

**CASE STUDY ON KOREAN EXPERIENCES RELATING TO THE
CONSERVATION OF BIODIVERSITY IN MOUNT CHIRI, WITH SPECIAL
ATTENTION TO THE POACHING OF BEARS**

Case Study for OECD Expert Group on Economic Aspects of Biodiversity

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by
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1. GENERAL DESCRIPTION

1.1 General

Mount Chiri is located in the southern part of the Korean peninsula and was designated the first national park in 1967. The Asiatic Black Bear, known as Bandal-gasum-gom (meaning a bear with a half moon shape on the breast, hereafter Bandalgom), are distributed in Siberia, the north-east of China, and high mountainous altitudes of Japan, North Korea and South Korea, but currently survive only around the DMZ (Demilitarized Zone between North Korea and South Korea) and at Mount Chiri in South Korea. Mount Chiri, which has a total area of 440 km², is estimated to have proper conditions for a maximum of 150 Bandalgom to be able to live.

The Bandalgom have been designated as a national monument since 1982 under the Cultural Property Protection Act, which is managed by the Ministry of Culture and Sports. Bears, including the Bandalgom, have been the most important and unique totem for ancient Korean people. Although the Bandalgom as a natural monument have been protected by the Birds and Mammals Protection and Game Act, they are currently included in the category of extremely endangered species. At least six have been formally reported to currently exist in the southwestern part of Mount Chiri by the Ministry of Environment (MOE).

The current endangered status of Bandalgom has been attributed mainly to poaching by means of snares or traps in order to acquire bear gallbladders, which are important in Traditional Chinese Medicine (TCM). One of the most important problems in protecting Bandalgom is that the virtues of bear gallbladders are overestimated. A lot of people believe that bear gallbladders are a cure-all, and that serves as the chain of supply and demand for Bandalgom. The gallbladder of Bandalgom is, thus, traded on the black market at very expensive rates, a retail price of about 100 to 200 million Korean won (approximately 67-133 thousand US dollars). Other reasons why they are endangered are the lack of appropriate protection policies, unsustainable use, habitat fragmentation by artificial impacts, etc.

The MOE and local ecosystem protection groups launched ambitious Bandalgom protection measures for the first time in the fall of 1996. These efforts were motivated by making local amateur hunters and residents aware of the importance of protecting the Bandalgom. At the same time, various incentives were given to local ecosystem protection groups and perverse incentives for poaching were removed. The protection of Bandalgom has had a number of positive effects on the conservation of biodiversity on Mount Chiri and has activated local residents' power for conserving biodiversity.

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This case study focuses on 1) explaining spatial reasons for the Bandalgom's endangered status that are rarely found in other countries, 2) introducing various incentive measures for the protection of the endangered Bandalgom, and 3) illuminating the drawbacks of and remedies for their implementation.

1.2 Description of ecosystem

Mount Chiri extends over three provinces, Chunnam, Chunbuk and Kyungnam, and has a girth of 320 kilometers. The many lofty peaks and steep mountain ridges make Mount Chiri's scenery impressive. A 44 kilometer-long ridge line extending from east to west and branching north to south with many valleys creates the graceful figure of Mount Chiri.

Mount Chiri, the widest and highest mountain in South Korea's inland has fertile soil and sufficient water volume, which assist in the formation of a virgin forest with 1 147 species of herbaceous plant and trees. Mount Chiri can be divided into four areas by altitude. The first area ranges from the bottom of the mountain to 500 meters above sea level where the main trees are queritrons and chestnut trees. The second area ranges from 500 to 1 000 meters above sea level, and the main trees are pine trees, queritrons, and dogwood. The third area ranges from 1 000 to 1 400 meters above sea level, and the main trees are spruce, Korean fir, Mongolian oak and royal azalea. The fourth area ranges from 1 400 to 1 900 meters above sea level where the main trees are Russian rock birth. Many animal species (over 41 species of mammals, 165 species of birds and 200 species of insects, including natural monuments such as Bandalgom, musk deers and others) also live in the dense forest of Mount Chiri.

1.3 Identification of keystone species

In South Korea, wild Bandalgom have been nearly endangered and are listed on Appendix I of the Convention on International Trade in Endangered Species of wild fauna and flora. Wild Bandalgom, designated as a natural monument in 1982, have a distinct white patch on their chest, which is sometimes shaped "V". The length of an adult is 140 to 170 centimeters. Adult males range from 50 to 120 kilograms and adult females from 42 to 70 kilograms.

The relatively small sized Bandalgom are deeply connected to the forest and are good at climbing trees, eating buds and fruits, and resting on broken and piled up branches. Bandalgom migrate mainly around the eight-tenths ridge line, which is 800 meters above sea level.

The habitat of Bandalgom varies according to the condition of food, sleeping places, etc. The Bandalgom often migrate seasonally. During the summer, the Bandalgom move frequently, keeping track of gradually ripening food patches and the shade of trees. During the fall, their climbing ability is most important. The most suitable foods - acorns, pine nuts and chestnuts - are up in the trees.

Bandalgom eat nearly everything, but they are mainly herbivorous. Right after waking up from hibernation, they eat plants, including new buds, bamboo shoots and the young leaves of trees. They also catch amphibians, reptiles and fishes. The Bandalgom's summer diet consists of raspberries and mulberries. Insects, mainly ants, are most commonly found in their summer diet.

Based on the food distribution for the Bandalgom, Mount Chiri might be divided between the northern slope and the southern slope. While pine nuts are distributed sporadically or centrally on the northern slope, few pine nuts are distributed on the southern slope. Both the northern and southern slopes consist of virgin forest. Habitats for aquatic beings are different between the northern slope and southern slope. While aquatic beings like fish and crustacea on the northern slope are decreasing remarkably, the habitat for those on the southern slope is quite satisfactory.

The durability of the Bandalgom's life depends on biological diversity, specially on deciduous trees. The biological diversity of animals and deciduous trees must be secured to protect the Bandalgom.

2. IDENTIFICATION OF CAUSES AND SOURCES OF PRESSURES

2.1 Identification of sectoral activities and resulting pressures

There have been a lot of artificial factors that have affected the Bandalgom's life since the nineteenth century. Some important artificial factors are: unsustainable farming, timber felling, habitat fragmentation, pollution and poaching. The number of Baldalgom on Mount Chiri has decreased dramatically due to these artificial factors. However, the primary reason for the decreasing number of Bandalgom is poaching. Over fifty Bandalgom have been killed on Mount Chiri since 1950.

Bear gallbladders have been used in TCM. It is known that bear gallbladders effectively reduce fever. The potential demand of bear gallbladders is very high, because they are overestimated as a cure-all. Some medicine companies advertise their products showing pictures or copies related to bear gallbladders even though the products do not include any bear gallbladders. Furthermore, it is believed that gallbladders from wild Bandalgom are more effective. The number of orders placed through distributors like traditional health care centers and TCM retailers are hundreds of times the actual number of Baldalgom.

Professional poachers usually use guns, snares or traps to catch Baldalgom. Snares and traps were distributed throughout Mount Chiri in the past. The MOE and local ecosystem protection groups have removed more than two thousands snares and traps since 1996. In spite of those activities, many poaching instruments are still on Mount Chiri, and poaching has not ceased.

Other pressures on the Bandalgom's life are 1) decreasing foodstocks due to local people picking natural forest products such as wild edible greens and acorns, 2) road and related construction, including guard rails and U-type concrete ditches, and 3) environmental pollution from wastes and people who visit the mountain. Roads have divided Mount Chiri into several parts, which is a severe hindrance to the wildlife's freedom of movement.

2.2 Identification of the underlying causes for the current status of the Bandalgom

There are several important causes underlying the current endangered status of the Bandalgom.

The overestimation of bear gallbladder's effectiveness: While some traditional medical books report that bear gallbladders are obviously effective for reducing fever, there is no scientific proof of the effectiveness of this cure-all in which the general public believes.

Greed of a few indiscreet rich consumers for bear gallbladders: Though this is the reason that the supply of the bear gallbladders has not ceased, their supply and demand is extremely restricted because supplying them is illegal. Therefore, they are traded on the black market at very high prices. Thus, the chain of distribution is spontaneously generated.

Insufficient law enforcement: Not only are fines for poaching or trading in Bandalgom considered to be too low compared to its trading price, but also punishment is too mild when compared to the opportunity costs for those individuals who are related to poaching Bandalgom. Additionally, there are not nearly enough law enforcement agents to watch for poaching.

Lack of information and awareness: The government and citizens have not had accurate knowledge related to poaching. The most significant problem is that the government’s concern for and investment in the protection of Bandalgom is not as high as that of NGOs or the press.

Table 1. **Institutional framework**

Institutions	Function
Ministry of Environment	- Overall nature conservation - Protection of plants, amphibians and reptiles (However, there is no actual jurisdiction on highest-ranked species in the food chain system)
Ministry of Culture and Sports	- Protection of Natural Monuments including Bandalgom (However, they have little man power to protect Bandalgom)
Ministry of Home Affairs	- Management of National Parks Authority including Mount . Chiri National Park
Forestry Administration	- Management of forest, mammals and birds (However, their policies, like afforestation , openly and negatively affect biodiversity conservation)

Decentralized government functions for ecosystem conservation: Due to its decentralization, the Government lacks the ability to respond systematically to the extinction of the species (see Table 1). The policies related to the protection of Bandalgom are sometimes ineffectively established and implemented due to their decentralized functions.

Lack of careful consideration of ecosystem conservation during development projects: Due to the lack of inter-agency cooperation, a lot of natural habitats have been ruined by various development projects, such as the construction of roads and dams.

Human activities and policies, such as afforestation, land use, and overuse of pesticides, etc.: They may have changed ecosystems or impacted negatively on the food chain system.

2.3 Identification of adverse incentives

Adverse incentives to the conservation of Bandalgom can be divided into financial support for agriculture, national land use plans, afforestation and weak penalties for poachers in Korea.

Firstly, financial support to agriculture could be one of the major causes for the destruction of the ecosystem. Since it has been motivated by mass production, land conversion from forest to farmland has accelerated and fertilizers and pesticides have been overused. Such activities have affected the ecosystem and have eventually caused the Bandalgom to become endangered.

Secondly, development policies that do not carefully consider the ecosystem are also important perverse incentives. While the Bandalgom require a large habitat, their habitat are currently divided into three pieces on Mount Chiri. This has resulted in a reduction of existing habitat, which could eventually decrease the habitable population. The density of Crustacea, such as crabs and crawfish, has also been

significantly reduced due to the Namgang Dam construction near Mount Chiri, which caused the Bandalgom to become endangered by making their habitat environment worse.

Thirdly, the afforestation policy is one of the adverse incentives. The afforestation policy focused mainly on flood control without considering biodiversity and its components. While such policies successfully induced a green revolution in Korea, an unknown number of species have disappeared due to the habitat disturbances.

In addition to the above adverse incentives, the weak penal regulations is the most important adverse incentives. Fines that are too low compared to trade value on the black market has failed to remove the motivation for poaching. The most severe problem is that there is no penal regulations for the gallbladder consumers who are creating poaching.

3. IMPACTS ON ECOSYSTEM AND ECONOMY

3.1 Impacts on ecosystem

The habitation of the highest-ranked keystone species in the food chain system might stand as a symbol for the conservation nation’s nature. The Bandalgom are the highest-ranked keystone species living endangered lives. There has been research showing that six to ten Bandalgoms are now living in South Korea. Continuous poaching and insufficient measures on the part of the government to protect the Bandalgom have led to the recent decline of the Bandalgom. The current number of Bandalgom is not sufficient maintaining ecosystem resilience.

The Bandalgom is the representative forest animal for temperate deciduous forests. The main trees of Korean deciduous forests are oak trees, the main food of the Bandalgom. Seed distribution of oak trees is done by animals, including the Bandalgom, i.e., the oak tree and the Bandalgom depend on each other to live. It is not easy to estimate the economic value of the ecosystem. However, it is definitely very valuable to the Korean people who eat acorns. The oak trees also have a large water holding capacity, which is very useful for maintaining the ecosystem and preventing flooding. The Bandalgom are therefore very important to the maintenance of natural ecosystems.

3.2 Economic valuation of damages to public property

We completed a survey to determine the monetary value of a Bandalgom with a sample size of 178. The contingent valuation method with the total value-to-component-allocation method was used. Donations to the special program for conserving Bandalgom was used as payment vehicle and the open-ended question followed by the dichotomous choice was used for determining the derivation of willingness to pay (WTP).

Table 2. **Monetary value of Bandalgom**
(in US\$)

	Total	Use value	Preservation value		
			Subtotal	Traditional preservation value	Option value
WTP per household	346	65	281	254	27
Total WTP	3.806 billion	715 million	3.091 billion	2.794 billion	297 million
Monetary value per Bandalgom	380.6 million	71.5 million	309.1 million	279.4 million	29.7 million

The study results showed that Korean people imposed the greater weight on the traditional preservation values, especially on bequest value, which was consistent with Korean people’s emotion of ‘warm glow’ for their following generations (see Table 2). Average WTP per household was US\$ 346,

which broke down to: use value for scientific and non-consumptive use, US\$ 65 (18.9 per cent of average WTP); and preservation values including option, existence and bequest values, US\$ 281 (81.1 per cent of average WTP). Total WTP for the conservation of about 10 Bandalgoms (the currently estimated number) was US\$ 3.806 billion. The monetary value of each Bandalgom was therefore US\$ 380.6 million.

Considering the trade value per Bandalgom of approximately US\$ 67-133 thousand, the disappearance of one Bandalgom would decrease the nation's social welfare significantly, more than US\$ 380 million arithmetically. This represents the loss of national benefits of only the Bandalgom, without considering damage to their related ecosystem.

3.3 Impacts on social welfare

The Korean legend of the origin of the first Korean refers to the transformation of a Bandalgom into a woman after eating mugwort and garlic and avoiding the sun for 100 days. She married Whanung, the son of the god, after becoming a woman and begot a son called Tangun, the first Korean. It would be tragedy if the humans that arose from the bear ultimately led to its disappearance in South Korea.

4. IMPLEMENTATION OF INCENTIVE MEASURES AND CONTEXT

4.1 Identification of actual or planned incentive measures

It is currently known that while approximately 10 Bandalgoms are estimated to live on Mount Chiri without detailed information on their habitats in general, a couple of poaching teams are still active. Under such circumstances, it is urgently required that visible protection measures be implemented; to which end, the following, mainly disincentives, have been undertaken along with efforts to remove the perverse incentives.

4.1.1 Actual incentive measures

Action 1 Introducing incentive measures

Since the punishment prescribed by existing related laws and rules are relatively mild, the MOE revised the Natural Environment Conservation Act. It includes various incentive measures such as a sharp increase in fines and heavier punishment, new items prohibiting distribution and advertisement, and a legal foundation for positive incentive measures, etc. Forestry Administration also began redirecting afforestation policies in a direction more favorable to biodiversity conservation.

Action 2 Formation of ecosystem protection groups and their financial support

Since poachers are professional, only retired and/or current hunters could stop them. The MOE therefore encourage them and related countries to form ecosystem protection groups on major counties around Mount Chiri. The groups formed have been financially supported by the MOE's fund for the NGOs. Their missions are to have currently activating poachers given up, to remove snares and traps, and to monitor the status of the Bandalgom.

Action 3 Strengthening penal regulations

The punishment for poaching is based on the Cultural Property Protection Act, the Birds and Mammals Protection and Game Act, and the revised Natural Environment Conservation Act, which is stricter. It is requested that inns, lodges, motels and hotels report the suspected poachers to related institutions. Accused poachers are subject to strict law enforcement. In addition to this, their lists will be made public after identifying the distributors and consumers who request the poaching of Bandalgom.

Action 4 Constructing an eco-corridor

As part of the Nationwide Green Networking Plan launched in 1995, an eco-corridor is under construction on Mount Chiri to connect divided habitats.

Action 5 Removing facilities that disturb wild animals' freedom of movement

Since some roadside facilities can be barriers to moving wild animals, they have been removed from some of the places where wild animals traveled

Action 6 Control of hiking routes

Hiking routes on Mount Chiri were controlled during the winter to prevent poacher's from tracking the Bandalgom's footprints in the snow. This was implemented by the National Parks Authority (NPA) and monitored by the local ecosystem protection groups.

Action 7 Strengthening gun control

Since gun shops are known to often play a role as a bridge for poaching, police and the local ecosystem protection groups began to strictly controlling gun shops' gun management.

Action 8 Providing food for wildlife

The NPA provided wildlife with food between January and February, and undertook a continuous survey of the Bandalgom habitats.

Table 3. Classification of Incentive Measures

Positive incentives	<ul style="list-style-type: none">- Public land purchase- Species enhancement schemes- Customary cultivation of species- Incentive payments for environmentally sound farming, environment cleaning facility establishment, and eco-tourism- Financial support for conservation- Covenants/conservation easement
Disincentives	<ul style="list-style-type: none">- User fees- Non-compliance fees- Fines for damages- Environmental liability
Indirect incentives	<ul style="list-style-type: none">- Property rights mechanisms- Forestry offsets
Removal of Inappropriate or perverse incentives	<ul style="list-style-type: none">- Reform of fines and regulations- Reduction of agricultural products price support- Strengthening Environmental Impact Assessment- Redirection of afforestation policy

4.1.2 Planned incentive measures

Plan 1 Formation of resident patrols

Since the revised Natural Environment Conservation Act provides the legal foundations for the formation of ecosystem protection groups to protect endangered species, the groups will be stimulated with more law enforcement power and greater financial support. Accordingly, the MOE plans to continuously increase ecosystem groups and support them. The residents patrols will also be formed in order to protect not only the Bandalgom but also the ecosystem in general.

Plan 2 Continuous implementation of countermeasures against poaching

Countermeasures against poaching will be continuously undertaken in association with local governments, the NPA and local people until poaching disappears. It will focus on intercepting the relationship between wild edible greens-pickers and poachers.

Plan 3 Establishing more eco-corridors on Mount Chiri

Additional construction sites will be determined by the MOE in association with the NPA and local ecosystem protection groups. In addition to constructing eco-corridors, appropriate facilities will be substituted for guard rails and U-type ditches which are barriers to wild animals. Enlarging and paving unpaved roads on Mount Chiri will basically be prohibited.

Plan 4 Food supply in winter

The NPA, in association with local ecosystem groups, will supply food for wildlife in winter. The MOE will also support food supply using the fund for ecosystem conservation.

Table 4. Urgent and long-term measures of each institutions

	Urgent	Long-term
Ministry of Environment	- Summarization of urgent measures - Organization of a team for removing snares and traps	- Summarization of prevention activities - Support NGOs - Amendment of the Natural Environment Conservation Act - Construction of eco-corridors
Ministry of Home Affairs	- Control of the people who enter the mountain with guns after November - Strengthening control activities to catch poachers - Removing snares and traps	- Food supply for Bandalgom - Removing guard rails from places where wildlife pass through - Supervision and prosecution of poachers
Ministry of Justice	- Summarization of prosecution of poachers - Adoption of strict penal regulations to poaching	
Ministry of Culture and Sports		- Protection of natural monuments
Forestry Administration	- Control of poaching	- Protection of mammals and birds
Local governments	- Removing snares and traps - Support local ecosystem protection groups	
Police	- Prosecution of illegal hunters - Strengthening gun management	- Control of people who enter the mountain without permission after November
NGOs	- Removing snares and traps - Playing a role as voluntary watchdogs	- Ecosystem survey

Plan 5 Education and public information for the people

To make people in local communities realize the importance of nature conservation on Mount Chiri and its utilization, it is planned to educate them through schools, community meetings, etc. and to stimulate public relations.

Plan 6 Making natural property

It is planned that the ecosystem of Mount Chiri and the Bandalgom should become natural property profitable to the local communities rather than being mere conserved. For this purpose, the Bandalgom will be designated as the local governments' symbolic species, as well as being utilized for ecosystem education and eco-tourism by building an onsite nature museum should the number of Bandalgom increase.

Plan 7 Foundation of the fund for ecosystem conservation

The fund for ecosystem conservation will be founded by the revised Natural Environment Conservation Act and will support local governments in order to encourage the conservation of the ecosystem. The local government will use the funds to educate local people, establish environmentally sound nature-using facilities, and make systematic research improvements on the ecosystem.

Plan 8 Introduction of the cost-sharing/management agreement

For areas with abundant biodiversity or substantial habitats for endangered wild fauna and flora, the MOE will make contracts with land-owners to change cultivation types, create wetlands and reduce pesticides by appropriately compensating for losses ensued by maintaining the contract.

4.2 Identification of stakeholders

4.2.1 *Winners and losers before implementation of the incentive measures*

Winners can be defined as all the agents involved, from the early stage of poaching to its consumption, including poachers, consumers, distributors and information providers, etc. Those who have benefited from development projects, such as road and dam construction, etc., that did not consider the ecosystem would be included in the category of the winners.

On the other hand, losers include: firstly the ecosystem, in the sense that the endangered status of the highest-ranked species which possibly disturbs the ecosystem; secondly, the public, in the sense that they will bear additional social costs due to the conservation of the endangered status of public property; and, lastly, local community people. The general public does not pay proper attention to the Bandalgom, since the current status of the keystone species is thought to be due to the provision of information to only a small number.

4.2.2 *Winners and losers after implementation of the incentive measures*

After implementation of the various incentive measures, it appears that the positions of winners and losers before the implementation will switch.

5. POLICY RELEVANT CONCLUSIONS

5.1 Lessons learned

The conservation of ecosystem is an issue of not only the country but also the people. Local people provide the basic protection activity. Local ecosystem protection groups for the Bandalgom are successful local NGOs. They contributed to stopping poaching and encouraging local people's awareness of protection, which leads their neighbors to form similar NGOs. We learned that local NGOs were very important in protecting the ecosystem

The people and the press recognized that the Bandalgom still live in Mount Chiri, and they were already almost endangered during the protection process. The protection process made them realize that the urgent and long-term protection programs were required. The press therefore asked the government to strengthen regulations related to ecosystem conservation, and eventually the Natural Environment Conservation Act was revised. The Korean government has demonstrated a strong will to protect Bandalgom by arresting a few poachers at the end of last year, which was subsequently announced in the press to arouse poachers' attention. The press are also very important in protecting the ecosystem.

The main underlying causes of the current endangered status of the Bandalgom in Mount Chiri can be summarized as follows:

- overestimation of Bandalgom gallbladders
- lack of special attention to endangered species;
- lack of habitat protection efforts;
- lack of ecosystem surveys;
- lack of habitat management and restoration;
- lack of poaching prohibition efforts;
- distorted public awareness;
- lack of an inter-agency cooperative system;
- lack of experts.

Many of above causes have been removed through the implementation of various incentive measures for the protection of the Bandalgom by the MOE. Especially, the President's special attention achieved active cooperation by the related institutions. This led to a reduction of the number of poachers and obtained local community cooperation.

They are, however, temporary and provisional measures to urgently protect the Bandalgom. More systematic and scientific policies and their implementation are required. In other words, reconsideration of the existing and planned protection programs are strongly recommended on the basis of various data derived from both natural and social scientific approaches.

5.2 Transferability of the experience

The experiences of the implementation of various incentive measures for the protection of the Bandalgom in Mount Chiri could be useful to related policies for other endangered fauna and flora. Since the Bandalgom are the highest-ranked species in Mount Chiri, it implies that the protection programs should include the protection of lower-ranked species of food chain system.

The public has seen the results of indiscreet poaching and development during the process of undertaking various measures to protect the Bandalgom. These lessons will be used as policy references in order to request the reconsideration of a number of current and planned developments.

5.3 Possible policy recommendations for implementation

Since the conservation of the Bandalgom is important for judging the success of Korean ecosystem conservation policies and the sustainable existence of the national symbol animal, more thorough conservation policies are required. The followings are recommended as desirable conservation policy for future implementation.

Introducing effective incentive measures

First of all, the existing penal regulations should be reinforced to remove negative incentives to poaching. Those who are related to Bandalgom poaching, from its demand to its supply, such as poachers, distributors and consumers, should be punished through stricter penal codes. Based on the WTP for the protection of the Bandalgom in section 4.2, the penal regulations should be greatly strengthened.

Conservation of wildlife protection policy

The revision of protection policies for endangered wildlife is required. The direction of policies should be converted from the protection of the species itself to the protection and management of the whole ecosystem, including the species. The implication is that there should be the conservation and management of one species as well as integrated ecosystem management that considers the entire food chain system. Therefore, the development of integrated ecosystem protection technology, such as the management of protected areas, is necessary

Other important things are the survey of ecosystems and the designation of protected areas. Both intensive surveys by experts and long-term surveys by survey monitors are necessary. The number of survey monitors should be increased since the best choice is to continuously monitor onsite. The ecological data collected should be put in order using GIS so that it may be used by the public and the government at any time. The major habitats should be designated as protected areas and unquestionably preserved.

It is also necessary to artificially increase the number of Bandalgom sufficiently in order to maintain an appropriate population of the species itself, in addition to serving social, economic and cultural needs.

Strengthening environmental impact assessment (EIA)

EIA is essential to protecting the ecosystem. Since the current assessment does not take into account any economic indicators during the policy-decision process because it focuses on the natural scientific approach, the derived policies have the possibility of having negative effects on the ecosystem in general. The social scientific approach should be taken in order to harmonize both development and conservation scientifically and rationally during the EIA process.

The activities affecting habitat changes can be prevented through the EIA process. Such activities as dam construction, road construction, hunting, timber felling, recreation, etc. should be restricted partially or completely around protected areas. Some consideration of economic factors is also required.

Strengthening inter-agency cooperation

Inter-agency cooperation is very important to effectively protect the Bandalgom because the government functions for nature conservation are decentralized in Korea. It is impossible that each of them can independently protect and manage the endangered species. The utilization of current resources and the organization of a joint committee to protect the Bandalgom is therefore required. Nature conservation policies should be integrated into land use plans, forestry policies, agricultural policies and national park policies in the long-term.

Education and public relations

The public should reform their concept of the Bandalgom. The Bandalgom is not for our health but for natural harmony and our future generations. Scientific information on the effectiveness of bear gallbladders should be announced accurately to the public so that they do not misunderstand them. Educational programs for raising public awareness of endangered species is also required.

The maintenance of a close cooperative relationship with the local communities and people is very important to protect the Bandalgom effectively. It is therefore necessary to make the local communities and people recognize that species protection is directly linked to their benefits through developing various programs, including supports for them. Various measures to promote NGOs' voluntary watchdog activities should be taken.