

Challenges of the Coastal Use Fee and Levy System in Korea

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ABSTRACT

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Economic incentives in coastal management aim to prevent a coastal zone from being damaged or abused by the activities of specific users, and to induce socio-economically sustainable use of the coastal zone. The Korean marine environment budget was about 200 billion KRW in 2015, but the amount collected annually through marine environmental levies was only 8 billion KRW (by the income of the fisheries development fund in 2014). The levied amount from coastal users is significantly lower than the negative external effects (such as environmental damage) caused by marine use. Therefore, it is necessary to improve the use fee and levy system such that it can contribute to a socially desirable marine utilization level and secure finance for governmental coastal management. The performances and problems of the current coastal use fee and levy system in Korea were analyzed through case studies over 10 years and advanced alternatives based on ecosystem services and regulatory efficiency were made. The results provide suggestions for the improvement of the present coastal use fee and levy system.

ADDITIONAL INDEX WORDS: *coastal use fee, marine levy, marine ecosystem services, economic incentives*

INTRODUCTION

As the demand for the use of marine resources and spaces is increasing, so is the burden on the state from environmental costs. Every year, the Korean Ministry of Ocean and Fisheries (MOF) has invested more than \$200 million in the marine environment budget to manage and restore the ecosystems of coastal areas that have been damaged by development and overutilization (MOF, 2016). The use of common goods, including marine resources, can generate economic externalities such as ecosystem damage. Moreover, excess use of common goods accelerates negative externalities. Economic incentives, which are one of the measures used to reduce externalities, ensure that users shoulder the burden of the negative external costs that are caused by their activities. Marine use fee and levy, as an economic incentive, can have a significant impact on users' activities. However, the actual burden on marine users in Korea from marine use fee and levy is very low. In fact, based on Fisheries Development Fund (FDF) income, the annual levy from marine environment-related dues was only 6.4 million USD in 2016. This is due to the fact that the current standard rate for marine use fee and levy is insufficient to reflect the value of the target area or its impact. In particular, the tax rate is very low compared with other charges such as for forest utilization. The low tax burden of marine use is likely to lead to higher demand for development. In addition, as tax is not

collected at an adequate rate, there are a lack of funds for local or central governments to carry out voluntary restoration and management projects.

Therefore, it is necessary to improve the use fee and levy system so that it can contribute to keeping marine use at a socially desirable level and ensure financing for government management schemes, while considering various characteristics based on the value of ecosystems. To this end, 10 years of case studies were employed to analyze the performance and problems of the current coastal use fee and levy system in Korea and to suggest advanced alternatives based on ecosystem services and regulatory efficiency. The analysis focused on the "Occupancy and Use Fee of Public Water Surface" (OUFP), which is a fee related to marine utilization, and the levy "Cooperation Charge on Conservation of Marine Ecosystem" (CCME). Based on a review and analysis of the current marine use fee and levy system, an expert Delphi opinion survey on major problems was conducted and ways to improve the system are suggested.

CURRENT ISSUES

The following sections introduce the marine use fee and levy system and present an analysis of its status over the last 10 years.

General Status

Under the current law, "levy" means the obligation to pay money other than tax imposed in accordance with the law related to a specific public service (Article 2 of Framework Act on the Management of Levy). A levy is used to meet the cost for a specific service rather than general financial demands, and it is necessary that the object of the levy and the specific public service are closely related. As of the end of 2015, 94 levies were

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charged and collected by Korean government departments. Among these, environmental levies are mainly raised by the Ministry of Environment (23ea), the Ministry of Maritime Affairs and Fisheries (7ea), and the Forest Service (2ea). Levies can be classified, based on the purpose of the policy by which they were created, into 4 categories: ① to discourage the discharging of pollutants, ② to promote environmental resource conservation, ③ to promote recycling, and ④ to cover the expense of a specific service. Table 1 shows levies classified using this system.

Table 1. *Types of environmental levy in Korea*

Purpose of policy	Related levy	Related law
To discourage the discharging of pollutants	Emission Charge, Environmental Improvement Levy, Waste Levy	Water Quality and Aquatic Ecosystem Conservation Act, Environmental Improvement Cost Liability Act, Act on the Promotion of Saving and Recycling of Resources
To promote environmental Resource conservation	Quality of Water Improvement Levy, Water Use Levy, Cooperation Charge on Conservation of Ecosystem, Levy on Exclusive Use of Mountain Area	Drinking Water Management Act, Act on the Improvement of Water Quality and Support for Residents of the Hangang River Basin, Natural Environment Conservation Act, Mountainous Districts Management Act
To promote recycling	Charge on Recycling, Charge on Recovery of Waste materials	Act on the Promotion of Saving and Recycling of Resources, Act on Resource Circulation of Electrical and Electronic Equipment and Vehicles
To cover the expenses of a service	Charge on Wastewater Dischargers	Sewerage Act

In order to impose a levy, one condition is to satisfy the legal requirements set out by the Act on the Management of Levy, which are as follows: i) the administrative agency are authorized to impose monetary burdens under individual laws; ii) the person(s) who are charged are relevant to specific public services; iii) the levy is imposed as prescribed by law; iv) the levy is charged separately from tax. Moreover, it is necessary to satisfy the constitutional requirements established by the Constitutional Court(2008), namely: i) the levy should be imposed only on those who have a distinct identity within the public and who can be understood as a specific group; ii) imposition of the levy should be particularly, objectively, and closely related to the relevant specific economic and social services; iii) the levy should be imposed on groups that are responsible not only for taxes, but also for other contributions to the performance of specific public services; iv) the income of the levy should be used for the collective benefit of the persons to be charged.

On the other hand, the legal requirements to impose a fee are as follows: i) there should be legal grounds for charging the fee; ii) a government entity such as a state or local government should be able to manage and provide the public facility or

property concerned; iii) the person to be charged the fee should use the public facilities or property provided by the government entity and obtain the benefit.

Overview of Coastal Use Fee and Levy System

The Coastal Use Fee and Levy System can be regarded as a monetary, non-tax financial obligation that is borne by the entity that uses and develops the marine area, such as companies engaged in industrial activities. In other words, this system includes the levies and the fees related to using the sea. The system comprises three levies (CCME, marine environment improvement levy, levy on usage of deep sea water in levies) and one fee (OUFP). CCME imposes on who do development project that have a significant impact on marine ecosystems or cause a decrease in marine biodiversity, such as development projects in public water surface that need EIA(Environmental Impact Assessment), collecting aggregate over 50 million m³ etc by Article 51 of Conservation and Management of Marine Ecosystems Act. Imposed amount is calculated as follows:

Imposed Amount = 0.25USD/m³ × zone coefficient (port : 2, non port : 4). OUFP imposes on who intend to occupy or use the public waters for a certain period of time in 10 types as follows by Article 13 of Public Waters Management and Reclamation Act(PWMR Act). At first, any person who intends to perform act one of those types shall obtain permission for occupancy or use by Article 8 of PWMR Act.

Table 2. *Types and Rate of Occupancy and Use Fee of Public Water Surface*

Type		Rate and Imposing Unit	
		% of land price (m ²)	Others
1. Artificial structure	1.1. Pier, Revetment, Lighter's wharf, Breakwater	3.0 %	none
	1.2. Coastal road	1.5%	none
	1.2.1. Marine bridge deck	0.5%	none
	1.2.2. Undersea tunnel		
	1.2.3. Over the water (Cable car, power line)	1.5%	none
2. Slipway, Quay wall		1.0%	none
3. Drawing sea water	3.1. Electric power plant	none	200,000 KRW per m ³ /sec per year
	3.2. Others	none	100 mm - 800 mm diameter of pipe : 100,000 - 600,000 KRW per month
4. Aggregate		none	20- 30% of average wholesale price per m ³
5. Planting of plants		0.25 - 0.5%	none
6. Floating material		0.5 - 1.0%	none
7. Extraction of minerals		5 - 15%	none
8. Emission of dredged soil		none	100 KRW per m ³

9. Others (swimming pool, skating rink, playground, etc)	5%	none
10. Indirect use	0.5%	None

Source: Article 8 of PWMR Act

METHODS

The status of the coastal use fee and levy system was analyzed from January 2007 to December 2016, specifically the user characteristics and utilization types of the CCME and OUPF. The source of data for analyzing CCME was retrieved from the MOF in Korea, while OUPF was retrieved from data of the MOF Coastal Portal. The Delphi-expert surveys were employed in order to assess problems and estimation factors of each system. Delphi, in contrast to other data gathering and analysis techniques, employs multiple iterations designed to develop a consensus of opinion on a specific topic(Hsu & Sandford, 2007). Expert opinions were collected through conducting several focus group interviews on 9 professionals, who gave feedback on how to develop a calculating system and suggest applicable evidence.

RESULTS

The results are presented in three sections: the first on the conservation levy, the second on the utilization fee, and the third on expert feedback.

The various marine activities can be categorized into three types: natural resource use, exclusive use of areas, and marine emissions. The specific activities in each of these areas are listed in Table 3.

Table 3. *Types of marine activities*

Object	Types	Activity	Description	
↑ I E E ↓	↑ U C G	Natural Resource Use	- Seawater pumping - Aggregate/mineral/ crude oil/gas extractions	Behavior which directly takes resources other than fisheries resources from public water surface
		↓ Exclusive Use of Areas	- Landfill - Installing artificial facilities - Excavation and dredging - Plant cultivation - Floating materials - Occupying space to use natural resources	Behavior which occupies certain areas of public water surface for development
	↓ Marine Emissions	- Emission of dredged soil and dirt - Discharge of thermally polluted waste water - Emission of marine polluted materials	Behavior which can change water quality and ecosystems by emitting specific substances, and in doing so could transform the form of public water surface	

IEE: internalizing environmental externalities; UCG: using common goods.

Cooperation Charge on Conservation of Marine Ecosystem

As shown by Table 4, the area covered by the CCME was 181 km², and the amount raised by this levy was 699 million KRW. There were 156 governmental payers, which accounted for 271 million KRW, while the civil sector was charged 425 million KRW. In terms of utilization type, the number of landfill was 10 while there were 211 partial landfills.

Table 4. *Overview of Marine Ecosystem Cooperation Fund payment, by user type and utilization type analyzed from 2007 to 2016*

Category	Payers		Area		Charge	
	Number	%	km ²	%	100 mill. KRW	%
User type						
Total	439	100	181	100	696	100
Governmental	156	35.5	68	37	271	39
Private	283	64.5	113	62	425	61
Utilization type						
Total	443	100	181	100	696	100
Landfill	10	2.3	9	4.8	33	4.8
Partial Landfill	211	47.6	114	62.9	384	55.2
Others	222	50.1	58	32.3	279	40

Occupancy and Use Fee of Public Water Surface

As of 2016, the total number of permits issued was 3,911. As can be seen in Table 5, almost 3329 million KRW for these permits was charged to the private sector, meaning that the majority of permits were used by the private sector. In terms of utilization type, the number of artificial facilities was 2,937, which accounted for 3102 million KRW. The area of sand and rock material extractions covered by permits was 15 km², which was 51.2% among all categories.

Table 5. *Overview of Occupancy and Use Fee of Public Water Surface payment, by user type and utilization type as of 2016*

Category	Payers		Area		Charge	
	Number	%	km ²	%	100 mill. KRW	%
Total	3,911	100	304	100	3,412	100
User type						
Governmental	724	18.5	29	9.5	83	0
Private	3,187	81.5	275	90.5	3,329	100
Utilization type						
Artificial facilities	2,937	75.1	76	25.1	3,102	90.9
Excavation and dredging	52	1.3	10	3.3	7	0.2
Submerged land composition	9	0.2	5	1.5	-	0
Seawater drawing and drainage	550	14.1	0	0.1	269	7.9
Sand and rock Material extraction	91	2.3	156	51.2	0	0
Plant cultivation	65	1.7	42	13.9	0	0
Dumping stone	11	0.3	10	3.4	0	0
Use of facilities by state and local government	36	0.9	1	0.3	26	0.8
Mining	6	0.2	0	0	0	0

Others	154	3.9	4	1.2	7	0.2
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Results of Expert Survey

First, regarding the question of “whether fee/levy should be adjusted in accordance with the purpose of marine use fee and levy system,” the professionals responded that it is highly necessary (on average 4.33 points out of a possible maximum 5; 1=not important, 2=less important, 3=neutral, 4=important, 5=quite important). As shown in Table 6, in terms of managing coastal use (use of common goods), seawater pumping was deemed the most appropriate activity to regulate, while in terms of coastal environmental damage (externalities), emission of marine polluted matter and soil dredging were named.

Table 6. Expert assessment of appropriateness of implementing a fee/levy on coastal activities, for the purpose of managing use of common goods (UCG) and internalizing environmental externalities (IEE)

Coastal activity	Charging Purpose	
	UCG (%)	IEE (%)
Drawing seawater	100	11.1
Aggregate and mineral extractions	88.9	66.7
Landfill	66.7	88.9
Artificial facilities (fixed)	77.8	55.6
Artificial facilities (floating)	77.8	44.4
Excavation and dredging	44.4	77.8
Plant cultivation	66.7	44.4
Emission of marine polluted materials	22.2	100
Emission of dredged soil	22.2	100

Note: The ratios reflect the evaluation of nine experts, i.e., when all experts responded that it regulating the activity was appropriate for this purpose, it is expressed as 100%.

Table 7 illustrates the experts’ opinion that for the purpose of managing use of common goods (UCG), profitability of the type of use was considered to be the most crucial factor. When the purpose is to internalize environmental externalities (IEE), the most important factors were the environmental impact of the activity and the ecological characteristics of the marine area.

Table 7. Estimation of key factors for setting marine use fee and levy system for the purpose of managing use of common goods (UCG) and internalizing environmental externalities (IEE)

Considering Factors	Charging Purposes	
	UCG(%)	IEE(%)
① Environmental Impact of Development	11.1	77.8
② Ecological Characteristics of the Sea area	11.1	22.2
③ Profitability of Development Type	66.7	0
④ Location of the Sea Area	11.1	0
⑤ Others	0	0
⑥ No response	0	0

The experts also responded that it is appropriate to consider the level of impact occurring from development of the sea area when setting rates in a marine use fee and levy system (4.33/5). Moreover, they expressed that it is appropriate to set varied targets for desired level of development, in accordance with the recoverability of different marine environments (3.89/5).

DISCUSSION

Table 8 gives an overview of the main findings regarding challenges of the current marine use fee and levy system, which gives scope to suggest improvements to the system.

Table 8. Challenges for the Korean marine use fee and levy system

Types	Challenges
CCME	- Standard based on the value of marine ecosystem services - Consideration of marine space characteristics
OUPF	- Expansion of imposition types - Separation between resource utilization and occupation of space on public water surface

CCME: Cooperation Charge on Conservation of Marine Ecosystem; OUPF: Occupancy and Use Fee of Public Water Surface

Improvement of the Imposition System

OUPF should be reorganized into a fee system focused on occupancy of public water surface, from its current complex form of exploitation of aggregate and mineral. If a sustainable use of resources is to be maintained, it is necessary that the purpose of any charges is clearly demonstrated. In addition, it is necessary to apply the principle that the user pays, in order for the placement of the financial burden to conform to the purpose of the system. Social and environmental costs should be separated as levy. CCME aims to collect environmental costs for large-scale utilization and development projects. Therefore, it is imposed according to the polluter-pays principle. For the use of resources, it is necessary to impose a standard on the basis of the amount of the resource rather than in terms of the area damaged. The present lump sum system (one-time imposition) of CCME must be improved to a periodic imposition system in accordance with the nature of the project.

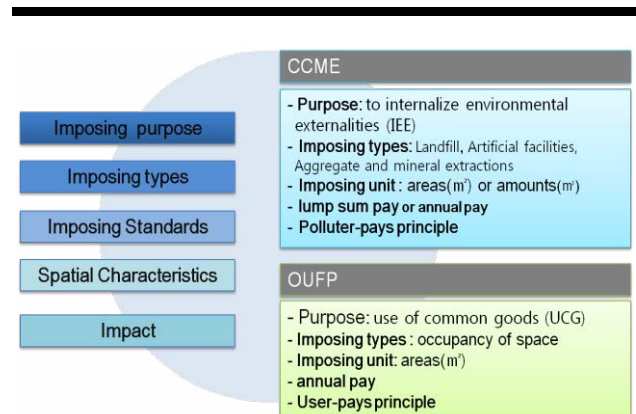


Figure 1. Improvement of marine use fee and levy

Considering Marine Spatial Characteristics

There are many criteria on which marine areas can be divided, for example physical, topographic, and ecological environments; marine usage and functions; and marine habitats. To classify ocean space, countries such as the United States, the United Kingdom, and Canada have established marine life classification systems and marine life maps based on various criteria (Choi,

2009; Maes J. *et al.*, 2013; McBreen *et al.*, 2011; Roff & Taylor, 2000).

Such spatial information serves as an important criterion on which an appropriate approach to managing each marine habitat or ecosystem can be established and the effects of human activities on the habitat or ecosystem can be examined. There has, however, been no consistent and generalized system for classifying marine ecosystems or habitats throughout the seas in Korea, although it is possible to identify the distribution of a certain ecosystem throughout the ocean space.

Marine environments and other ecological features including spatial information are one of the important factors that have to be taken into account in the case of taxation of the marine sector. As a method of classifying the ocean space that considers domestic circumstances, it is necessary to identify a typical marine ecosystem in need of protection, to establish spatial information on the identified ecosystem, and to utilize the data. The most typical marine ecosystems of Korea are tidal flats and *zostera marina* habitats, so damage to or loss of these two ecosystems can result in substantial decrease in the benefits human beings obtain from the sea. It is, therefore, necessary to conduct research into these two spaces and produce a map for them.

Table 9. *Marine spatial characteristics*

Type	Characteristics
Marine ecosystem	- Representative marine habitat : tidal flats, estuaries, habitat of <i>zostera marina</i>
Socio-economic	- Marine protected areas and coastal conservation zone

Consideration of the Intensity of Use

Marine ecosystems are adversely affected by diverse activities of humans using the ocean. As the adverse effects are dependent on the intensity of the activities, it is necessary to take this into consideration when preparing criteria for calculating the coastal use fees and levies. The intensity of the marine activities should be judged based on the possibility of recovery of the marine ecosystem reflecting various factors such as marine physics, coastal and submarine topography, and fish and fishery resources.

For example, once excavation or dredging is performed, it is impossible to restore the original conditions due to loss of habitat of marine life as well as changes in the submarine topography. This is thus a very high intensity of use. On the other hand, if a structure circulated seawater, it could be seen as having a low intensity of use since coastal and submarine topography and floating and benthic ecosystems could be quickly restored to their original state.

Therefore, it is necessary to assess the intensity of marine activities through research and investigation in order to set appropriately graded fees and levies and achieve the objective of placing environmental costs on the relevant user.

CONCLUSIONS

In an atmosphere of ever-increasing demands on the marine environment, a system must be implemented that effectively manages the sea as a common pool resource and correctly

internalizes environmental externalities. In order to improve the marine use fee and levy system in Korea, the current legal requirements and the current status of marine use and development were reviewed. An expert analysis, using the Delphi method, was conducted to identify the standard characteristics of the marine use fee and levy system. The results provide suggestions for the improvement of the present coastal use fee and levy system.

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