---|---|---|---|---|---|---|---|
| No. of Houses | 96,812 | 110,310 | 84,882 | 48,310 | 35,297 | 36,171 | 411,782 |

Source: Ministry of Environment, et al. (2011), *Evaluation on the Implementation of the First National Strategy for Sustainable Development.*

The government expanded spending on projects related to improving living environment for urban people in the low income bracket as part of an effort to improve living environment for those in the low income bracket. A total of 796.4 billion won have been supported for 6 years since 2006 to install infrastructure within aged and defective housing district in 317 areas. It was ROK's effort to promote stable settlement and improve quality of life by improving housing welfare for those in the low income bracket.

**Table 8 Housing Environment Improvement Project**

| Year | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | Total |
|---|---|---|---|---|---|---|---|
| Project Cost (1 million won) | 120,477 | 132,988 | 122,436 | 108,680 | 153,138 | 158,700 | 796,419 |
| Districts Subject to Project (number) | 203 | 247 | 267 | 247 | 253 | 219 | 371* |

* The districts belong to more than 1 year category are calculated as 1 district.

Source: Ministry of Environment, et al. (2011), *Evaluation on the Implementation of the First National Strategy for Sustainable Development.*

## 2.2 Social Welfare

### (1) Poverty and Public Health

Elimination of poverty and improvement of health status are key to sustainable development. ROK's strategy to remove poverty is to consider both economic growth and environmental issues eliminating absolute poverty in the short term and reducing relative poverty in the long-term.

The life protection system for those in the low income bracket has been implemented long before and expansion of support amount and improvement of ways to support have been pursued. To make the Basic Livelihood Security System really work, the government raised minimum living cost and cleary stated the standard for those responsible for support so that more benefits can be given to the poor who don't get enough support.

ROK implemented projects to improve appropriateness of basic life support benefits by operating "Basic Benefits Management Unit TF" to check the management of local governments, identify and take measures against those who receive the benefit wrongly, support survey on assets, strengthen monitoring system, and remove dead zone.

In 2010, ROK opened social welfare integrated network "Happiness e-um", that links and manages 215 kinds of information including income, property,

and service history in 27 institution. It is expected that this network will guarantee a proper level of benefits for those who receive basic livelihood security benefits and contribute to removing dead zone of welfare.

ROK implemented job opportunity expansion project in social service sector to expand the number of sustainable job for those vulnerable to unemployment. By doing so, ROK has expanded vocational rehabilitation infrastructure for the disabled to 417 and the number of social service job from 14,128 in 2006 to 75,147 in 2010.

In 2010, ROK selected promising sectors in health and welfare sector (cultivation of caring service industry, expansion of customized child-care service, practical long-term care service and expansion of local social service) as it established the plan to expand the number and advancement of jobs in social service sector to provide appropriate jobs to mid-to-old aged women.

ROK revised Public Health and Medical Services Act to expand public health medicine. By doing so, ROK could designate or support base medical institution for areas where medical supply is significantly short, designate and support public medical center for special area where supply is not enough due to low profitability, establish public health medicine master plan for efficient project implementation, install support center for public health medicine and evaluate public health medicine projects.

As long-term care system was implemented in July 2008 and long-term care insurance system was improved to increase the number of caring facility and home care, the number of caring facility was increased to 3,751 and home care facility to 19,947 as of 2010.

The Master Plan for Expanding Public Health Medicine has been established and implemented since 2005 to expand supply base for public goods including emergency medicine, blood, and rehabilitation supply. With this support ROK's life expectancy at birth increased to 80.8 as of 2010.

(2) Protection of Foreign Workers' Rights

The shortage of production labor in domestic industrial site has been aggravated in ROK as the number of working age population decreases with low birth rate and aging population and people tend to avoid working in difficult, dirty and dangerous industry. So, the government has implemented Employment Permit System instead of Industrial Trainee System in 2004 to provide production labor systematically while protect domestic labor market, strengthen protection of foreign workers' rights, improve transparency in the process of labor migration, and resolve illegal stay issues effectively.

The Employment Permit System is to apply National Labor Relation Act including Labor Standard Act, Minimum Wage Act and Industrial Safety and Health Act equally to foreign workers resulting in reduction in overdue wage, industrial accident of foreign workers and human rights improvement. Moreover, the burden of foreign workers including the cost of labor migration was relived by improving fairness and transparency as public sector becomes responsible for labor selection and adoption process excluding the private sector.

This result is well recognized in the international society. ILO evaluated ROK's Employment Permit System as "Pioneering a system of migration management in Asia" in 2010, and ROK won grand award by UN in recognition of innovation of ROK in the area of Preventing and Combating Corruption in the Public Service in 2011.

**Table 9 Comparison of Employment Permit System and Industrial Trainee System**

| Classification | Ratio of Foreign Workers with Wage Overdue Experience | Industrial Accident Rate (%) | Satisfaction Level of Working Environment | Labor Migration Cost ($) |
|---|---|---|---|---|
| Industrial Trainee System (2001) | 36.8 | 0.90 | 2.5/5 Points | 3,509 |
| Employment Permit System (2011) | 1.6 | 0.58 | 3.6/5 Points | 927 |

Source : *Evaluation on the Implementation of Employment Permit System and Ways to Improve the System* (Gilsang, Yoo et al., 2011)

ROK has also implemented services to support foreign workers' stay to have stable work life and basic working condition protected. First, ROK

installed 7 foreign workers support center and 27 sub-regional centers in areas where population of foreign workers is concentrated like Seoul and Uijeongbu City to establish more network for on-site support for foreign workers. In July, 2011, the Counseling Center for Foreign Workers with call center function where employers and foreign workers can have counseling on labor issue, and difficulties anytime and anywhere was established in Ansan, Gyeonggi-do (counselling service is provided with 10 languages including Vietnamese).

Second, the contents of the counselling and education provided by foreign workers support center has been more practical with the expansion of infrastructure providing 319,000 counseling service, 107,000 education services on Korean language, Korean culture and computer and 12,000 medical check-up services for free as of 2011. In addition, Counseling Center for Foreign Workers has provided 129,000 counseling services.

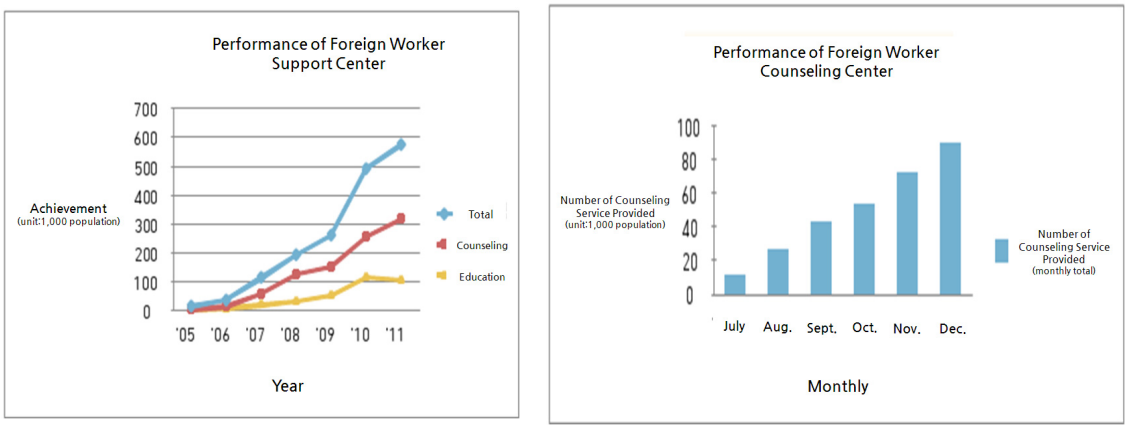


**Figure 4 Performance of Foreign Worker Support and Counseling Center**

Source : Human Resources Development Service of Korea (2011)

Third, ROK has conducted inspection on workplace employing foreign workers on a regular basis to improve and protect basic working conditions for foreign workers by preventing illegal employment, and wage overdue and making businesses keep minimum wage level (4,621 workplaces were inspected in 2011).

Fourth, insurance for foreign workers system has been implemented given the fact that foreign workers hired in small workplace (the workplace with less than 10 employees accounts for 69% of the total) have higher change of experiencing wage and retirement allowance overdue and injury. ROK continues its effort to

establish a safety net to protect basic working condition for foreign workers achieving penetration rate of guarantee insurance in preparation for wage and retirement allowance overdue at almost 90%.

Finally, the time required for the adoption was reduced (89.6 days in 2006 to 70.5 days in 2011) through simplification of employment procedure with the establishment of one-stop public service system and ROK has eased regulations on the requirements regarding movement to other workplace and implemented joint crack-down on illegal stay to prevent the risk of infringement on right as a result of illegal stay. As a result, the illegal stay rate which recorded a whopping 60 to 70% under the Industrial Trainee System has decreased to 10.4% as of 2011.

## 2.3 Industrial Sectors

The Korean environmental industry market shows about annual growth rate of 14.5% on average expanding market capitalization of 29.1961 trillion won in 2006 to 50.1114 trillion won in 2010. The share of environmental industry to GDP was 4.1% as of 2009, the similar share of information and telecommunications sector (3.9%) and the share is relatively higher than that of EU countries (0.8%~4.5%).

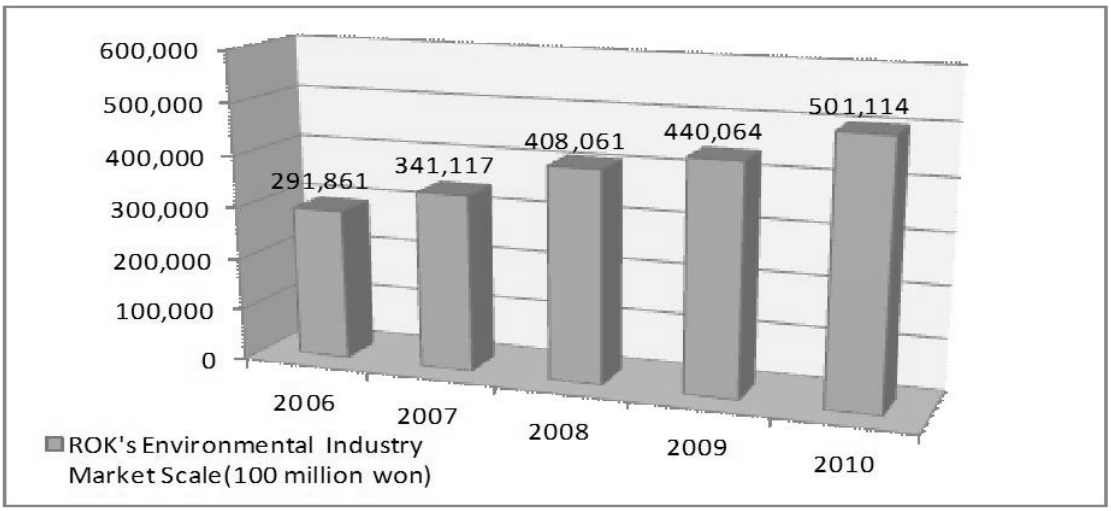


**Figure 5 Environmental Market Scale in Korea**

Source : Ministry of Environment (2011), *Environmental White Paper.*

The government expanded support for environmental consulting business and existing environmental service business and share environment-related information by running Korea National Environmental Technology Information Center (KONETIC) since 2008. With the continued increase in demand for environmental service due to strengthening environmental regulation and spread of environmental management, the number of environmental consulting companies increased. The sales of registered environmental consulting companies increased from 16.4 billion won in 2006 to 55.4 billion won in 2010.

The government is implementing plans to nurture environmental consulting industry including expansion and improvement of education support program, establishment of price standard for consulting service, induce unregistered companies to be registered, and provide information through the establishment of information network. Even though environmental consulting industry is one of the representative knowledge-based industries increasing added value of the overall industry, the competitiveness of ROK's environmental consulting industry is week[1].

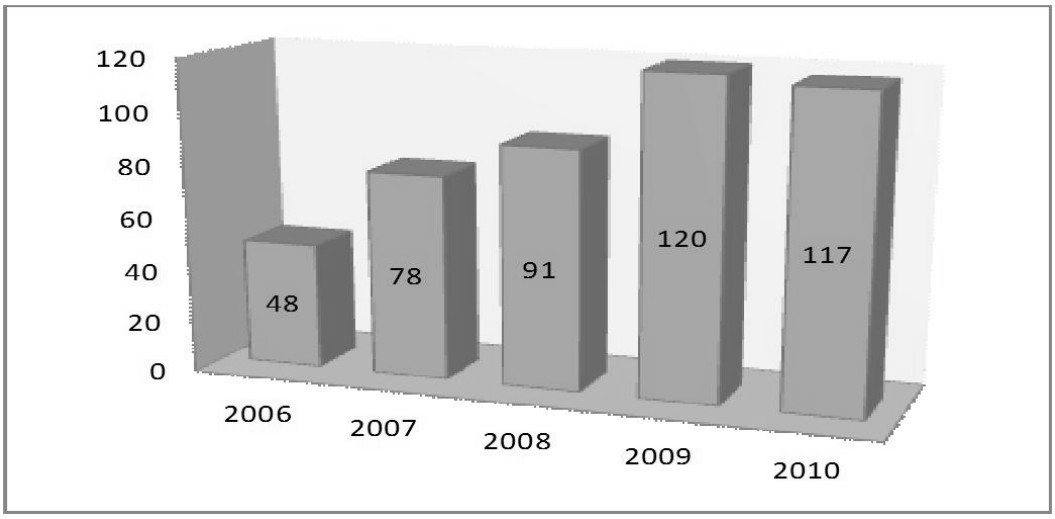


**Figure 6 No. of Registered Environmental Consulting Companies**

Source : Ministry of Environment (2011), *Environmental White Paper.*

1) The number of environmental consulting companies registered in Korea is 117 with sales volume of a mere 55.4 billion won (as of 2010).

The export volume regarding environment has increased continuously as the government is focusing on export of environmental industry. The export volume of environmental industry shows high growth rate of 26.2% on annual average for 5 years, but 67.7% of the export is related to construction of water facilities like sewage treatment facility, and 22.1% is related to air related products. The concentration of export on certain business seems to be the issue to be resolved in the future.

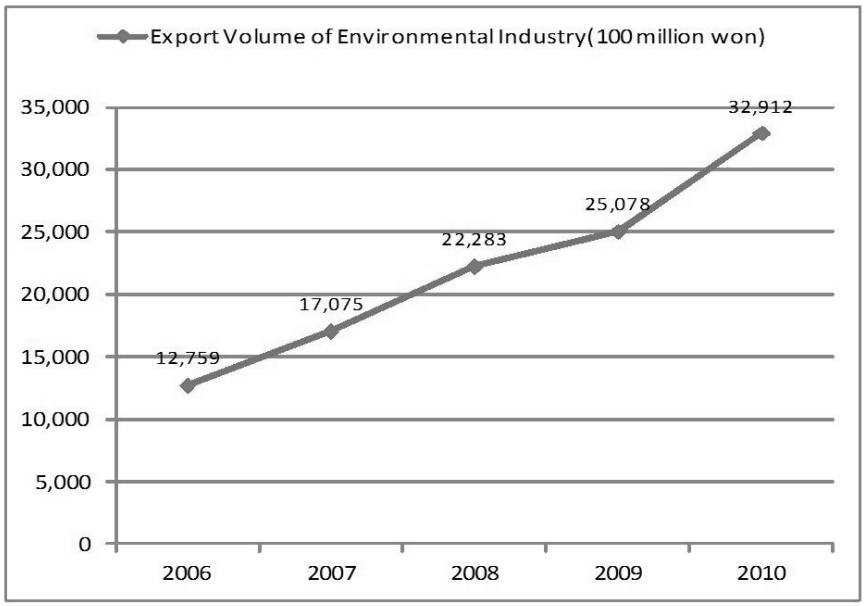


**Figure 7 Export of Environmental Industry (100 million)**

Source : Ministry of Environment (2011), *Environmental White Paper.*

Individual Consumption Tax Act is aimed at treating external diseconomies by expanding the scope of compact car for which individual consumption tax is exempted and imposing tax on huge items consuming lots of energy. This act was revised in 2008 to relive industrial distortion effect and serve as a corrective tax for items that cause social cost.

The government has adopted Type 1 environmental labelling program since 1992 to induce production and technology development of environmentally-friendly products and provide accurate environmental information related to product to consumers so that consumers identify environmentally-friendly product. Since the adoption of the system, the number of product with environmental labelling

has continued to increase to 148 product category in 2010 and 7,904 products from 1,632 companies obtained environmental label certification.

The Type 2 labelling system introduced in 2001 conducts an environmental evaluation for all product cycle from production, distribution, consumption and disposal and the result of the evaluation is provided in the form of environmental information to increase environmental reliability. It is one of the voluntary systems. As of 2010, a total of 309 products were certified and the government established LCI database information network so that businesses and individuals can access to DB to obtain necessary information to calculate environmental attributes.

The lack of general consumer's perception of environmentally-friendly product and poor sales record made the government to revise the Act on the Encouragement of Purchase of Environmentally-friendly Products in 2006 to install the selling place for environmentally-friendly products at large stores so that consumers can purchase environmentally-friendly products easily. As a result, the amount of environmentally-friendly product purchase amount has continued to increase from 15.7 trillion won in 2006 to 24.9 trillion won in 2010.

Thanks to this effort, the perception of the consumers regarding environmental labelling increased by 5.8% compared to 2007 to 39.3% in 2010. It is judged that improving the perception of green purchase is necessary through continued promotion and education in the future.

ROK has made industry adopt environmental accounting and issue environmental report to spread environmental management. ROK wrote "Environmental Report Guideline 2002" for 21 items in 6 areas in 2002 and supported the issuance of environmental report by the businesses by conducting pilot project to issue environmental report. ROK has established Society for Environmental Accounting Policy and developed environmental cost accounting guideline, which is applicable to domestic companies, in June 2002 based on case study and pilot project.

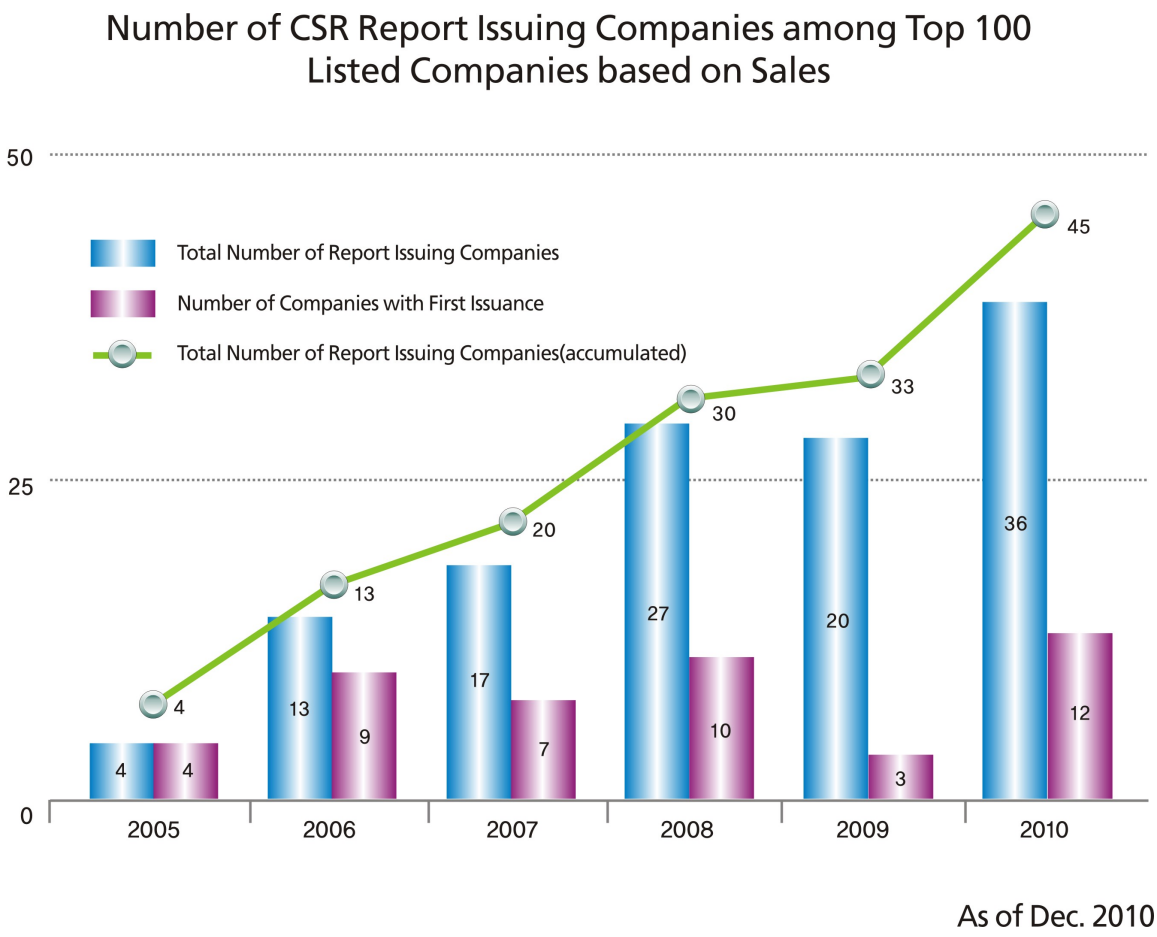


**Figure 8 The Number of Businesses Issuing Environmental Report**

Source : 2011 CSR Report Issuance State, Center for Good Corporations (csr.action.or.kr).

ROK has pursued transition to resource recycling industrial structure by establishing clean production network in industrial complex, and making businesses recycle water and waste generated in industrial complex. Korea Industrial Complex (KICOX) and ISL in UK signed an MOU for exchanges and cooperation on Eco-industrial Park (EIP) and National Industrial Symbiosis Program (NISP) as part of an international cooperation projects and ROK has pursued project to recycle waste or byproduct generated in industrial complex to make raw materials or energy for other companies.

Thanks to these efforts, the government could establish the waste resources and byproduct recycling network nationwide in 2005 and energy and resource recycling network between large corporations and small-and-medium-sized corporations. As a result, the water reuse amount in industrial complex

increased from 7,000 tons in 2008 to 10,000 tons in 2010 and the amount of waste recycling has continued to increase from 6,000 tons in 2008 to 8,700 tons in 2010.

## 2.4 Environmental Science and Technology

The government confirmed the "10-year Plan for the Development of Next-generation Core Environmental Technology" in July 2002 and established step-by-step goals and strategies. Based on the opinion of experts in industry, academia and research institute, the government made Technology Road Map by the year 2010 and implemented the development of relevant environmental technology strategically.

The Development of Next-generation Core Environmental Technology project supports technological development tasks by dividing them into 12 large categories and 30 sub categories. In the Phase 1 (2001-2003) period, the government secured technologies to resolve current environmental issues, in the Phase 2 (2004-2007) the government secured mid-and-long-term strategic technologies and in the Phase 3 (2008-2010), the goal was to secure core technology for the future.

The government established new and renewable energy resources map web service to make technological innovation system for sustainable energy system to analyze new and renewable energy resources distribution state and estimate potential energy amount at the national level.

The Technology development to respond to Restriction on Hazardous Substances (RoHS) and technological development to respond to regulation on end-of-life vehicles (ELV) were planned to meet the international environmental standards. The development of 28 green technologies are underway under the "Master Plan of Green Technology Research and Development" (2009).

The government supported following projects in table 10 to secure

next-generation core and clean technology. The government selected 5 modeling complex in phase 1 through clean production base establishment pilot project to establish energy reuse network with businesses by analyzing process and material flow in industrial complex, technologies related to byproduct and development of technologies to make byproduct into resources.

**Table 10 Support for the Next-generation Core Clean Technologies**

| Year | Project Details |
|---|---|
| 2007 | Technological development and promotion of movement related to clean production base of small and medium sized businesses |
| 2008 | Projects based on clean areas among strategic technological development projects based on manufacturing area |
| 2009 | Material and process technology to replace hazardous material, design and production technology of green products mimicking nature and ecosystem, uni-material technology to maximize resource circulation, and pollution free production technology to reduce pollutants in the production process. |
| 2010 | Clean technology related to vehicle painting, polyethylene uni-material tire technology |

Source : Ministry of Environment (2011), *Environmental White Paper.*

With the need for the development of integrated technology of river basin, stream and reservoir, water management technology development project was implemented (from Nov. 2010 to Mar. 2011). The development of base technology for water management was completed in 2004 and pilot application and validation process were underway until March 2007. The establishment of integrated water resources management system was completed in 2011. Water budget analysis and water resources planning technology were executed in the project to secure technology to increase the utilization of Korea-Water Evaluation And Planning System (K-WEAP), an integrated water resources evaluation planning model. The function of the system was improved in 2007.

The government supported the development of natural disaster reduction technology to develop a total of 7 reduction technologies by 2010. Cell Broadcasting Service (CBS) system was established to shorten the disaster message sending time. Accordingly, the emergency disaster information including typhoon, torrential rain, mountain fire, heavy snow, earthquake and tsunami is provided to the public in real time and the sending time of the

disaster message has been reduced from 8 minutes to 2 to 3 minutes through regular and continued improvement of function.

Compared to other sectors, forest has poor research environment, but support system was established to push ahead with forest research and development and promote the research making the momentum for to internationalize forest science technology development and strengthen the international competitiveness. As a result, the number of papers in this field increased from 220 in 2006 to 540 in 2010 and the number of effective policies increased from 61 in 2006 to 77 in 2010.

Open sea fish case was developed to make strong fishing ground and future-oriented fishery industry and 6 open sea farming projects were implemented. If the artificial production technology for cultured species including bluefin tuna for 5 years (2010-2014), it will lay the foundation for fishery farming and improve the competitiveness of Korean fishery culture industry. The useful living organism development and technology development for preserving unique species (production of fertilized egg, stock preservation, etc.) were pursued[2].

## 2.5 Agriculture and Rural Development

The ROK's agricultural land has been on the downward trend for the past 5 years while the agricultural land per farm household has been on the rise from 144.6a (2006) to 145.7a (2010) and the export of agricultural products grew by 73.5% from 3.39 billion dollars in 2006 to 5.88 billion dollars in 2010.

The organization in charge of agricultural administration was hauled from Ministry of Agriculture and Forestry to Ministry for Food, Agriculture, Forestry

2) Establishment of the integration center that combines technology for disaster safety level evaluation by the region, flood mitigation from inland inundation technology, earthquake and tsunami reduction technology, yellow dust damage reduction evaluation and responsive technology, landslide prediction and reduction technology, slope collapse prediction and responsive technology, and information technology related to natural disaster.

and Fisheries and plan for sustainable agriculture and fisheries and rural development was established to expand the system for stabilizing the income of people working in the industry, improve welfare and development of the region. "Comprehensive plan for Agriculture and Rural Communities (2004-2013)" was established to implement relevant policies considering priority.

The investment and lending, which have been focused on SOC were changed to income, welfare and regional development and direct payments to agricultural household were made to actively respond to farm household income decrease providing 1,244,455 million won a year on average from 2006 and 2010.

Tourism promotion and development of local industry were pursued with an aim to increase the income of farm households by attracting 2nd and 3rd industry. As a result, the share of off-farm income was increased from 62.6% in 2006 to 68.6% in 2010. The government has implemented "The Basic Plan on Improving Quality of Life for People in Agricultural and Fishery Sector and Promoting Rural Development" since 2005 to improve the level of welfare, education, culture and rural development. Under the plan the investment and loan amount was 6.1992 trillion won in 2010 and the amount has been on the gradual increase since it recorded 4.0105 trillion won in 2006.

**Table 11 Investment and Loan Amount under the Basic Plan on Improving Quality of Life for People in Agricultural and Fishery Sector and Regional Development**

| Year | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|
| Investment and Loan Amount (100 million won) | 40,105 | 44,082 | 51,606 | 58,533 | 61,992 |

Source : Ministry for Food, Agriculture, Forestry and Fisheries (2011).

With the growing consumer interests in health and food safety, environmentally-friendly agriculture research unit was established to develop core technology to it. From 2006 to 2010, 4.7 billion won was supported for R&D achieving 14 cases of patent application and registration, 4 cases of industrialization and 19 cases of technology transfer.

A total of 278 environmentally-friendly agricultural districts were established

from 2006 to 2010. To spread such type of agriculture, the government compensated initial income decrease and production cost differences to those who implemented environmentally-friendly farming. The amount supported directly to them was 135,691 million won between 2006 and 2010.

**Table 12 Direct Payment for Environmentally-friendly Agriculture**

| Year | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|
| Target (ha) | 34,896 | 53,682 | 76,352 | 90,132 | 93,318 |
| Amount (million won) | 14,106 | 20,807 | 28,656 | 34,514 | 37,608 |

Source : Ministry for Food, Agriculture, Forestry and Fisheries (2011), 2011 Major Statistics of Agriculture and Fishery Products.

The Environmentally-Friendly Agriculture Fosterage Act was revised in 2006 to improve environmentally-friendly agricultural products certification system. Accordingly those whose certification was cancelled cannot apply for the certification for a year and the penalty on fault presentation or illegal distribution of products were strengthened to increase reliability. In 2009, the Act was revised to stop granting new certification to low-pesticide agricultural product and it is decided that the certification on low-pesticide agriculture product will be totally abolished by 2016. Currently environmentally-friendly agriculture are conducted focusing on pesticide-free and organic agricultural products and direct payment system for that type of agriculture is modified.

The amount of pesticide and fertilizer used on agricultural land is a major indicator showing eco-friendliness. As a result of the support for the use of organic fertilizers and biological control methods replacing chemical fertilizer and pesticide the use of pesticide and chemical fertilizer has been on the downward trend as shown in table 13.

**Table 13 Use of Pesticide and Chemical Fertilizer**

| Year | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|
| Pesticide (kg/ha) | 12.9 | 12.4 | 13.2 | 12.2 | 10.6 |
| Fertilizer (kg/ha) | 257 | 340 | 311 | 267 | 233 |

Source : Ministry of Environment (2011), Environmental White Paper.

The foundation for environmentally-friendly livestock farming has been established and livestock excreta treatment issues has been resolved by promoting the use of livestock excreta. The project to turn livestock excreta into resources and energy is also underway.

**Table 14 Use of Livestock Excreta as Fertilizer**

| Year | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|
| Use of Livestock Excreta as Fertilizer Use (1,000 tons(%)) | 33,298 (82.7) | 34,656 (83.7) | 35,208 (84.3) | 37,396 (85.6) | 40,286 (86.6) |

Source : Ministry for Food, Agriculture, Forestry and Fisheries (2011).

## 2.6 Forests

The government formulates the National Forest Plan every 10 years for all forests across the nation to promote afforestation and sustainable utilization and conservation of forest resources and evaluates the feasibility of the plan every 5 years to promote afforestation and sustainable utilization and conservation of forest resources.

The 5$^{th}$ National Forest Plan (2008-2017) was established following the 4$^{th}$ National Forest Plan (1998-2007). The 5$^{th}$ Plan is aimed at realizing the goal of sustainable forest management and green welfare state through expansion of application of sustainable forest management criteria and indicators, expansion of international forest management certification, establishment of domestic certification system, and development of forest sustainability index. The importance of forest resources as carbon sink is emphasized as the need for response to climate change arises.

Since 2006, the area subject to sustainable forest management certification has been expanded and 260,000 ha was certified as sustainably managed forests as of 2010. Based on evaluation criteria and indicators (28) for sustainable forest management", national report on sustainable forest management was published in 2009 and the level of sustainable forest management was elevated by

applying forest sustainability index to meet the demands of the international society.

Forest Protection Act was enacted to preserve and manage healthy forest ecosystem. Forest diseases and pests control center was established, disease and pest forecasting, design and supervision system was adopted and legal foundation was established by adopting long-term measures for fire protection and forest fire inspection system. As a result, the ratio of disease and pest prevention rate was increased from 47% in 2006 to 77% in 2010.

The system was established to resolve conflicts and disputes on dedicated use of mountainous area, relevant expert institution is designated or expert's inspection and review result are updated. By classifying forests nationwide into conservation forest and semi-conservation forest 77% of total mountainous area of 6,440,006 ha has been maintained as conservation forest.

"Making good forest" and "planting trees suitable for a certain land and climate" projects have been implemented to improve value of forest and healthy of ecosystem. Thanks to those efforts, urban forest of 1.126 million ha was established between 2006 and 2010 and the projects are linked to 13 businesses including the utilization of forest biomass. These efforts created 50,000 regular jobs and contributed to vitalizing the economy of ordinary people.

**Table 15 State of Forestation Project : "making good forest" and "planting trees suitable for a certain land and climate" projects**

| Classification | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|
| Making Good Forest (ha) | 179,224 | 176,090 | 215,993 | 304,144 | 250,718 |
| Planting Trees Suitable for Certain Land and Climate (ha) | 20,600 | 20,775 | 21,992 | 21,919 | 21,515 |

Source : Korea Forest Service (2011), *Yearly Statistics Book of Forest.*

To promote forest recreation culture, natural recreation forest policies are implemented and natural recreation forest feasibility evaluation system was adopted to run resting year system for trails. Visitors' safety was improved by

standardizing operation procedure of natural recreation forest including adoption of ISO9001/14001. With the operation of portal system and reservation information system, the foundation for quality forest culture and recreation service has been laid. As a result, the number of natural recreation forest increased from 123 to 145 and the number of visitors has increased from 5.775 million to 9.347 million between 2006 and 2010.

Since 2003, urban forestation project has been underway focusing on ignored public land in urban area or area whose stand state is poor. The project cost related to urban forest by local government has increased to establish 1,914 ha of urban forest from 2005 until 2011. The urban forest on public land was established for 700 ha (45 places) from 2003 until 2011. Nationwide, the ratio of urban forest within living area to urban area has increased in Incheon, Gwangju, and Daejeon, but the ratio has decreased in Seoul, and Jeju with continued urban development. The overall ratio of urban forest is on the rise nationwide contributing to increasing stability of urban ecosystem and providing green resting place for the public.

**Table 16 Ratio of Urban Forest within Living Area to Urban Area**

| Classification | Total | Seoul | Busan | Daegu | Incheon | Gwangju | Daejeon | Ulsan | Jeju |
|---|---|---|---|---|---|---|---|---|---|
| 2007 | 2.4 | 7.0 | 5.4 | 1.3 | 0.8 | 1.9 | 1.7 | 0.6 | 0.6 |
| 2009 | 2.7 | 5.1 | 5.7 | 1.5 | 2.7 | 3.2 | 2.5 | 1.0 | 0.2 |

Source : Korea Forest Service (2008), 2010 *National Statistics on Urban Forest.*

The government established “comprehensive measures on forest to respond to climate change (2008-2012)” to preserve and expand forest as a carbon sink and use woods as bio-energy. The foundation for reducing greenhouse gas emissions was established by enacting the Act on Maintenance and Expansion of Carbon Sink recently, which is to maintain and expand carbon sink through afforestation, reforestation and forest management.

## 2.7 Conservation of Nature and Biodiversity

ROK is a signatory to the Convention on Biodiversity. To be a responsible member, it has established a strategy to conserve nature and biodiversity, and systematically managed endangered species, endemic species and marine life in Korea. The Korean government has made various efforts to lay the foundation for the advancement of biodiversity conservation and management system. For example, it has concluded biodiversity management agreement with 20 cities or districts and come up with a master plan for the conservation, management and use of biological resources.

ROK has pursued the establishment of National Institute of Biological Resources in Incheon Environmental Research Complex to collect, preserve and manage biological resources in a systematic manner. The construction was completed in March 2007 and the institute opened. Since the opening of the institute, the number of visitors has increased continuously from 47,898 in 2007 to 342,935 in 2010. With the establishment of the institute, ROK pushes ahead with research and sampling of the endemic species of Korea.

A council composed of domestic biological resources research institutes was established (34 institutes in 2007 → 60 institutes in 2010) to serve as a central organization for biological resources research, laying the foundation for securing and researching biological resources as a national asset while improving biodiversity on earth through expanded international exchanges and cooperation.

In order to identify and research biological resources, including the endemic species of Korea, the "Comprehensive Measures to Preserve Biological Resources (2005-2014)" was established. In addition, database covering 2,177 endemic species of Korea was created and an illustrated guide to Korean bio-resources was published. Through the identification and research project for ROK's unique species, database and list composed of 36,921 species was made and their sampling was completed.

It is found that a total of 221 endangered species, including 22 species of mammal, 61 species of bird, 6 species of amphibian and reptile, 18 species of

fish, 29 species of invertebrate, 20 species of insect, 1 species of seaweed and 65 species of plant, exist in ROK. In order to restore endangered species, the Korean government has set mid-and long-term goals and encouraged each national park to restore more than one animal and one plant species. As a result, the number of wildlife subject to restoration increased from 2 in 2006 to 35 in 2010. Moreover, the foundation to preserve wild animal and plant was expanded by establishing protection, and monitoring network for wild life as well as designating special protection zone.

In order to conserve and manage marine life, Korea has been conducting regular monitoring activity as well as collecting and keeping the samples. The Korea South Pacific Ocean Research Center (KSORC) conducts a variety of research activities: monitoring of marine ecosystem such as coral reef and marine environment; research on tropical life and habitat; production of functional animals and plants; development of new and renewable energy system; and research on acidification of ocean resulting from increased $CO_2$ emissions. An information system on marine life was established and, as of 2010, 11,476 species were registered by making a list of species to provide information on biodiversity of marine life in coastal area. Monitoring is being conducted for marine life species based on which the government can come up with policies to preserve and manage marine life diversity.

Bio science information system is established to make database on genetic information of marine life and protective measures are being established. In 2010, the "Specification on Marine Life Sampling Standard" was published to provide systemic and comprehensive information on securing marine life and sampling procedure with the latest technology.

**Table 17 DB on Genetic Information of Major Marine Species**

| Year | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|
| Achievement | 32 types of marker | 1 type of marker | 69 types of marker | Genome(6 types 47,490 cases) | Marker(660 types) |

Source: Ministry of Environment, et al. (2011), *Evaluation on the Implementation of the First National Strategy for Sustainable Development.*

To preserve ecosystem in DMZ which is under special management due to Korea's unique political conditions, an internal ecosystem research in DMZ area has been conducted at the regional level and the result has been announced. The research on ecosystem in 9 areas including geology, landscape, plant, bird, and mammal for inner land of southern part of DMZ (excluding coastal area) has been conducted step by step.

The 2009 survey on the central part of DMZ found that a total of 450 animals and plants inhabit in that area and the central part has more abundant biodiversity than the western part (with 348 species) and five endangered species designated by the Ministry of Environment (rat snake, common Korean bitterling, goshawk, sparrow hawk, and leopard cat) live in the area.

An international conference on "Peaceful Management of DMZ Ecosystem" was held in conjunction with G20 summit in 2010. ROK has pushed ahead with the designation of DMZ as an UNESCO Biosphere Reserve as one of the national agenda and pursued the way to make both South and North Korean DMZ be designated together. DMZ preservation action plan, as well as measures to preserve and utilize DMZ ecosystem will be discussed at the World Conservation Congress to be held in Jeju in 2012. Video clips about DMZ ecosystem for public relations will be made and distributed with the purpose of public education and promotion on DMZ ecosystem conservation.

## 2.8 Marine Sector

Ministry of Land, Transport and Maritime Affairs and Ministry for Food, Agriculture, Forestry and Fisheries have led the implementation of various policies related to sustainable development of coast and sea and have laid the foundation for integrated and systemic management of marine pollutants since the reorganization of the government in 2008.

Based on these efforts, the government revised Cost Management Act to adopt cap-based natural coastline management system to preserve natural cost.

The government made the guideline on the method and procedure of the system, natural cost inspection and coast state map drawing standard, and method to make natural coast control chart at the national and local level to implement the cap-based natural coastline system. By doing so, the government could induce the environmentally-friendly use and development of coast.

Moreover, the government strengthens the management of coast by selecting 259 specific tasks for the next 10 years based on the second coast integration management plan focusing on planned space management, response to climate change and disaster and strengthened publicity. In 2010, the Coast Management Act was revised to establish coastal zoning system and the government plans to divide the total coast into 19 coastal zone and 4 purposes. To this end, the government conducts feasibility evaluation to adjust conflicts of different purposes based on objective analysis and makes detailed rules for management.

With the integration of Public Waters Management Act and Public Waters Reclamation Act in 2010, the Public Waters Management and Reclamation Act was enacted to strengthen the management of public waters reclamation project. The basic plan on public waters reclamation plan will be established every 10 years to make public waters be reclaimed and managed suitable for overall function and purpose of the nation and harmonized with the nature.

Masan Bay was designated as the pilot sea for which cap-based coast pollution management system was adopted in 2008. As a result, the bay achieved more than the target water quality in 2 years after the implementation. This case is regarded as the moment when the leadership of managing marine environment was turned from the central government to local governments.

Useful information is provided including policies on coast, leisure, coat map through coast management information system and work efficiency has been improved as “work support system” in the portal provides information

on public waters reclamation, use and dedicated use of public water and desert island. However, it is evaluated that integrated management in the areas of discussion on sea use activities and management of marine fishery life resources is not sufficient enough.

The base data for exclusive economic zone and continental shelf management has been secured by conducting step-by-step inspection on marine in accordance with implementation plan for marine and fishery development.

**Table 18 Investment in Marine Survey**

| Year | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|
| Investment Amount (million won) | 1,000 | 500 | 2,400 | 3,200 | 3,400 |

Source: Ministry of Environment, et al. (2011), *Evaluation on the Implementation of the First National Strategy for Sustainable Development.*

ROK plans to increase the metal self-sufficiency rate to more than 30% from the present rate of less than 1% by developing deep sea manganese nodule, sea-bed mining and exclusive economic zone (EEZ). The government is also making an effort to strengthen the management of exclusive economic zone and continental shelf through continued investment in ocean survey and to identify characteristics of surrounding ocean and remaining resources.

## 2.9 Water Management

(1) Water Quality Management

As the water is a major issue in Korea, the first national strategy for sustainable development (2006-2010) focused on the management of water resources and water quality, reuse of water, water conservation, informatization of water management and management of underground water.

The preservation of stream water quality is necessary to produce and provide safe drinking water as most of the drinking water sources is stream in ROK. Therefore, water is directly related to the public health and quality of life.

The Ministry of Environment achieved innovative institutional improvement regarding overall system of tap water production and supply. The Ministry strengthened the regulation on hazardous chemicals against those who produce waste water to upstream of major head bays and established the chemical treatment facility for water treatment plant for emergency use and advanced water purification treatment system in water purification plant.

ROK increased the drinking water quality inspection items from 55 to 58 and expanded financial support to areas vulnerable to insufficient water supply to improve the facilities with water quality limit exceeded and aged facility. Moreover, ROK has notified the tap water quality to the residents based on the items or severity of the water quality if the water quality does not meet the standard and implemented facility improvement plan.

The comprehensive special measures for water quality management for each four major rivers includes various policy measures including water usage sharing system, total pollution load management system, water pollutant buffering zone and protection forest designation system. Total pollution load management system is expanded to other water systems beyond the 4 major rivers and the total phosphorous (T-P) was added to total pollutant management material list contributing to the water quality of major rivers.

**Table 19 Water Quality of 4 Major Rivers : Paldang, Mulgeum, Daechung Lake, Juam Lake**

| Classification | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|
| Han River-Paldang (㎎/ℓ) | 1.2 | 1.2 | 1.3 | 1.3 | 1.2 |
| Nakdong River-Mulgeum (㎎/ℓ) | 2.7 | 2.6 | 2.4 | 2.8 | 2.4 |
| Geum River- Daecung Lake (㎎/ℓ) | 1.1 | 1.0 | 1.0 | 1.0 | 1.0 |
| Yeoungsan River-Juam Lake (㎎/ℓ) | 1.1 | 0.8 | 0.6 | 0.8 | 1.0 |

Source : Ministry of Environment (2011), *Environmental White Paper.*

In 2008, ROK strengthened the standard for underground water quality by revising rules related to water preservation, drinking water and inspection and pursued the installation of water quality monitoring site since 2007 to install 78 monitoring sites by 2010 laying the foundation for managing underground water quality synthetically nationwide.

**Table 20 Improvement of Underground Water**

| Year | Achievements |
|---|---|
| 2007 | Monitoring of the underground water usage amount in Gyeonggi Province. |
| 2008 | Partial revision of act on underground water (permission and strengthening the post management) |
| 2009 | Monitoring of underground water usage amount in Chungchung Province. |
| 2010 | Total underground water survey for 7 cities and counties and running self-reporting period for illegal facilities (Sept. 2010 to Feb. 2011).<br>Pursuing underground water usage amount monitoring in Gyeongsang and Jeonlla province. |

Source: Ministry of Environment, et al. (2011), *Evaluation on the Implementation of the First National Strategy for Sustainable Development.*

The penetration of water and sewage facilities in ROK is 97.7%, which is high, but agricultural and fishery villages have relatively lower rate so the regional imbalance issue has been raised. To resolve this imbalance issue, ROK expanded investment in water supply conduit installation and improvement projects between 2006 and 2010. As a result, the water and sewage facility penetration rate increased from 41.1% in 2006 to 55.9% in 2010.

ROK developed SWAT-K, which is an integrated modeling of surface water and ground water, by integrating scattered water resources/environmental plans and evaluations to manage water resources in an integrated manager. With the establishment of Integrated Ground water Information Service System (IGIS), ROK could manage water quality and quantity in real time. ROK intends to diversify water resources by developing alternative water sources including reservoir dedicated to drinking water, river bank filtration and underground water development.

ROK enacted the Water Reuse Promotion and Resources Act in 2010 to strengthen the system of water reuse and made it mandatory for public wastewater treatment facility with capacity of more than 5,000 ton treatment per day to use waste treatment water again. It also implemented policies to spread water reuse by laying the foundation for preemptive response to water shortages based on technology linked to Korea-type water reuse.

ROK implemented water saving policies including the expansion of water conservation equipment, installation of recycling system, adoption of water-conserving tap water bill system and replacement of aged water pipe. As a result, 868 million tons of water was saved between 2006 and 2009 thanks to water conservation education and promotion.

(2) The Four Major Rivers Restoration Project

The industrialization process of ROK has its focus on large SOC investment in transportation and living environment improvement like road and housing but the interests and investment in river environment have not sufficient relatively. Most rivers and waterfront have been used as agricultural land or abandoned land instead of being used as an open space.

Every year damage caused by flood is repeated and the damage is likely to be increased due to climate change in recent years. We have witnessed damage to residents living near rivers due to dried stream and deteriorated water quality and the health of the ecosystem was weakened due to seasonal flow variation.

The government decided to pursue the four major rivers restoration project as part of Korean-type green new deal project in December 2008 to resolve the issues mentioned above, respond to climate change and recreate national land focusing on revitalizing rivers. To this end, experts from various fields gathered in June 2009 to establish a master plan and the project was initiated in October 2009 after gathering opinion from residents and local governments.

As of March 2012, construction works including the installation of structures have been completed and dredging works have been completed except for 2 sections in the downstream of the Nakdong River. Information and convenience facilities are being installed with priority on areas with many visitors and the opening event of bicycle road was held on April, 22. The project for mainstream will be completed by late June except for some parts of the

Nakdong River, and other projects (3 dams, 2 flood control detentions and 33 tributaries) will be completed by the end of this year.

The 16 weirs and 36 landscape focal sites which were designed to reflect regional characteristics will be used as landmark as they will be linked to region's cultural heritage and ecosystem.

The project serves as a driving force behind green growth as it promotes symbiosis and contributes to the boosting of regional economy by producing energy for 58,000 households based on environment-friendly small hydropower generation.

In November 2011, the UNEP Green Economy Report expected that the four major rivers restoration project would restore the health of the rivers with 40 trillion won of economic benefits. The project was also introduced in OECD Environment Outlook 2050 as an exemplary case of integrated water resources management and green growth.

## 2.10 Air Pollution Control and Transportation

The atmospheric environment policies of ROK are composed of setting air environment standard, managing businesses, operating air pollution monitoring site, designating special zone and air environment regulatory district from institutional perspective and managing pollutants including sulfate gas, scatter-prone dust, odors, VOC, ozone, acid rain and reduction of automobile pollution.

The particulate matter causes social damage and becomes the cause of early death as it raised issues of respiratory disease, bronchitis attracting public attention. Therefore, ROK strengthened the atmospheric environmental standards on particulate matter to reduce the concentration of it and promoted improvement of air quality and quality of life through measures to reduce the concentration of particulate matter in each sector.

**Table 21 Strengthened Atmospheric Environmental Standards ($NO_2$, PM-10, PM-2.5, benzene)**

| Classification | Standard | | Remarks |
|---|---|---|---|
| | Existing | Revised | |
| Nitrogen Dioxide ($NO_2$) | Annual average 0.05ppm<br>24h average 0.08ppm<br>1h average 0.15ppm | → 0.03ppm<br>→ 0.06ppm<br>→ 0.10ppm | Applied since 2007 |
| Particulate Matter (PM-10) | Annual average 70㎍/㎥<br>24h average 150㎍/㎥ | → 50㎍/㎥<br>→ 100㎍/㎥ | 〃 |
| Particulate Matter (PM-2.5) | <newly established> | Annual average 25㎍/㎥<br>24h average 50㎍/㎥ | Applied since 2015 |
| Benzene | <newly established> | Less than 5㎍/㎥ on annual average | Applied since 2010 |

Source : Framework Act on Environment Policy.

ROK strengthened the particulate matter emission stands to the level of advanced countries (Euro-5) for manufactured vehicles in 2009 and extend the distribution of vehicles with low particulate matter emission. To reduce particulate matter emissions for in-use vehicles, policies were implemented regarding installation of exhaust emission reduction system to diesel-powered vehicles, encouragement of conversion to low emission engine or early termination of old vehicles that cannot meet the emission.

ROK could reduce the particulate matter concentration from 56.7㎍/㎥ on average in 2006 to 48.7㎍/㎥ on average in 2010 in 7 major cities including Seoul metropolitan city by replacing diesel-powered city buses to CNG (Compressed Natural Gas) buses and diesel cleaning vehicles to CNG one starting from 2000. ROK also implemented prediction and warning system of particulate matter in metropolitan cities including Seoul starting from 2006 to protect citizens' health from particulate matter which causes respiratory diseases.

ROK limits the installation of business premises which produce huge amount of air pollutants on densely populated area and adopts total pollution management system at the business preemies level to manage total amount of nitrogen oxides and sulfur oxides. In addition, the government makes allowable emission standard more rigid step by step and induces the development of pollutant reduction technology by adopting allowable emission standard notice system.

ROK puts special management on 10 industries which generate scatter-prone dust. The scatter-prone dust emission standard violation rate shows downward trend from 8.1% in 2006 to 5.7% in 2010 through continued guide, inspection and facility improvement for 37,793 businesses premisses which generate scatter-prone dust.

Transportation is emerged as one of the most troubled areas in achieving sustainable development of ROK from the perspective of pleasant living environment, air quality management, efficiency of energy consumption and industrial activities. In 2007, the government revised the plan for key national traffic network to respond to internal and external changes including global transportation and logistics conditions like convention on climate change, and structural changes like the construction of multi-functional administrative city, innovative city and corporate city in an effort to establish sustainable national transportation system.

The government implemented the construction of bicycle roads to promote the use of bicycle, which is one of the environmentally-friendly transportation means establishing a total of 13,037 km of bicycle roads nationwide by 2010. In particular, 1,757 km of bicycle travel roads alongside 4 major rivers in conjunction with the four major rivers restoration project will be established expecting that the roads will attract public interests and contribute to the development of sports and tourism industry.

To promote the use of public transportation means, ROK designated Jungang Road located at Jung-gu, Daegu metropolitan city, as district dedicated to public transportation means resulting in 22.9% increase in city bus users and decrease in environmental pollution (54% decrease in $NO_2$, 36% in PM-10, 33% in CO, 25% of $SO_2$, and 6㏈ in noise).

Thanks to the efforts to boost the use of public transportation means, the share of public transportation means in metropolitan areas increased from 42.6% in 2005 to 54% in 2010. Under the Project to reduce the number of the

injured and dead caused by traffic accident, the number of people killed due to traffic accident decreased from 13.1 per 10,000 population in 2006 to 11.3 per 10,000 population in 2010.

## 2.11 Improvement of Resource Recycling

ROK has implemented integrated waste management policies by deterring the generation of waste as much as possible in the process of production and development projects and handle waste generated by reusing or recycling based on priority of cycling process to establish resource recycling society.

ROK established clean production network focusing on companies in industrial complex to make sustainable production system in the industrial sector and developed and operated program to resolve and manage conflicts between a company and local community. As a result, the water reuse amount in industrial complex increased from 7,000 tons in 2008 to 8,700 tons in 2010.

ROK made an effort to overcome environmental regulations focusing on products by establishing energy and resource cycling network between large and small-to-medium-sized companies (green partnership) and conducting win-win management. This efforts are expected to promote recycling of energy and resources and convert industrial structure into more environmentally-friendly one by reducing the use of energy and resources.

As part of an effort to strengthen the link between environmental policy means and industry, ROK conducted a research on total process evaluation method for product and developed guideline for 29 products in power system, tap water and packed bean curd in food industry by 2009. This guideline is used for the establishment of measures to manage hazardous chemicals, reuse, incineration and burial of waste, which is regarded as a guideline that helps draw optimal treatment measures from environmental and economic perspective.

The government has implemented Extended Producer Responsibility (EPR) system to put more responsibility on producers who are in the best position to

reduce and recycle waste since 2003. The EPR system is intended to induce eco-friendly economic activities in total cycle of products from design, manufacturing, distribution and consumption to promote resource recycling society. This system is being applied to paper pack, glass bottle, metal can, synthetic packing material, tire, lubricating oil and electronic goods.

Under the system, the government imposes mandatory recycling amount to producers of the goods mentioned above and if the producer does not fulfill its responsibility, recycling penalty is imposed. The rate of recycling is adjusted linked to annual inflation rate. EPR implementation management information system is established to improve the convenience of produce and producers can submit performance report and recycling plan online.

In 2007, the Act on the Resource Circulation of Electrical and Electronic Equipment and Vehicles was enacted to improve the easiness of recycling at the designing stage of electronic and electrical goods and vehicles, limit the use of hazardous materials and recycle after use. This is to make manufacturers and importers of the product evaluate and manage resource recycling on their own. The foundation for using waste as resources has been expanded through the formation of eco recycling center (ERC) as a pilot project.

The government is active in promoting policies to turn waste into energy as a new growth engine for low carbon, green growth. These policies are to use flammable waste and organic waste resources like food waste, food waste water and livestock excreta and waste water sludge for refused derived fuel (RDF) production and generation.

As of 2011, a total of 15 RDF production facilities and RDF boilers are in operation including Gapyung facility and 40 bio gas facilities and waste sludge dry and fuel-making facilities are in operation or under construction. In addition, facility where bio gas is turned into fuel for vehicle is in a pilot run in the reclaimed area of metropolitan city.

Moreover, the government has expanded investment in human resources in the areas of technology turning waste into energy and implemented the

establishment of energy-independent low-carbon green village in agriculture and fishery villages and small cities.

The recycling rate of designated waste in business premisses and living waste is on the rise through these policy efforts.

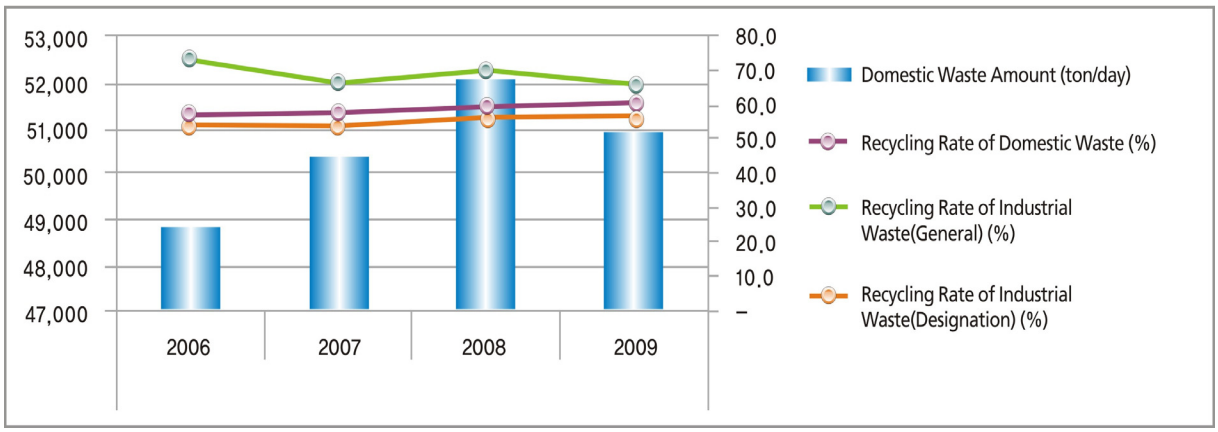


**Figure 9 Domestic Waste Amount and Recycling Rate (2006-2009)**

Source : Ministry of Environment (2011), *Environmental White Paper.*

## 2.12 Education

In 2002, UN General Assembly recognized education as a driving force behind sustainable development and declared UN Decade of Education for Sustainable Development (UN DESD) for the period between 2005 and 2014 to strengthen education sector. In 2007, UNESCO decided to publish sustainable development education implementation report (Global Report) for three times (2009, 2011 and 2015) during the DESD period and checks the progress of DESD in each country.

**Table 22 Publish Plan Education for Sustainable Development Implementation Report**

| Year | Phase | Title/Submission |
|---|---|---|
| 2009 | First Global Report | Context and Structure of Education for Sustainable Development (2008 monitoring result submitted) |
| 2011 | Second Global Report | Process and Learning of Education for Sustainable Development (2011 monitoring result to be submitted) |
| 2015 | Third Global Report | Impact and Outcome of Education for Sustainable Development (2014 monitoring result to be submitted) |

Source : Korean National Commission for UNESCO, et al. (2011), *Measures to Strengthen Education for Sustainable Development (ESD).*

The education for sustainable development in ROK is implemented by central government organizations (Ministry of Education, Science and Technology, Ministry of Environment), major institutions (Commission on Sustainable Development, Commission on Green Growth, and Korean National Commission for UNESCO), local governments, civil organizations (National Council for Sustainable Development), Regional Center for Expertise related to education for sustainable development, and schools. Korean National Commission for UNESCO, which was established in 2009, has been implementing and monitoring DESD in ROK.

The government confirmed implementation plan on education for sustainable development established through cooperation between the commission on sustainable development, Ministry of Education, Science and Technology and Ministry of Environment in October 2006. The plan was reflected in the First National Strategy for Sustainable Development (2006-2010) under Johannesburg Plan of Implementation in 2002. The goal of the plan is to 1) establish the foundation for education for sustainable development, 2) spread the recognition of the sustainable development and 3) expand education program and strengthen cooperation in each sector.

ROK reflected plan to establish national implementation system for green growth education in national strategy for green growth and 5-year plan established in July 2009. ROK has conducted green growth education linked to DESD.

Under this plan, the government made a guideline to include education for sustainable development in the elementary school and middle school curriculum by revising 2007 and 2009 educational curriculum at the school level and developed references for elementary school teachers on education for sustainable development and guideline for middle and high school teachers on education related to Low Carbon Green Growth.

The government changed the name of subject from "Environment"

curriculum in middle school and high school into "Environment and Green Growth“ in 2009 and developed teacher’s guideline which focuses more on sustainable development and green growth education. With the development of "Environment and Green Growth” curriculum, the Ministry of Education, Science and Technology and the Ministry of Environment develop and provide additional material for this.

At the regional level, the "National Agenda 21" published "What is Sustainable Development?" with the support from the Ministry of Environment in 2006 and "Gyeonggi Province Agenda 21" held national forum for education for sustainable development in 2009 to develop ESD indicators. In addition, Tongyoung (2005), Incheon (2007) and Ulju (2011) established ESD RCD to implement education for sustainable development in consultation with local government, middle and high schools, universities and civil societies.

In 2010, Tongyoung RCE established "Education for Sustainable Development Foundation" for sectoral discussion to develop education policies, promote HR development and lifelong learning, nurture experience oriented education tourism industry, identify grassroots wisdom, develop educational contents and support educational institutions

Universities have been active in establishing higher education network for sustainable development by holding international workshop, forum, symposium, and conference on sustainable development in cooperation with international organizations.

The major contents of the implementation report on Education for Sustainable Development submitted to UNESCO in 2008 are presented in Table 23.

**Table 23 ROK's Implementation Report on Education for Sustainable Development (submitted in 2008)**

| Classification | Major Contents |
|---|---|
| Institution/ Policy | The Commission on Sustainable Development serves as an organization to adjust education for sustainable development and there are policy documents including Framework Act on Sustainable Development, National Strategy on Sustainable Development and its implementation plan for which education for sustainable development was reflected. |
| School Education | In the 6th educational curriculum (1992), the selective subject of "Environment" in middle and high school dealt education for sustainable development. Under the revised curriculum in 2009, the name of the subject for both middle and high school was changed to "Environment and Green Growth" emphasizing green growth and education for sustainable development. |
| Teacher Education | Teachers responsible for ASPnet do education for sustainable development activities as part of ASPnet project. |
| Social Education | Workshop on education for sustainable development and materials for the subject is established for government officials, teachers responsible for environment and ASPnet teachers. |
| Education Material | Use education material for children which deals with sustainable development and the subject is reflected in textbook of elementary, middle and high school curriculums and teachers' guideline. |
| R&D | Tongyoung RCE is developing education for sustainable development indicators in the region. The Korean Society for Environmental Education has emphasized the subject and evaluated through special meeting on education for sustainable development for more than 5 times. |
| International Cooperation | The Ministry of Environment has participated in Korea China Japan Environment Education Network since 2000. Tongyoung RCE participated in the AGEPP of ESD-J. Various activities are conducted at the Korea National Commission for UNESCO and Korea Society for Environmental Education level. |

Source : Korean National Commission for UNESCO, et al. (2011), *Measures to Strengthen Education for Sustainable Development (ESD).*

## 2.13 Sustainable Tourism

Tourism represents above 5 percent of Korea's total GDP (2010) and is an important sector, designated as one of seventeen new growth engine industries of Korea in 2009[3]. In particular, tourism is a means of improving the quality of lives and life environment of Korean people and has close linkages to three major dimensions of sustainability - economic, social, environmental sectors - for development.

3) MICE and Tourism was designated as one of these industries.

Sustainable tourism[4] emerged as a new paradigm of tourism development in the 1990s and the principles established in the Rio Declaration of the United Nations Conference on Environment and Development in 1992 served as the basis for the development of the concept of sustainable tourism. In order to accomplish sustainable tourism, the Korean government has implemented diverse policies by expanding eco tourism resources and developing environmentally-friendly tourism and produced and distributed the guideline for the development of green tourism resources in 2009. It is noteworthy that the Korean government released the Basic Plan for Green Tourism over the period 2010 - 2014 as a way of implementing "Low Carbon, Green Growth" strategy, which was announced at the President's national address on the 60th anniversary of the Republic of Korea in August 2008. This Plan intended to turn the tourism industry into more low-carbon green tourism and served a basis for making green growth initiative more concrete and operational with the green contents and production development.

In accordance with the Basic Plan, the government, particularly involving the Ministry of Culture, Sports and Tourism, has taken important steps in creating a policy architecture for eco-friendly and sustainable tourism that could mobilize eco-tourism resources such as wetlands, breeding sites of migratory birds, DMZ (demilitarized zone) and link paths with the representative historic and cultural resources of the local community. Such policy initiatives include a project on the development of Korean eco-tourism models and a project on the development of story-telling and cultural eco-paths from 2010, and a project on the development of cultural and tourism attractions around the Republic of Korea's four major rivers from 2011.

On the other hand, since the ST-EP (Sustainable Tourism-Eliminating Poverty) programme, a new framework of concept that links sustainable tourism and alleviation of poverty, was developed in WSSD held in Johannesburg, South Africa, in 2002, the Korean government established the headquarters of the ST-EP Foundation, an international non-profit foundation under the UN World Tourism Organization, in Seoul and contributed 5 million

4) Sustainable tourism means "one that meets the needs of present tourists and of the host regions while protecting and promoting opportunities for the future. It is conceived as a way to manage all the resources so that they can meet the economic, social and aesthetic, while respecting the cultural integrity, essential ecological processes, biological diversity and life support systems." (UNWTO, 2004)

US dollars for the initial establishment. Through this foundation, Korea has been actively engaged in carrying out sustainable tourism programmes and projects, which also consider the preservation of culture and natural environments. The foundation also serves as an effective channel for injecting Korea's know-how and resources into the developing and the least developed countries (LDCs).

The Ministry of Culture, Sports and Tourism has also actively engaged in the negotiation for the outcome document for Rio+20 conference beginning from January 2012 and made utmost efforts for the inclusion of the 'sustainable tourism' in the priority actions for sustainable development. As the result, the UNWTO and OECD have spoken highly of Korea's outstanding contribution in the process of the negotiation[5)].

## 2.14 International Cooperation

ROK has made an effort to implement international agreement on sustainable development and has been active in international cooperation to support sustainable development in developing countries. Under the First National Strategy for Sustainable Development established in 2006, ROK focused on "prevention of desertification through international cooperation and support for tropical forest restoration", and "narrowing digital divide in developing countries and expansion of official development aid".

ROK made an agreement with China and Mongolia to prevent desertification in the Northeast Asian region supporting green belt forestation project in Mongolia and forest network project in Northeast Asia while it signed Forest Cooperative Agreement with ASEAN to cooperate in the fields of restoration of damaged forest, response to climate change and development of human resources specialized in forest. ROK signed an MOU with China and Mongolia to prevent yellow dust and has held regular forum or meeting to

5) The Secretary-General of the UNWTO, Dr. Taleb Rifai, extended special gratitude to the Korean government for its efforts to include 'sustainable tourism' in the outcome document of the Rio+20 during the joint UNWTO Commission meeting for Asia and the Pacific and South Asia held on May 4th, 2012.

cooperate in forest field with Southeast Asian countries by supporting forestation project, transferring technology for forestation and cooperative project led by international organizations.

**Table 24 Cost for International Cooperative Projects including Desertification Prevention and Restoration of Discarded Land (2007-2010)**

| Classification | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|
| Green Belt Forestation Project in Mongolia (1,000 USD) | 500 | 1,010 | 1,180 | 1,068 |
| Forest Network in Noreast Asia (Revised to Noreast Asia DLDD Network) (million won) | – | 48 | 52 | 51 |
| Forestation support project in private sector (million won) | 300 | 300 | 500 | 500 |
| Asian Forest Cooperation Organization (Pilot project in member country) (million won) | – | – | – | 270 |

ROK has implemented various projects to narrow digital divide in developing countries based on the excellent information technology. By 2010, ROK supported the establishment of information access center in 26 countries, consulting on transportation T-DMB technology in Latin America including Mexico and adoption of RFID service related to library informatization. In the meantime, it supported Allbaro system, which is related to electronic management of waste treatment history and establishment of e-government.

In the industrial sector, ROK signed mutual recognition agreement of environmental labeling system between 2002 and 2006 with 6 countries: Japan, China, Taiwan, Australia, New Zealand, Thailand. With the increase in investment for international technology cooperation, the support for international common technology development has increased by more than 30% on annual average between 2006 and 2010.

**Table 25 Investment in International Common Technology Development**

| Investment in International Common Technology Development | | 2006 | 2007 | 2008 | 2009 | 2010 | Total (Annual Average) |
|---|---|---|---|---|---|---|---|
| Investment in International Common Technology Development | (100 million won) | 328 | 367 | 783 | 837 | 920 | 647 |
| | (%) | 12.3 | 11.9 | 113.5 | 6.8 | 9.9 | 30.88 |

Source: Ministry of Environment, et al. (2011), *Evaluation on the Implementation of the First National Strategy for Sustainable Development.*

ROK has implemented comprehensive ODA plan since 2006 to deliver its experience of remarkable economic growth within short period of time effectively to developing countries. As ROK became the member of OECD DAC in 2010, the ratio of total ODA amount to GNI and grant aid have been increased continually. As a result, total amount of ODA increased 256% from 455.3 million dollars in 2006 to 1,167.7 million dollars in 2010 and the ratio of ODA to GNI increased from 0.051% to 0.12% as well.

**Table 26 ODA (grant) Amount by the Region (unit: USD 1 million ) (2006-2010)**

| Region | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|
| Asia | 105.4 | 147.7 | 161.0 | 164.2 | 315.9 |
| Africa | 26.1 | 51.9 | 73.5 | 69.2 | 88.8 |
| North America | 16.5 | 37.1 | 35.4 | 31.9 | 54.8 |
| Middle East | 64.7 | 70.1 | 22.4 | 21.2 | 27.8 |
| Europe | 2.1 | 2.2 | 3.6 | 9.7 | 5.9 |
| Oceania | 1.8 | 4.3 | 2.7 | 2.0 | 3.3 |
| Others | 42.5 | 45.1 | 70.0 | 68.9 | 70.3 |
| Total amount of Grant | 258.9 | 358.3 | 368.7 | 367.0 | 566.8 |

In 2007, the Overseas Emergency Relief Act was enacted to support overseas disaster relief efforts in a prompt and systematic manner.

ROK is very actively involved in international cooperation for ocean protection area management and signs an agreement with China and Japan to exchange various information on prevention education and training for oil pollution. In addition, ROK is actively participating in international organizations including International Oceanographic Commission (IOC), and International Hydrographic Organization (IHO) and forms joint research and cooperation system with international research institutes. ROK leads ocean environment cooperation in the Asia Pacific region through APEC Center for Integrated Coastal Management and Partnership in the Management for the Seas of East Asia.

# III. Efforts to Strengthen the Foundation for Implementation

## 1. Efforts to Strengthen Institutional Foundation and Achievement

The strategy to strengthen institutional foundation for ROK's sustainable development was established aiming to lay the legal and institutional foundation for the spread of sustainable development at the national and local level and to improve the sustainability by establishing ex-ante and ex-post evaluation system for policy sustainability.

A total of 3 implementation tasks and 10 specific tasks including 1 in evaluation system area, 1 implementation system area and 1 in education area are selected to achieve these goals.

Since 2006, ROK has established master plan for sustainable development for every 5 years and organized evaluation method by selecting 77 national sustainability indicators and conducted evaluation on sustainability indicator every 2 years.

In 2007, ROK established the Framework Act on Sustainable Development to lay the legal foundation for sustainable development. To improve the governance of sustainable development, ROK has attracted more participation from the public through private-public council on environmental policies, designation of sustainable development week and meeting to discuss sustainable development resulting in improved awareness of the public.

To strengthen the capacity to implement sustainable development of the local government, ROK holds Local Agenda 21 every year and held Local Government Summit for Sustainable Development (2010). As of 2011, 89% of total local governments or 216 of 244 local governments including 16 metropolitan city governments enacted 21 rules and these efforts are introduced as best practice in the international society.

In the education sector, ROK revised 2007 education curriculum to include education for sustainable development in elementary and middle school curriculum while "references for elementary school teachers on education for sustainable development" and "guideline for middle and high school teachers for education related to Low Carbon Green Growth" were developed. It is judged that education that links sustainable development and green growth is well implemented.

## 2. Considerations to Strengthen the Foundation for Implementation

As the world faces environmental crisis including climate change and resource depletion, recently, the "Low Carbon, Green Growth", which means reduction of greenhouse gas emissions and environmental pollution and securing future growth engine at the same time, has been emerged as the core strategy of national competitiveness.

The background of the emergence of "Low Carbon, Green Growth" can be summarized as follows. First, not only advanced countries including the US, Canada, and Japan but also developing countries like China, India, and Brazil began in-depth discussion on regulations related to climate change. Second, international energy price has surged with growing concerns over energy resources depletion. Third, The growth of green industry has expanded on the market.

As such, advanced countries in the world are making efforts to lead low carbon green growth, which is a new paradigm to reduce carbon emissions, and to make it as new economic driving force. As the advanced countries' efforts spread internationally, the demand for low-carbon technology and product is expected to increase and the share of green industry is expected to grow accordingly.

Major countries in the world present a long-term vision for low-carbon, green growth. The US began to develop strategic technologies related to energy in the late 1980s to establish the paradigm for green growth.

In the meantime, President LEE MYUNG-BAK declared that Low Carbon, Green Growth would be implemented as a future strategy to make Korea achieve another Miracle on the Han River in his congratulatory address to mark the 63th Anniversary of Independence Day and 60th Anniversary of the Foundation of ROK.

After the president's declaration, the ROK government and some institutions are quick to respond to this new vision saying "Low Carbon, Green Growth is a new national paradigm that creates jobs and new growth engine based on green technology and clean energy so we present this is a new vision for ROK". The government clarified its will to nurture Low Carbon, Green Growth as a future economic growth engine as it increased the investment in this sector for 2009 budget.

Against this backdrop, the foundation for Low Carbon, Green Growth has been laid in advanced countries as a new paradigm for economy and society in the 21st century. Therefore, ROK needs to present a long-term vision for Low Carbon, Green Growth society. In addition, ROK accepts this international trend and adjusts its policy direction to take this trend as an opportunity for economic growth.

# 3. Participation of Major Groups

## 3.1 Civil Society

The development of the role of private environmental group in ROK is divided into 4 phase: Initiation period (1960-1970s); Period of kicking pollution movement (1980-1987); Period of environmental movement spread (1988-1992); Expansion of environment preservation movement (since 1993). The growth of international environmental movement including Rio Summit in 1992 and Johannesburg Declaration in 2002 had a significant impact on the growth of civil environmental groups in ROK.

The number of private environmental groups has continued to increase as public demand for pleasant environment against environmental pollution coming from rapid economic development increased. The number of private environmental group was a mere 33 before 1980 and most of them were not recognized as legal organization, however, the number increased to 47 in 1985 to 339 in 1996 and 489 in 2001. As of 2010, 468 private environmental groups are active and the table below shows more information.

**Table 27 Permission and Registration of Private Environmental Group (as of late 2010)**

| Total | Corporation | Not-for-Profit Organization registered | Remarks |
|---|---|---|---|
| 468 groups | 391 groups | 126 groups | 49 groups are overlapped |

Source : Ministry of Environment (2011), *Environmental White Paper.*

The government strengthens the support for private organizations to guarantee voluntary activities and activities for public goods by enacting the Assistance for Non-Profit, Non-Governmental Organization Act (implemented in April 12, 2000). In addition, the government attracts public opinion by expanding the participation of private environmental organization for major policies and strengthens the cooperation with the private sector. The financial support for the private organizations are handled by the Ministry of Public Administration and Security under the Assistance for Non-Profit, Non-Governmental Organization Act and the Ministry of Environment supports environmental preservation projects based on other acts.

Major decision making related to sustainable development is institutionalized in ROK but there are many cases where social groups and media led the public opinion to influence the top level of decision making.

The activities of civil society has been the driving force behind sustainability improvement for major policies and media informs the public of the importance of environment preservation as well as provides relevant information to turn people value more on environmental friendliness. Media has played a decisive role in leading major decision makings to the direction of sustainability improvement.

## 3.2 Youth

The ROK government is exerting great efforts to build the environmentally-friendly infrastructure for youth activities; adopting eco-friendly design in youth training facilities, conducting Green Education to employees, providing Green life education to youths and etc.

Also, the Government has implemented mid-to-long term youth policies focusing on the integrated and universal consumers.

To support the vulnerable youth in difficult condition, ROK has strengthened its welfare system and to raise youth's consciousness in protecting the environment and to increase their participation in the environmental conservation, various training activities and international exchange programs specialized in the environment and science are been designed and provided.

These policies are aimed to make the youth be conscious in environmental issues so to make environment protection a part of their life.

As a leading organization for UN Decade of Education for Sustainable Development (DESD), UNESCO considers sustainable development as a essential factor to resolve social, economic, cultural and environmental issues in the 21$^{st}$ century.

Korean National Commission for UNESCO is planning to implement Asian Regional Initiative for Climate Change Education starting from 2012 to contribute to nurturing the youth to be the leader in changing region and the world in cooperation with schools and local communities in Asia to achieve sustainable future. In addition, it has held Model UNESCO Conference to make the youth have interest in global issues and follow the value and concept of sustainable development and green growth. The Model UNESCO Conference intends to provide the youth an opportunity to participate in the relevant activities with more interest in ESD by students and youths who will be the leader of the future.

The Model UNESCO Conference, which was restarted in 2010, serves as an opportunity for the middle and highschool students who have not had many opportunities to experience international conference and had no interest in the relation between global issues and individual life to understand society and culture of other countries and decision making process of the international society.

## 3.3 Women

Gender Impact Assessment (GIA) is the main policy of the government for gender mainstreaming and has been implemented since 2005. As the GIA takes root, the number of participating institution increased from 187 (2006) to 293 (2011). To promote women's economic participation and to nurture high-skilled women workforce, 19 Career Development Centers for Female Students were established in 19 universities and annually 48,000 students are using these centers. And the share of high-ranking public officials increased from 5.4% (2006) to 8.4% (2011). The gender wage gap ratio increased slightly from 61.5% (2006) to 62.6% (2010) but women's economic participation rate decreased from 50.3% (2006) to 49.4% (2010).

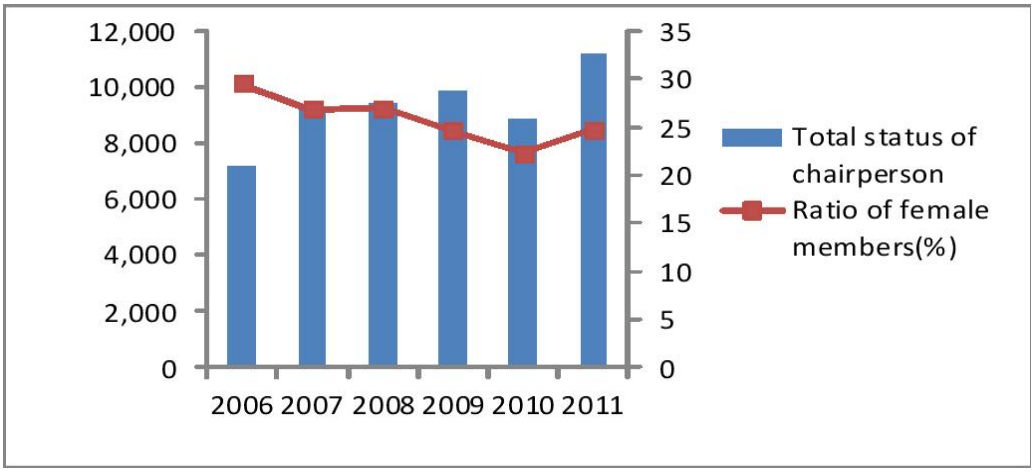


**Figure 10 Women's Participation Rate in National Advisory Committes**

Source : Ministry of Gender Equality and Family (internal data), 2012.

The government established the Ministry of Gender Equality in January 2001 with functions of establishing and implementing policies on women to integrate

sustainable development strategy from the gender perspectives. The Ministry has evaluated the government policies from gender perspective and laid the foundation for policy analysis considering influences on both genders.

To promote women's participation in decision-making process, the government introduced the quota system for female members to participate in national advisory committees. As a result, the proportion of women members increased from 12.4% in 1998 to 23.6% in 2000 to 29.6% in 2006, but the rate decreased to 22.3% in 2010. The rate increased again to 24.8% in 2011 as the government included the female ratio in advisory committees as the indicator for assessing the ministries and strengthened the rules and regulations regarding the operation of advisory committees.

## 3.4 Private Sector

Korea Chamber of Commerce founded Environmental & Safety Commission in 2000 to induce the private sector to improve environment and safety issues in a voluntary and continuous manner and explore ways to maximize eco-efficiency through integrated management of economy and environment contributing to the development of sustainable society. The commission has managed Policy Council on Corporate Environment Policies, managed Environment and Safety Forum, established partnership with the media, conducted a research on industrial environmental safety and health policy, raised issue, and expanded industrial environmental information system.

The Federation of Korean Industries declared Environment Management Charter in June 2000 and established Korea Business Council for Sustainable Development (KBCSD) aiming to make a joint international effort on sustainable development and contribute to establishing sustainable society. It also delivers the opinion of the private sector and induces voluntary environmental management at an advanced level in the private sector.

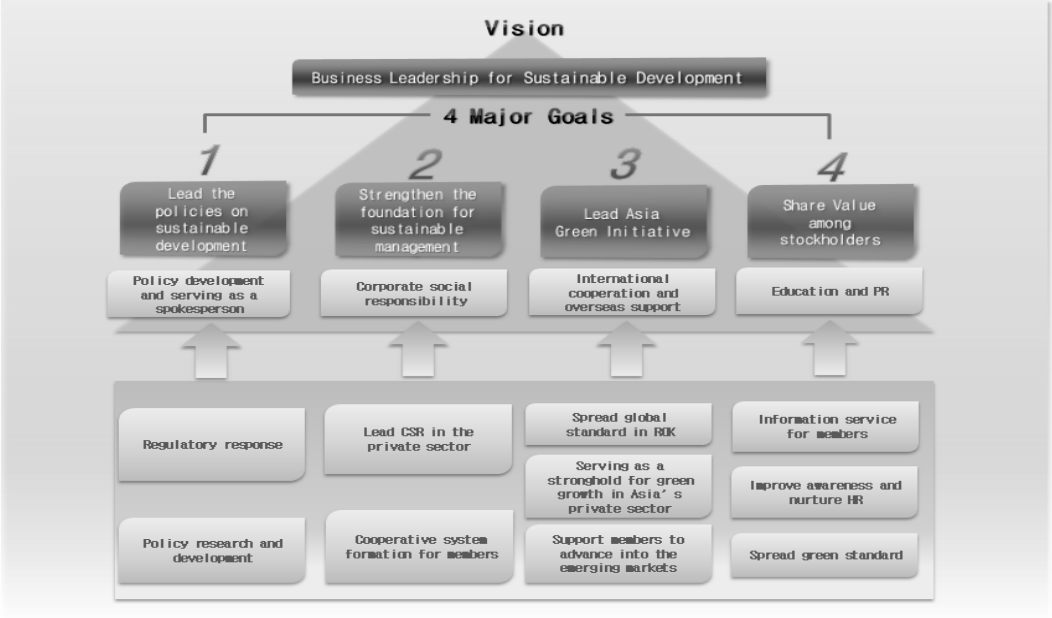


**Figure 11 Vision of Korea Business Council for Sustainable Development**

Source : Korea Business Council for Sustainable Development (www.kbcsd.or.kr).

## 3.5 Local Governments

The Local Agenda 21 of ROK began to be implemented in 1995. As of 2011, 89% of local governments including 16 metropolitan city governments installed Local Agenda 21 implementation organization showing high participation rate. ROK's efforts are well recognized in the world as the report submitted by International Council for Local Environmental Initiatives at the World Summit on Sustainable Development held in Johannesburg, South Africa in August 2002, introduced these efforts as one of the best practices.

Local Agenda 21 raised the issue of environment and quality of life to the local community and presented scientific and popular solutions to the problem developing governance. The Local Agenda 21 made the administration and NGO work together for sustainable development. Unlike the Western world, the agenda contributed to the development of local autonomy system and democracy based on citizens' voluntary participation and consensus. As a result, sustainability of the region and the nation has improved significantly.

The National Council on Local Agenda 21 was established in 2000 based on voluntary consolidation of local agenda 21 implementation organizations in Korea. It changed its name into National Council on Sustainable Development in 2007 to clarify its goal to pursue sustainable development. It is a network organization of Local Agenda 21 of the nation.

The Council not only supports daily activities of Local Agenda 21 as a partner and supporter and spreads various tools and method to improve local sustainability through projects like national contest, best example contest, policy forum and academy and introduces domestic and foreign best practices. In addition, it supports education and training for relevant people and makes sustainable development and Local Agenda 21 be institutionalized laying the foundation for Good Governance.

Yeondaedo Eco-island formation project in Tongyoung (2007-2014) is a good example. The project was initiated by the Green Tongyoung 21 implementation council, which is a secretariat of local agenda that plans and aims to implements various programs for sustainable development. It aims to present a good example of sustainable model by identifying island where fossil fuel energy is zero, eco-tourism takes root and these activities can be linked to the income of the residents.

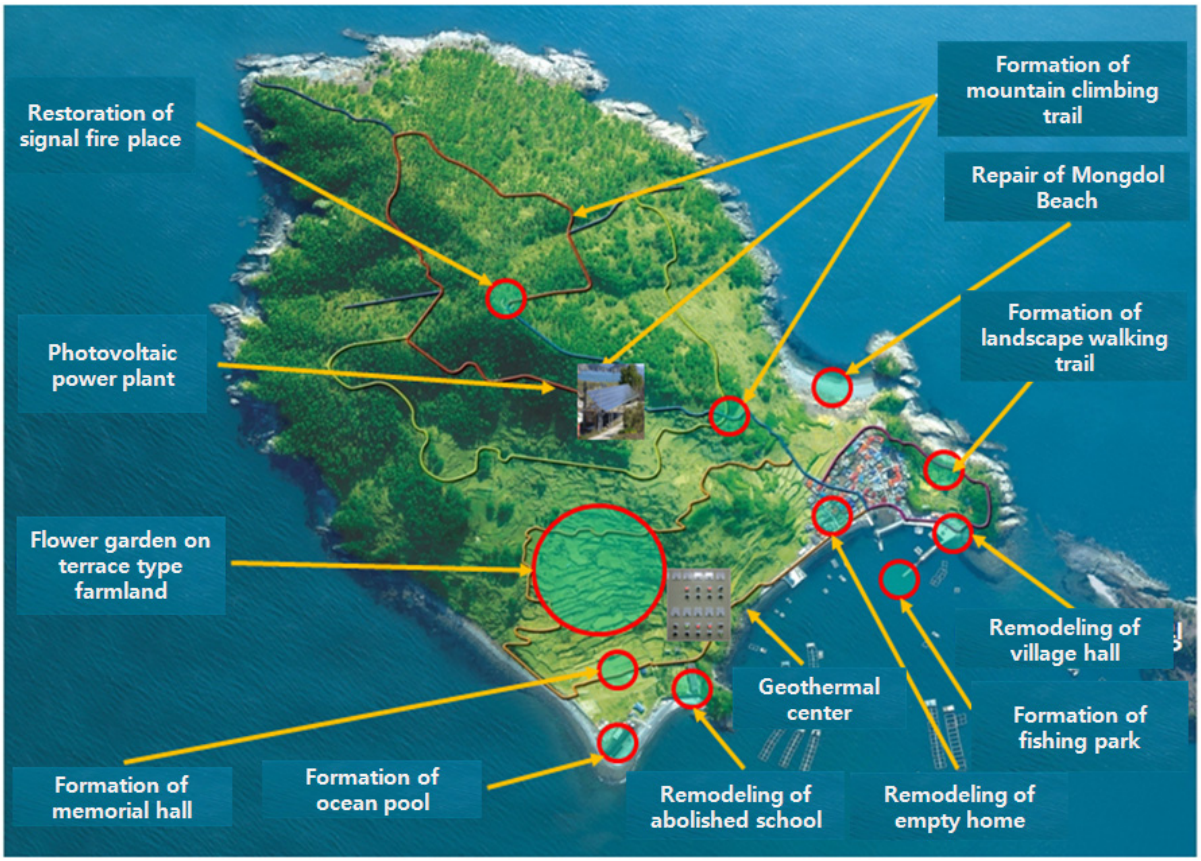


**Figure 12 Yeondaedo Eco-island Master Plan**

Source : National Council on Sustainable Development (Internal Data), 2012.

The characteristics of the Yeondaedo Eco-island example in Tongyoung are as follows. 1) It is the first project in Korea to make the island fossil fuel energy free. 2) It is the eco-friendly project run by the residents. 3) The project using natural resources leads to the income of residents. 4) It becomes an example of reversely using regulations and constraints. 5) It is the place where center for sustainable education and infrastructure related to eco experience exist together. 6) It is the sustainable development made by private-public joint governance.

## 4. ROK's Continued Efforts for Sustainable Development

The decrease in ability to provide resources and environmental pollution as a result of industrialization threatens the sustainability of earth environment and human beings. Internationally the trend is turning from quantitative growth based in increased input of land and environmental resources to qualitative growth based on harmony between environment, economy and society.

As the sustainable development takes the form of joint response at the international level like climate change discussion, the sustainability began to form central pillar of international relations and economic activities. In addition, major advanced countries are establishing comprehensive responses and systems to strengthen the linkage between economy and society by making environment as a driving force behind economic growth.

Domestically, the efforts to use climate change, strengthened environmental regulation of advanced countries, and demand for quality of life as a new growth engine are not sufficient. Moreover if the sustainable development is delayed with population decrease, population aging and bipolarization, the identification of a new growth engine will be more difficult. The raw material price increase as a result of import and export restrictions will have negative impact on ROK's economic development.

Against this backdrop, ROK has established and confirmed the follow-up action plan as the first National Strategy for Sustainable Development (2006-2010) was expired. To manage sustainable development plan systematically, ROK established national strategies for the areas of vision and strategy, implementation plan and sustainable indicators and pursued actual social integration and achievement of national development goal by presenting policy directions of economy, society based on sustainable development principle.

As a national strategy to realize sustainable economic growth and respond to climate change at the global level in the 21$^{st}$ century, ROK intended to make a new policy instrument for the integration of regional and local policies to

make use of it as policy direction at the local, national, regional and global level. In addition, ROK established the plan for policies and evaluation tools necessary for international cooperation, communication and carry-out of the agreement by changing paradigm that sustainable development strategy is a core strategy to respond to global issue at the national level in the 21st century.

The basic direction of the Second National Strategy for Sustainable Development is to distribute right related to fulfill survival and quality of life evenly, strike a balance between economic growth and environmental preservation and realize harmony between quality of life and nature in the process of securing equity within and among generations.

The recent economic development and lack of natural resources with increasing population and environmental problems due to climate change became a global concern. Limited natural resources and destruction between supply and demand have an impact not only on environment and ecosystem but also directly on human beings.

In particular, the UN General Assembly held in 2007 recognized the negative impact of climate change on sustainable development was a major issue in sustainable development. UNCSD (UN Commission on Sustainable Development) and IPCC (Intergovernmental Panel on Climate Change) presented a way to integrate climate change policies into each country's national sustainable development strategy. Recently the international sustainable development is defined as the concept focusing on environment based on human survival and development. In short, the concept has developed to pursue social and individual development as long as healthy ecosystem is maintained.

| Appendix I | Summary of the Second National Strategy for Sustainable Development |
|---|---|

## 1. Structure

The government established the Second National Strategy for Sustainable Development (2011-2015) under Article 50 of the Framework Act on Low Carbon Green Growth in Aug. 2011. The strategy is composed of internal and external condition changes for sustainable development, vision and prospects, strategy and implementation tasks, detailed implementation tasks and national sustainable development indicators.

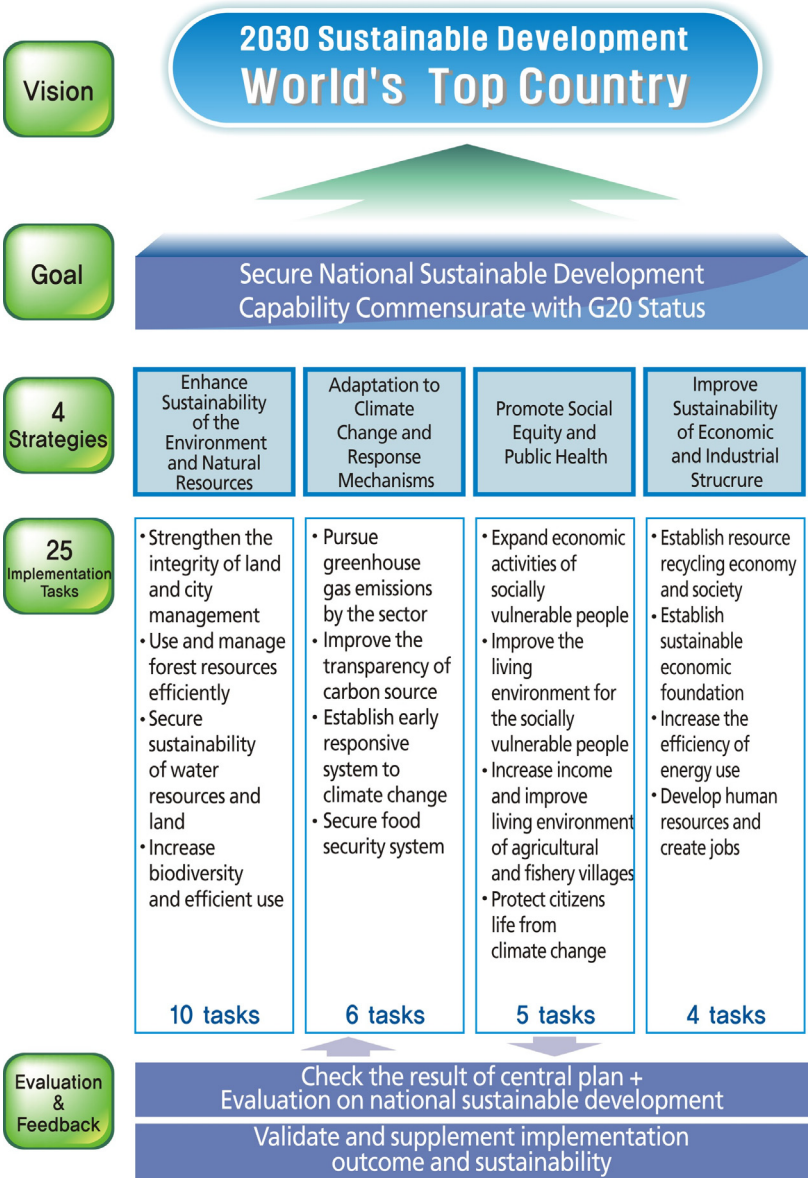


**Figure 13 Vision of the Second National Strategy for Sustainable Development**

Source : Data from relevant ministries (2011), *Second National Strategy for Sustainable Development.*

The strategy is composed of 4 areas, 25 implementation tasks and 84 specific tasks with an aim to secure national sustainable development capacity commensurate with G20 status. The 4 areas are enhance sustainability of environment and natural resource, adaptation to climate change and response mechanisms, promotion of social equity and public health and improve sustainability of economy and industrial structure.

The strategy to enhance sustainability of environment and natural resource is composed of 10 implementation tasks and 34 specific tasks. It includes the strengthening of integrity of land and city and establishing structure for it aiming to establish efficient system for integrated management of environment and resources, improve healthiness and productivity of ecosystems in city, forest, coast and sea and spread green life practice through education and promotion on sustainability.

The strategy to adaptation to climate change and response mechanisms is composed of 6 implementation tasks and 19 specific tasks including reduction of greenhouse gas emissions for each sector with an aim to establish low carbon society through efficient greenhouse gas emission reduction, strengthening the capability to respond to climate change through the development of response scenario, and securing competitiveness and entering into market through the development of climate-related industries.

The strategy to promotion of social equity and public health is composed of 5 implementation tasks and 16 specific tasks including the economic activities of the vulnerable people with an aim to establish the foundation for improving quality of life of the vulnerable, and protect public health from climate change

The strategy to improve sustainability of economy and industrial structure is composed of 4 implementation tasks and 15 specific tasks including the establishment of resource recycling economy and society with an aim to improve resource recycling of the nation through the establishment of resource recycling industrial structure, establish eco-friendly production, consumption and management system, develop human resources and create jobs in green industry.

## 2. Major Contents

### 2.1 Enhance Sustainability of Environment and Natural Resource

Here are 10 implementation tasks in the filed of strengthening sustainability of environment and natural resources.

(1) Strengthen Integrity and Structure of Land and City

To improve the efficiency of land use, the establishment of national land policy system was required. In addition, many countries in the world move toward low energy consumption and high efficiency and clean energy as part of a strategy to respond to climate change and achieve energy independence.

Japan set the goal of improving energy efficiency by 30% by 2030 and EU established a 20-20-20 strategy which is aimed to improve energy efficiency by 20%, reduce greenhouse gas emissions by 20% and achieve new and renewable energy penetration rate of 20%. ROK also needs to make stable energy supply system by establishing sustainable energy use system. The major focus is to strengthen integration, equity and efficiency by improving land and city management system and achieve balanced national development and preservation through sustainable land and city management.

(2) Sustainable Forest Management

As the importance of forest to expand carbon sink area increases, the role of forest to realize low carbon society is getting bigger. The need to preserve and manage forest ecosystem increases as negative perception on damage to forest increases and the health of the forest is under threat.

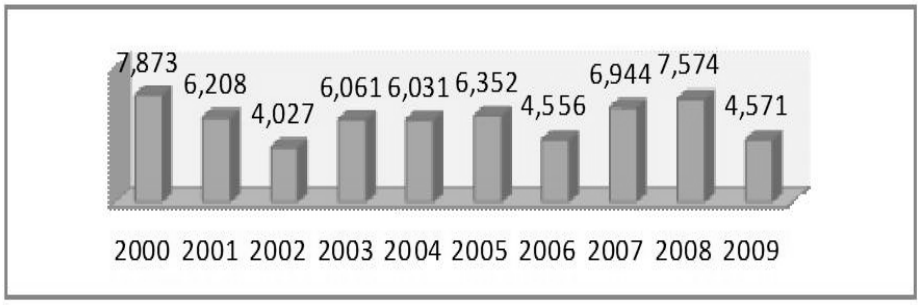


**Figure 14 2000-2009 Decrease of Forest Area**

Accordingly ROK aims to establish sustainable forest management system to meet the needs of growing role of forest resources and achieve economic development and improved social welfare.

### (3) Sustainable Coastal marine environmental management

As the factor for ecosystem disturbance increases it becomes urgent to take measures to prevent accelerated ecosystem destruction on stream, coast and sea. With more efficient management system through integrated management of coast and sea and increased demand for measures to respond to rising sea level and coast change management system, the need for policies to achieve sustainability of coast and marine resources increased as well. For the past 43 years (1964-2006), the sea level of the Korean Peninsula increased by about 8cm. ROK intends to establish the system for preservation of coast and marine environment, meet the economic demand for coast and marine resources and preserve healthy coast and sea environment.

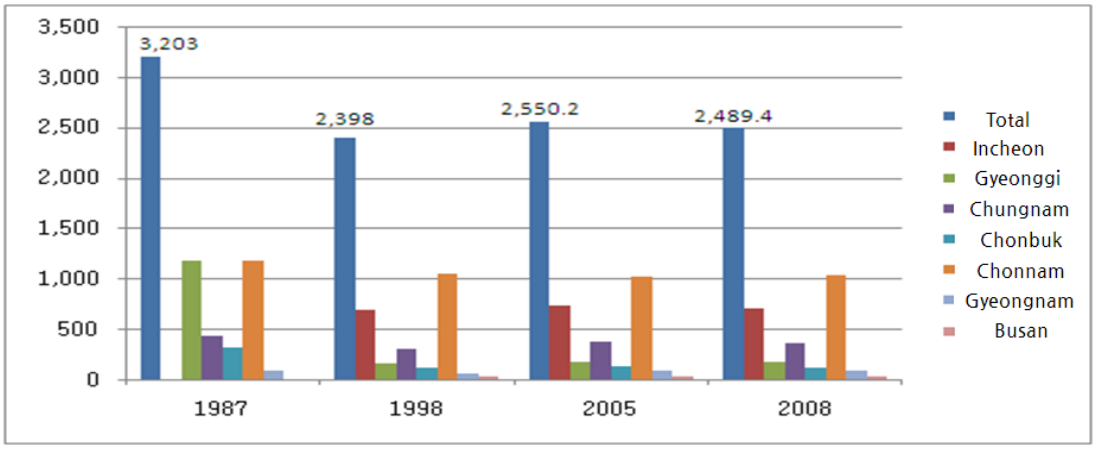


**Figure 15 Change of Tidal Flat Area : (Unit : $km^2$)**

Source: Data from relevant ministries (2011), *Second National Strategy for Sustainable Development.*

### (4) Enhance Soil Management Systems

The foundation for policy to link land and underground water, which have significant pollution relationship, is not enough and the measures to prevent pollution and damage to areas vulnerable to land pollution like abolished mining area and large industrial area. In addition, the pollution route of land and underground water becomes diversified with land and underground water

contamination caused by environmental pollution accidents in military base, increase in hazardous chemical and pathogenic pollutants like virus.

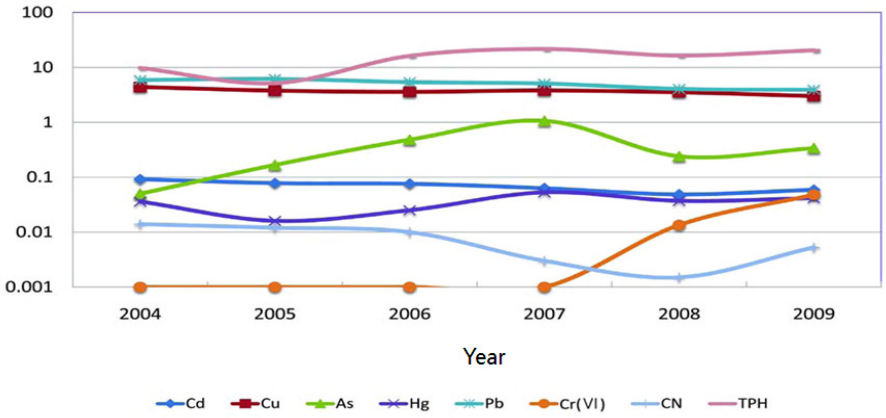


**Figure 16 Annual Change in Pollution Level**

Source : Data from relevant ministries (2011), *Second National Strategy for Sustainable Development.*

### (5) Design Basis for Sustainable Wetland Management

ROK has established the first master plan for wetland preservation, designated wetland protection area(26) and held Ramsar Convention since it enacted Act on Wetland Preservation in 1999. In particular, successful holding of Ramsar Convention elevated ROK's status in environmental diplomacy and increased the public interest in wetlands wetland protection area (Suncheon Bay, Upo wetland) were emerged as eco-tourism attractions.

However there is no expert research organization to conduct survey and research on the function and value of wetland and perform restoration and management of wetland and the policies to utilize the ecosystem resources value in ecosystem, landscape and education are also good enough. In addition, the ways to give legal and institutional incentives to designate wetland protection area, which hold great value and the cooperative system between private, public and academic sector does not exist. All of these led to problems including limit to manage overall wetland and ignorance of the value of eco resource. Accordingly, the government is implementing policies to establish the Korean peninsula with ecosystems of mountain, field, wetland, and paddy field linked and to make system for efficient and reasonable management of wetland.

## (6) Secure Biodiversity

The systemic management of biological resources becomes necessary as the competition for securing biological sovereignty has been intensified. ROK secured national competitiveness by nurturing BT industry through biodiversity. DMZ is a land for biodiversity and more than 50% of the Korea's unique species are inhabited in DMZ. As UN designated 2010 as the year of biodiversity, the importance of ecosystem has emerged. ROK's ecological welfare level is one of the bottom requiring measures to resolve the issue. The poaching and illegal trade of wild animals and destruction of habitant due to various development projects lead to decrease in the number and concentration of wild animals.

Against this backdrop, ROK implemented measures to preserve biological resources and ecosystem to secure biodiversity under the Second National Strategy for Sustainable Development with an aim to expand the area of organic agriculture and improve eco-welfare through in-site subsidy policy.

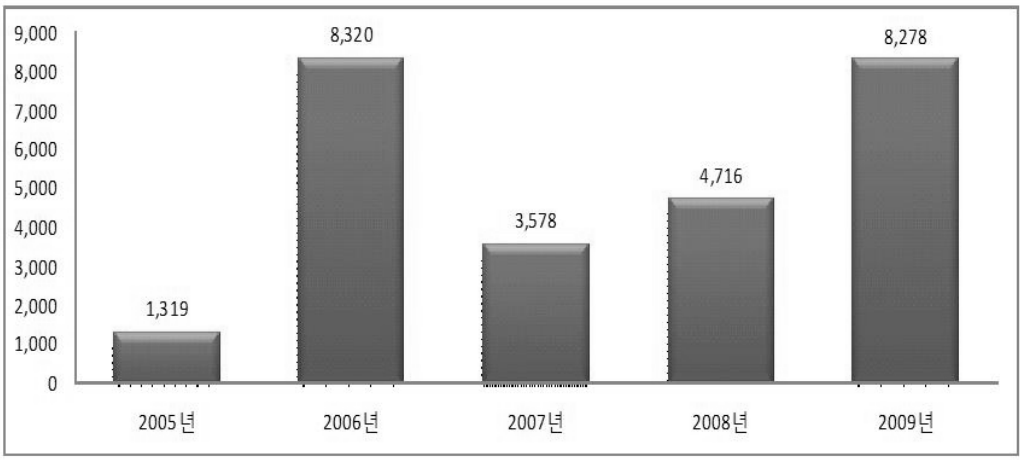


**Figure 17 Increase in the Number of Wild Animal Poached or Illegally Traded**

Source : Data from relevant ministries (2011), *Second National Strategy for Sustainable Development.*

## (7) Sustainable Water Resources Management

The need for the establishment of the system with which analysis, evaluation and prediction of water quality and pollutants in 4 major rivers are possible. The condition for water management has been changed with more frequent flood and drought and increase in water temperature. ROK's stream

has bigger difference between maximum water flow and minimum water flow compared to that of major foreign rivers resulting in difficulties in utilizing river. In addition, comprehensive measures to respond to severe flood caused by urbanization and torrential rain was necessary.

The need to improve the ability to respond to abnormal drought and use and preserve underground water efficiency increased as well. With the growing demand for stable source of water and efficient use, it was necessary to improve management system of the tap water business by making tap water prices reflect reality. Accordingly policies considering stability and equality of water use are implemented to secure future water resources and establish clean and healthy water environment and sustainable water use system.

### (8) Sustainable Prevention of Natural Disasters

Worldwide, the average temperature has been on the rise and extreme weather conditions including drought and flood have been intensified. For the past 5 years, the damage caused by natural disaster has been on the decrease but there are possibility of massive scale disaster considering long-term climate change trend. Therefore, ROK has minimized the damage from natural disaster by establishing preemptive disaster responsive system and efficient disaster restoration system and establishes preventive and responsive system considering climate change.

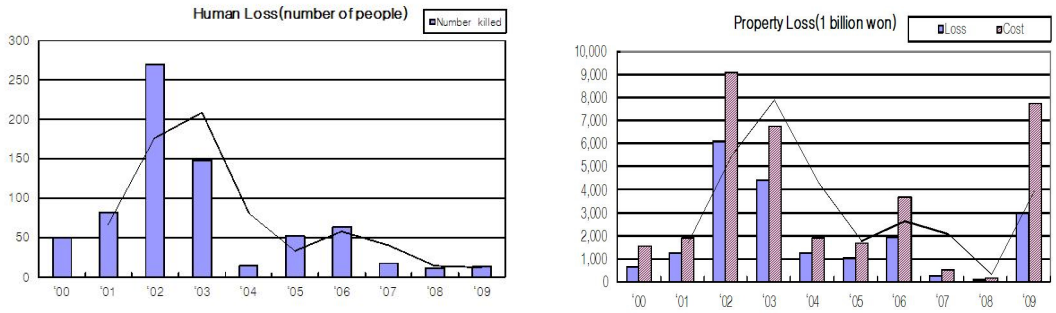


**Figure 18 Natural Disaster for the Past 10 Years (2000-2009)**

Source : Data from relevant ministries (2011), *Second National Strategy for Sustainable Development.*

### (9) Education and Public Relations for Sustainable Development

Major advanced countries show widespread of eco-friendly culture where green movement and green life are realized through the spread of green consumption. The sustainable consumption and production has increased in recent years as a result of strengthened environmental regulation and changed recognition. For example, TESCO, a British company has begun to put "carbon footprint" label to 20 products of its own brand since 2008. The spread of eco-friendly culture and sustainable development are implemented in a strategic manner by spreading green life movement like "Eco Mom" in the US and "Eco Driving" in Britain. However, the infrastructure that can induce the voluntary participation in green life is not sufficient. The green life campaign is implemented at the ministry level, but detailed tasks and programs to make people follow the concept of green life are not enough. In addition, the environmental and economic benefits of following green life are not clear and people regard green life as something special separated from their daily lives.

UN declared the period from 2005 to 2014 as the UN Decade of Education for Sustainable Development (UNDESD) to strengthen the education for sustainable development. ROK also came up with an action plan on education for sustainable development and established Korean National Commission for UNESCO in 2009. Under the Second National Strategy for Sustainable Development, ROK has promoted the implementation of sustainable development through education and promotion and wants to find a future course for sustainable development by making every single individual follows the concept of sustainable development.

### (10) Strengthen International Cooperation for Sustainable Development

As ROK's status has changed from ODA recipient to ODA provider, the expanded role of ROK for ODA in developing countries is required. In the meantime, the need for the expansion of green ODA where developing countries' vulnerability to climate change and eradication of poverty are handled together. Development Assistance Commission of OECD emphasized the integration of climate change issue with development in its declaration on 2006 OECD harmonization on response to climate change and development.

ROK is regarded as one of the rarest cases where rapid economic growth and environmental preservation were achieved together. ROK's sharing of its green growth experience in the process of ODA project is expected to contribute to environmental preservation and economic growth of developing countries. As the WSSD Implementation plan that includes the future direction of the world for sustainable development in the 21st century was adopted at World Summit on Sustainable Development in 2002, ROK has established and operated Network for Institution on Sustainable Development since 2005 after Special General Assembly of UNEP 2004. Accordingly, ROK has made a policy direction to strengthen international cooperative network and expand green ODA to support sustainable development of developing countries.

## 2.2 Adaptation to Climate Change and Response Mechanisms

### (1) Reduction of GHG Emissions by Sector for Carbon Reduction

Recent climate change and unstable supply of energy intensified the concerns among people. Internationally regulation on greenhouse gas emissions are becoming more rigid and participation in mandatory reduction spreads. The energy market is not in stable state due to continued demand increase for energy and supply shortage. Therefore, ROK faces challenge to reduce greenhouse gas emissions and achieve energy independence.

**Table 28 Greenhouse Gas Emissions Reduction Plan by the Country**

| Country | Plan |
|---|---|
| Korea | Reduce 30% compared to Business As Usual (BAU) by 2020 |
| Japan | Reduce 30% compared to the level of 2005 by 2020 (25% reduction compared to the level of 1990)<br>(September 22, 2009, Yukio Hatoyama, Japanese Prime Minister, UN Summit) |
| UK | ("Act on Climate Change" took effect in Nov. 2008) Reduce at least 26% compared to the level of 1990<br>(April 2009, Ministry of Finance) reduce 34% compared to the level of 1990<br>(July 2009, Ministry of Climate Change and Energy) Reduce 36% compared to the level of 1990 (Low Carbon Transition Plan submitted to the Cabinet) |
| US | Reduce 17% compared to the level of 2005 by 2020 (4% reduction compared to the level of 1990)<br>Stipulated in 'Waxman-Markey Legislation' which was passed in the House in June, 2009 |
| Australia | Reduce 5-15% compared to the level of 2000 by 2020, If Australia participates in global efforts, reduce 25%<br>Stipulated in Carbon Pollution Reduction Scheme (CPRS), which is underway |
| South Africa | Unclear mid-term goal, focusing on long-term plan<br>Declared theoretically possible goal of reducing 30-40% compared to the level of 2003 by 2050, scenario to achieve benefits is under review.<br>In October 2007 the joint private public and industry team for long-term reduction amount announced the goal through the report. |
| Canada | Reduce 20% compared to the level of 2006 by 2020 |
| EU | Reduce 20% compared to the level of 1990 by 2020 and if it participates in global efforts, reduce by 25%<br>It is recommended that country-level reduction amount shall be determined on its own considering GDP<br>Stipulated in "20-20-20 comprehensive act on climate change" in December 2008 (implemented in April 2009)<br>20-20-20 : Reduce 20% of greenhouse gas emission by 2020 and expand the ratio of renewable energy by 20% |
| Brazil | It has not presented clear figures, but review the goal to maintain the amount at the level of 2005 by 2020 |
| India | It cannot accept the mandatory reduction at a certain level |
| China | It is not possible to set mid-term reduction goal without the assumption that advanced countries will reduce 40% by 2020 |
| Russia | Reduce 10-15% compared to the level of 1990 by 2020, announced by President Medvedev in June, 2009 (press conference) |

Source : Relevant Ministries (2011), *Second National Plan for Sustainable Development.*

The greenhouse gas emissions and energy consumption increase rate in ROK are one of the highest in the world. The energy consumption increase rate is an annual average of 10.3% (1985-1995), which is one of the highest in the world, and absolute amount of greenhouse gas emissions is the 6th largest among OECD countries (2009). In 2009, ROK announced its goal to reduce greenhouse gas emissions in the mid-to-long term. With the implementation of "Framework Act on Low Carbon, Green Growth" in 2010, 458 companies in ROK has greenhouse gas energy target management system and ROK aims to reduce greenhouse gas emissions by 30% by 2020 compared to Business As Usual (BAU). Against this backdrop, ROK has implemented policies to strengthen capability to respond to climate change by pursuing greenhouse gas emission reduction goal met for each sector and active reduction of greenhouse gas reduction.

### (2) Transparency of Carbon Emissions Sources

As the national goal of greenhouse gas emissions reduction for the mid-to-long term was announced in 2009, the reduction amount for each emission sector has become major issue. In the same year, the Framework Act on Low Carbon, Green Growth was enacted as a legal basis for greenhouse gas emission means and emission trading system, which will serve as a major means of reduction will be implemented in 2015. For the greenhouse gas emissions reduction for each sector and emission trading system work well, the accurate information on carbon sources should be provided and made public. Accordingly the government is establishing infrastructure to make information on greenhouse gas emissions more accessible and provide national greenhouse gas emission statistics.

### (3) Expand Sustainable Carbon Sinks

Forest serves as a carbon source that absorbs greenhouse gas and is recognized as carbon sink by Kyoto Protocol. The 7.1% of total greenhouse gas emissions or 42.9 million tons (as of 2009) of $CO_2$ is absorbed by forest. Forest can replace fossil fuel as it can be utilized as forest biomass energy including wooden pallet.

To achieve the low carbon, resource recycling society, the continued forestation and forest management became necessary. To improve the capacity to absorb carbon, the forestation project on forest with lowered carbon sink capacity has been conducted by changing species of trees and forestation on idle land has been pursued. At the same time, ROK has established disaster management system to reduce the damage on carbon sink from disease and pest and forest fire. To prevent reckless use of mountain, consultation system to get approval to use mountain, mountain district feasibility study and system to form alternative forest resources are adopted and implemented. The responsibility for managing forest within ecological forest land use change area has been imposed and the ecological forest land for which purpose has been changed has been managed as mountain by establishing information system linked to geological and registration information.

The government is pursuing the expansion of supply and demand for wooden bio energy to achieve its goal of new and renewable energy penetration rate (11% by 2030). To this end, the government implemented policies for stable supply of wooden pallet by forming bio circulation forest and made plans for automation of forest work, expansion of access road for automation and formation of bio circulation forest.

### (4) Establish an Early Response System to Climate Change

The flood and drought caused by climate change become more frequent, but there is not enough system to predict and manage these abnormal weather conditions. Therefore, there is a need to establish the system to deliver high-resolution prediction and monitoring information and impact analysis drawn based on climate change scenario. In addition, it is needed to develope advanced technology for monitoring and measuring greenhouse gas emissions. Against this backdrop, the government establishes prediction system to respond to abnormal weather conditions through the expansion of climate change monitoring system and development of climate change scenario and pursues development of monitoring and measurement technologies for greenhouse gas emissions on the Korean Peninsula.

### (5) Establish National Food Security System

The imbalance between demand and supply of international grain has been increased due to climate change and the grain price is expected to grow gradually. Compared to the figure of 2000, the international grain price increased with rice by 787%, wheat by 307%, corn by 232% and bean by 557%. The inventory rate of global grain decreases from 32.0% (2000-2001) to 18.7% (2006-2007) and to 20.7% (2008-2009).

Japan predicts food production changes based on climate change scenario with its own model, but the technology development of Korea is lagging behind. Therefore, ROK has pursued the development of model for domestic agricultural production change prediction according to a new climate change scenario (RCP) and strengthened the R&D activities to establish national food security system to respond to climate change. As abnormal or extreme weather conditions become more frequent, it is urgent to develop disaster resistant and disease resistant species, adopt a new type of crop that was adjusted to climate change and develop cultivation technology. Against this backdrop, ROK has implemented policies to develop strong species of crop, establish food security system through the establishment of production information system and expand healthy agricultural production environment and production base for fishery resources for stable supply of food.

### (6) Enhance Identification New Projects on Adaptation to Climate Change

Climate change presents both challenges to reduce greenhouse gas emissions and opportunities to explore new business. It becomes possible to create new industry and jobs through the development of new technologies or products and to enter into the countries whose climate is similar to that of ROK.

Against this backdrop, it becomes necessary to establish the plan for developing promising business areas related to climate change. The need to explore market through new technology and product related to climate change and present national guideline to induce corporate participation and identify new business increased. The government intends to provide incentives to form market related to climate change and nurture new businesses and relevant experts supporting relevant projects.

## 2.3 Promotion of Social Equity and Public Health

### (1) Promote Economic Activities in Disadvantaged Communities

The World Summit on Sustainable Development (WSSD) suggested 'Cities without Slums by 2020." Industrial/employment structure and income polarization serve as a cause for social conflicts and working poor of the second highest class are excluded from the national basic livelihood security program though their income level is less than the minimum cost of living. Despite economic recovery, the low-income people are still facing tough living conditions and the low birthrate is aggravating the current situation of decreasing and aging population. To address issues related to low birthrate and aging population, the "Act on Low Birth Rate in an Aging Society" was enacted in September 2005; and the basic plans for low birthrate and aging society have been implemented. Under the situation, the national policy direction is to create an environment where the socially vulnerable are able to become economically independent with financial and employment support.

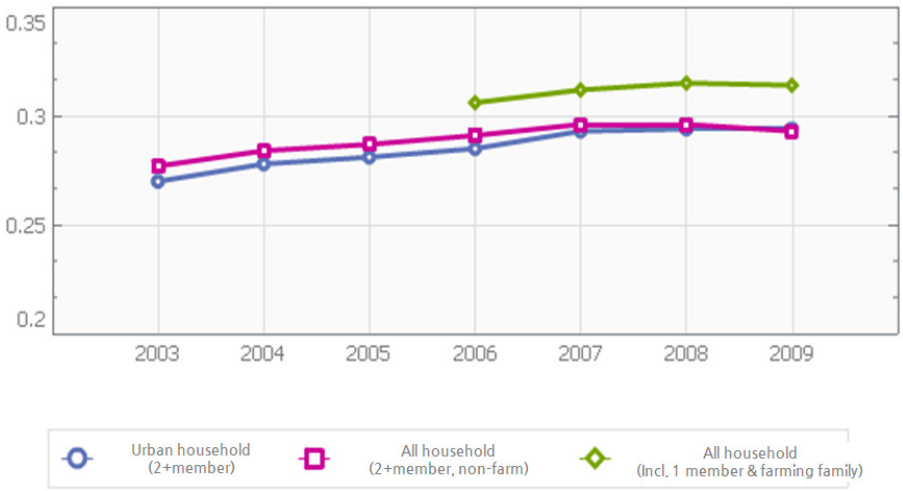


**Figure 19 Gini Coefficient Trend of Korea**

Source: Compiled data from relevant ministries (2011), *Second National Strategy for Sustainable Development.*

### (2) Improve the Living Conditions of Vulnerable Communities

Korea's welfare expenditure is relatively low compared to other OECD countries with a growing demand for welfare related to aging population. There is a new policy demand not only for the disabled, the elderly and poor children, traditionally considered as the vulnerable class, but also for elderly people living alone.

Economic recovery does not much help improve the living conditions of those in the low-income basket. The number of living-alone elderly increased to 0.55 million in 2000 to 1.02 million in 2010. The living quality of the vulnerable including children, the elderly and the disabled has consistently deteriorated. The relative poverty rate was also increased from 14.6% of 2006 to 14.9% of 2010. As seen in the fact that 18% of the households in poverty fell under the poor class due to medical expenditure, medical expense is a major cause of poverty that hinders them out of poverty. For the reason, the national policy direction is to improve the living conditions of the socially vulnerable by providing housing and medical service support.

### (3) Build a Community-based Rural Development

The agricultural sector has shown a widening growth gap with other industrial sectors. Compared to other countries, the overall environment of Korea's farming and fishing communities are considered poor in living, working and relaxation conditions. Damages from foot-and-mouth disease and abnormal weather conditions make worse unstable income of the rural areas where housing also requires consistent improvement. For the reason, needed was to come up with a policy to improve income level, relevant welfare and local development in the rural areas.

The national policy direction is now to improve living conditions and assure stable income, thus making possible sustainable development of the farming and fishing communities. In addition, education is provided to residents of mountain villages so that they are able to strengthen their ability to develop and preserve their areas.

| Rural | Comparison | With City | | With Those of Advanced Countries | |
|---|---|---|---|---|---|
| Living conditions | Housing | Rate of house aged less than 20 years | 80% of that of the city | Housing quality | Lower than advanced countries |
| | Medical service | Number of doctors per 1,000 residents | 71% | Number of doctors per 1,000 residents | Lower |
| Working conditions | Industrial infrastructure | Employment opportunity (Number of jobs/ Number of economically active population) | 115% | Ratio of employment in 2nd and 3rd industry | Lower |
| | Income level | Resident tax based on income of 1 person | 64% | Income level | Lower |
| Relaxation | Green field | Green field rate | 129% | Green field | Lower |
| Community | Population composition | Ratio of economically active population | 82% | Ratio of economically active population | Similar |
| | Education level | Ratio of population educated in university or above | 46% | Ratio of population educated in university or above | Lower |

**Figure 20 Rural Area's Key Indicator Comparison**

Source: Compiled data from relevant ministries (2011), *Second National Strategy for Sustainable Development.*

### (4) Protect Public Life from Changes in Environment

As environmental problems are getting worse, environmental pollution is increasingly affecting public health. 7.3% of the total population is exposed to air pollution exceeding the environmental standard with a growing number of children suffering from environmental disease such as atopy and asthma.

The situation requires a system to prevent and respond to environmental disease at the national level. Against the backdrop, Korea has implemented its national policy to establish a preventive system to address environmental diseases and to put into place diverse measures in a continued manner to reduce substances triggering such diseases.

(Unit : No. of patients/10,000 persons)

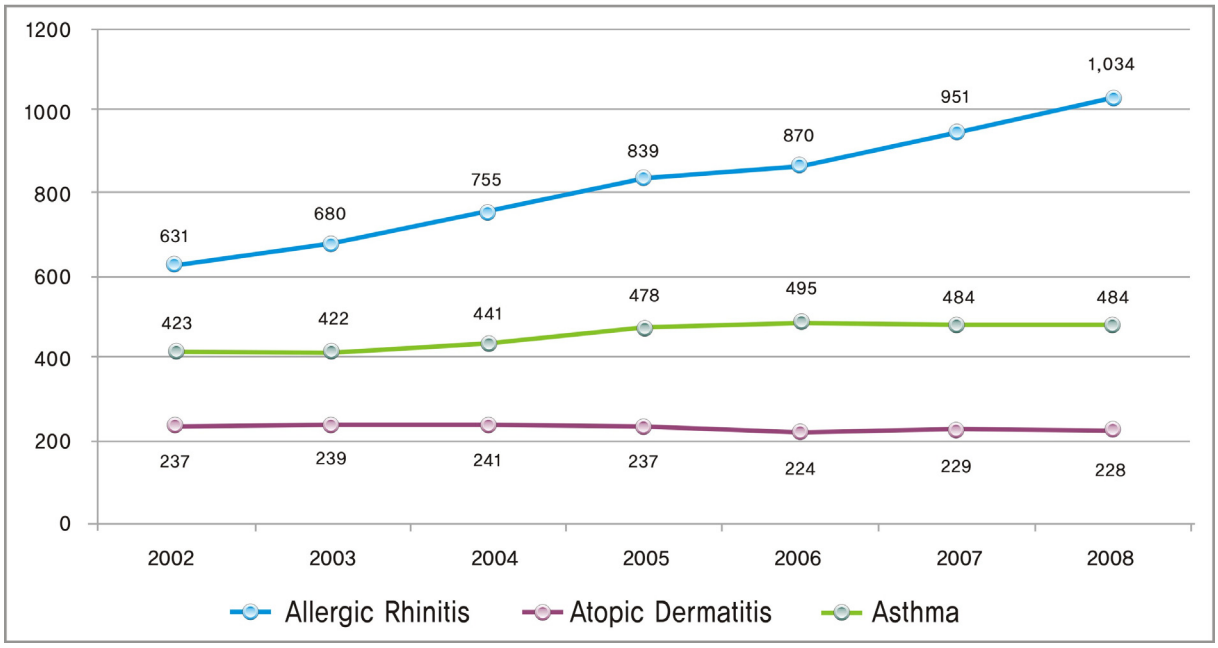


**Figure 21 Environmental Disease Patient Trend by Year (Unit: No. of patients/10,000 people)**

Data source: Data from relevant ministries (2011), Source: *Second National Strategy for Sustainable Development.*

## (5) Strengthen Public Health

Waste of medical resources and the government's insufficient investment placed Korea in the 29th position out of 35 OECD countries in the ratio of public health care expenditure against GDP. It highlights the need of expanding public health services and improving relevant systems with the goal of public health protection.

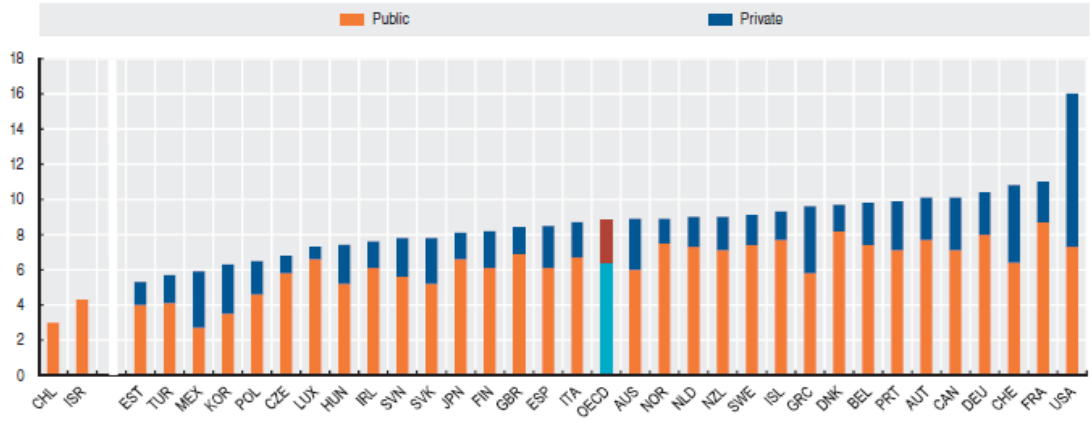


**Figure 22 Ratio of Public Health Care Expenditure against GDP by OECD Country (Unit: %)**

Source: Data from relevant ministries (2011), *Second National Strategy for Sustainable Development.*

Thanks to the 'Comprehensive Measure for Expansion of Public Health Service, 2005-2009', the infrastructure for public health care was established, but still Korea is faced with the lack of necessary health care services. The five-year plan with the budget of 4,300 billion won has been 85.6% completed up to now. About 600 billion won was injected into establishment of the public health care infrastructure focusing on regional national/public hospitals including cancer centers, cardiocerebro vascular centers and children hospitals.

To expand the medical care service for public interest through, for example, public health protection and essential health care service provision, it is necessary to change the public health care policy to the one where private medical institutions also take part; and to establish an efficient system encompassing public and private institutions for essential health care services whose provision have been difficult due to their low profitability. To meet the needs, the national policy is focusing on based on expanding the recipient areas of public health care services and improving the relevant medical care systems; and establishing the infrastructure to supply essential health care services including those for emergency, childbirth and blood supply in a stable manner, with the goal of public health protection.

## 2.4 Improve Sustainability of Economic and Industrial Structure

### (1) Compose Resource Recycling Economy and Society

To reduce green house gases, industrial structure change is required. In Korea with the heavy energy-consumption industrial structure, 57% of the total energy is used in the industrial sector. In particular, the manufacturing made up the largest percentage of 94% in the industrial energy consumption.

The situation requires resource-cycling by promoting markets for recycling of food waste and construction waste which are on the rise. Needed is also to establish a comprehensive waste management system with the goal of reducing waste and improving waste management efficiency. Such measures are designed to secure economics of waste treatment and recycling and take the initiative in the changing domestic and overseas trend of toxic chemicals management. Under the situation, Korea has implemented its national policy in the direction of improving resource saving and cycling with establishment of a resource-cycling industrial structure; and of laying the foundation of promoting waste recycling and food waste reduction.

### (2) Establish Sustainable Economic Structure

The current situation stresses the importance of laying a sustainable economic foundation through eco-friendly production and consumption. Related efforts include green product use for environmental pollution reduction, resource saving, conversion to a corporate management suitable for sustainable economy, toughened regulations on pollutants emission by advanced countries and promotion of green product manufacturing.

As part of the effort to lay the foundation for sustainable development, it is also necessary to expand investment in development of low-carbon technology. In this regard, Korea needs to prepare a plan for domestic low-carbon technology R&D in order to conduct low-carbon technology development in a systematic manner. The level of Korea's low-carbon technology is about 50~70% of that of advanced countries. Taking the current situation into account, Korea has been implemented its national policy to push

ahead with a systematic low-carbon technology development by establishing a system of promoting eco-friendly production, consumption and corporate management.

### (3) Expand Efficiency of Energy Use

High oil prices and weather change place more importance on the strategies for low consumption and high efficiency of energy. As effective ways of reducing $CO_2$ and saving energy, major countries strive to increase energy efficiency and promote new renewable energy use.

Japan set a goal of improving energy efficiency by 30% by 2030 while the EU announced the '20-20-20 strategy.' Measures to improve energy independence based on usage of sustainable energy have been also put in place.

Conversion to an industrial structure with low energy consumption is also pushed ahead with as an effort to improve energy efficiency and energy independence level. To respond to the trend, Korea's national policy is also to increase energy independence level through efficient management of energy demand and expansion of new renewable energy supply; help the economic structure with low energy consumption take root, thus strengthening the national competitiveness.

### (4) Human Resources and Job Creation

Advanced countries have expanded their strategic investment to create green jobs and green talents by promoting green technology and green industries. For the US, it adopted ARRA (American Recovery and Reinvestment Act) based on which it invests 500 million dollars in research and training programs designed to nurture experienced workers in energy efficiency and renewable energy areas.

From 2009 to 2012, Korea has invested a total of 50 trillion won in 36 'Green New Deal Projects' to create jobs and secure growth engines with the goal of generating about 960,000 jobs. Through the effort, it is committed to developing human resources for the green industry which, in turn, helps lay the foundation for low-carbon green growth; and expanding and generating jobs related to green technology and industries.

Appendix Ⅱ

## Results of National Sustainable Development Indicators

| Sector | Theme | Sub-theme | Indicator | 2006 | 2010 | Variation |
|---|---|---|---|---|---|---|
| Social | 1. Equity | 1-1. Poverty | 01) Percent of population living below the poverty line | 14.3% | 14.9% | 4.2% |
| | | | 02) Gini Index of income inequality | All households 0.306 | All households 0.310 | 1.3% |
| | | | 03) Unemployment rate | 3.5% | 3.7% | 5.7% |
| | | 1-2. Labor | 04) Average working hours | 193.4 hrs/month | 187.0 hrs/month | △3.3% |
| | | | 05) Wage ratio of regular to non-regular work | 62.8% | 54.8% | △12.7% |
| | | 1-3. Gender equality | 06) Ratio of female to male wages | 61.5% | 62.6% | 1.8% |
| | | | 07) Percent of women's economic participation | 50.3% | 49.4% | △1.8% |
| | 2. Health | 2-1.Nutritional status | 08) Nutritional status of children (% of required level) | 7.7% ('05) | 2.8% ('09) | △63.6% |
| | | 2-2.Mortality rate | 09) Mortality rate under one year old | 4.1/1,000 persons | 3.5/1000 persons | △14.6% |
| | | 2-3. Life expectancy | 10) Average life expectancy | 79.2 | 80.8 | 2.0% |
| | | 2-4.Drinking water | 11) Supply rate of water service in farming and fishing villages | 84.3% (Yup)<br>41.1% (Myeon) | 89.8% (Yup)<br>55.9% (Myeon) | 6.5%<br>36% |
| | | 2-5. Health care delivery | 12) Public revenue to national health expenditure ratio | 55.3% | 58.3% (expected) | 5.42% |
| | | | 13) National health & welfare expenditure | GDP 7.96% | GDP 10.38% ('09) | 30.4% |
| | | | 14) Percent of children vaccinated against infectious diseases | 79.6 % (BCG) | 82.7% (BCG) | 3.9% |
| | 3. Education | 3-1. Education level | 15) Net percent of children graduating from middle school | 98.3% | 98.4% | 0.1% |
| | | | 16) Number of students per class in elementary schools | 30.9 persons | 26.6 persons | △13.9% |
| | | | 17) Education expenditure (cost of public and private education) | 7.3% (gov't+private) | 7.6% (gov't+private) ('08) | 4.1% |
| | 4. Housing | 4-1. Living conditions | 18) Number of houses below the minimum housing conditions | 16.6% | 10.6% | △36.1% |
| | | | 19) Number of houses per 1,000 population | 279.7 ('05) | 302.1 | 8.0% |
| | | | 20) Comparison of house price against income | 6.4 times | 7.7 times ('09) | 20.3% |
| | 5. Disaster /Security | 5-1. Crime /disaster | 21) Number of recorded crimes | 3,787/100,000 persons | 3,750/100,000 persons | △1% |
| | | | 22) Damages from natural disasters | 63 persons<br>(1.9 trillion won) | 14 persons<br>(4.267 trillion won) | △78% |
| | 6. Population | 6-1. Population change | 23) Population growth rate | 0.33% | 0.26% | △21.2% |
| | | | 24) Population density | 485 persons/$km^2$ | 489 persons/$km^2$ | 0.8% |
| | | | 25) Percent of aged population | 9.5% | 11.0% | 15.8% |
| Environ-mental | 1. Atmosphere | 1-1.Climate change | 26) Green house gas emissions | 575.7Mt$CO_2$ | 607.6Mt$CO_2$ ('09) | 5.5% |
| | | | 27) Green house gas emissions per capita | 11.9t$CO_2$/person | 12.5t$CO_2$/person ('09) | 5.0% |
| | | | 28) Green house gas emissions per GDP | 0.63t$CO_2$/million won | 0.62t$CO_2$/million won ('09) | △1.6% |
| | | 1-2.Ozone layer | 29) Consumption of ozone depleting substances (CFC) | 3,248 tons | 1,320 tons | △59.4% |
| | | 1-3.Air quality | 30) Air pollution in metropolitan cities ($SO_2$, $NO_2$, PM10, Ozone) | Seoul:31, Busan:33, Daegu:29, Incheon:17, Gwangju:23, Daejoen:13, Ulsan:28 times<br>(No. of times exceeding the standard/monitoring center) | Seoul:90, Pusan:44, Daegu:94, Incheon: 91, Gwangju:48, Daejeon:60, Ulsan:47<br>(No.of times exceeding the standard/monitoring center) | 172%† |

| Sector | Theme | Sub-theme | Indicator | 2006 | 2010 | Variation |
|---|---|---|---|---|---|---|
| Environ-mental | 2. Land | 2-1. Agriculture | 31) Percent of farmland area | 1.45ha/household | 1.46ha/household | 0.7% |
| | | | 32) Production ratio of environmental-friendly Agricultural products of the quality-certificated | 6.2% | 12.0% | 93.5% |
| | | | 33) self-sufficiency rate of food* | 27.7% | 26.7% | △3.6% |
| | | | 34) Use of fertilizers (N, K, P) | 257kg/ha | 233kg/ha | △9.3% |
| | | | 35) Use of agricultural pesticides | 12.9kg/ha | 10.6kg/ha | △17.8% |
| | | 2-2. Forests | 36) Forest area as a percent of land area | 64.10% | 63.67% | △0.7% |
| | | | 37) Park area per capita within a city | 9.2 $m^2$ | 7.6 $m^2$ | △17.4% |
| | | | 38) Wood harvesting intensity | 9.7% | 8.4% | △13.4% |
| | | 2-3. Urbanization | 39) Urbanization rate | 90.3% | 90.9% | 0.7% |
| | | | 40) Concentration rate of population in Seoul Metropolitan areas | 48.6% | 49.4% | 1.6% |
| | 3. Oceans /coasts | 3-1.Coastal zone | 41) Coastal pollution (COD) | East Sea 0.90<br>West Sea 1.27<br>South Sea 1.49 mg/l | East Sea 0.75<br>West Sea 1.26<br>South Sea 1.30 mg/l | △9.5%† |
| | | | 42) Amount of ocean dumping | 8,812,000 $m^3$ | 4,478,000 $m^3$ | △49.2% |
| | | | 43) Size and rate of Increase and decrease of foreshore area | 2,550.2㎢ ('05) | 2,489.4㎢ ('08) | △2.38% |
| | | 3-2. Fisheries | 44) Amount of marine resources | 8,010,000 tons | 8,510,000 tons | 6.2% |
| | | | 45) Amount of fishery farming | 2,368,000 tons | 2,488,000 tons | 5.1% |
| | 4. Fresh Water | 4-1.Water quantity | 46) Annual withdrawal of ground and surface water | 36.2% ('05) | 40.3% ('08) | 11.3% |
| | | | 47) Amount of water consumption per capita per day* | 346ℓ | 333ℓ | △3.8% |
| | | 4-2.Water quality | 48) Concentration of BOD (Average in 4 major rivers) | Paldang 1.2<br>Mulkeum 2.7<br>Daecheong 1.1<br>Juam 1.1 | Paldang 1.2<br>Mulkeum 2.4<br>Daecheong 1.0<br>Juam 1.0 | △8.2%† |
| | | | 49) Sewage distribution rate | 85.5% | 89.4% ('09) | 4.6% |
| | 5. Biodiversity | 5-1. Ecosystem | 50) Protected area as a % of total area | 9.84 % | 12.2% ('09) | 24% |
| | | | 51) Number of national species | 29,916 | 36,921 | 23.4% |
| | | | 52) Number of species in danger of extinction | 221 | 221 | 0 |
| Economy | 1. Economic structure | 1-1. Economic performance | 53) GDP | 9,511 (100 million dollar) | 10,147 (100 million dollar) | 6.7% |
| | | | 54) GDP per capita | 19,691 USD | 20,562 USD | 4.4% |
| | | | 55) Economic growth rate | 5.2% | 6.3 % | 21.2% |
| | | | 56) Net investment share in GDP | 30.8% | 31.7% | 2.9% |
| | | | 57) Consumer price indexes | 102.2 | 116.1 | 13.6% |
| | | 1-2. Trade | 58) Balance of trade in goods and services | 161 (100 million dollar) | 411(100 million dollar) | 155.3% |
| | | 1-3. Financial status | 59) Ratio of taxation per capita | 21.1% | 19.7% ('09) | △6.6% |
| | | | 60) Debt to GDP ratio | 23.7% | 35.7% | 50.6% |
| | | 1-4.ODA | 61) ODA to GNI ratio | 0.05% | 0.12% | 140% |

| Sector | Theme | Sub-theme | Indicator | 2006 | 2010 | Variation |
|---|---|---|---|---|---|---|
| Economy | 2. Consumption /production | 2-1.Material consumption | 62) Intensity of material use | 1.212million won/tons | 1.264million won/tons ('07) | 4.3% |
| | | 2-2.Energy use | 63) Annual energy consumption per capita | 4.83 TOE/person | 5.17 TOE/person | 7% |
| | | | 64) Total energy supply | 233 million TOE (1st energy consumption) | 263 million TOE (1st energy consumption) | 12.9% |
| | | | 65) Share of renewable energy supply | 2.2% | 2.5% ('09) | 13.6% |
| | | | 66) Energy unit (based on PPP of 2005) | 0.263 TOE/1,000 USD | 0.258 TOE/1,000USD | △1.9% |
| | | 2-3.Waste management | 67) Generation of industrial and municipal solid waste | 318,928 ton/day | 365.154 ton/day | 14.5% |
| | | | 68) Generation of hazardous waste | 10,026ton/day | 9,060ton/day ('09) | △9.6% |
| | | | 69) Generation of radioactive waste | 5,778 drum (low-and intermediate level) | 2,419 drum (low-and intermediate level) | △58.1% |
| | | | 70) Rate of waste recycling and reusing | 57.2% (municipal) | 60.5%(municipal) | 5.8% |
| | | 2-4. Transportation | 71) Transportation shares of public transport modes (the Seoul Metropolitan area) | 42.6% ('05) | 54% | 26.8% |
| | | | 72) Total length of roads and cycling paths | 9,066 km | 13,037 km | 43.8% |
| | | | 73) Number of car accidents | Death 3.2persons/10,000 vehicle, 13.0persons/100,000 persons | Death 2.6persons/10,000 vehicle, 11.3persons/100,000 persons | △18.8% △13.1% |
| | 3. Information Society | 3-1.Access to information | 74) Number of high-speed internet subscribers | 14,043 (1,000 persons) | 17,224 (1,000 persons) | 22.7% |
| | | | 75) Ratio of households with PCs | 79.6% | 81.8% | 2.8% |
| | | 3-2. Information infrastructure | 76) Number of on-line civil application services | 648 | 3,015 | 365.3% |
| | | 3-3.Sciences and technology | 77) Expenditure on R&D as a percent of GDP | 3.01% | 3.74% | 24.3% |

Note :

⋆ Agricultural products of the quality-certificated self-sufficiency rate of food(including grains for animal feed), Amount of water consumption per person per day(excluding industrial water and agricultural water consumption).

† If more than one data exist for an indicator, composite evaluation was conducted based on representative data. The mark † is given to indicators for which representative indicators are hard to be determined so that rate of change was calculated based on the average of sum of the relevant data.

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