

Issues on the Introduction of Zoning System onto Korea's Coastal Areas

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Abstract: The Korean government are enacting '(tentatively) Coastal Management Act' as part of its response to Agenda 21, United Nations Conference on Environment and Development in 1992 that encourages every coastal state to apply the concept of integrated coastal zone management(ICZM). The tentative Act is likely to introduce zoning system onto the coastal area as main component to pursue the protection and sustainable development of the marine and coastal environment and its resources.

Zoning system is the major technique for implementing land use objectives and policies in many countries and Korea has adopted a nation-wide zoning scheme since 1972. However, zoning in the coastal area will be quite different from that of terrestrial-oriented area, because coastal and marine area is unique and different environmental characteristics from land area. This requires an elaborate preparation for applying zoning system onto coastal area in Korea.

This paper, therefore, aimed to analyze the possibility of zoning system in Korean coastal area with emphasis on finding and evaluating critical issues to be considered, when Korean government works on coastal zoning scheme. In this paper, eight factors had been identified and analysed. Among them, lack in data and information of coastal and marine area will be the major obstacle to immediate application of zoning system. Also, the position of Coastal Management Act

(tentatively) in the hierarchic scale that will regulate coastal zoning system will be one of most difficult tasks in a practical sense. Considering this situation, it is recommended an application of zoning system in a demonstration site is needed, that will ensure the success of application of zoning system for sustainable development of coastal resources.

I . Introduction

Agenda 21, United Nations Conference on Environment and Development (UNCED) in 1992 encourages every coastal state to apply the concept of integrated coastal zone management (ICZM) at the national and local levels to pursue the protection and sustainable development of the marine and coastal environment and its resources. In response with this recommendation, the Republic of Korea launched the Ministry of Maritime Affairs and Fisheries (MOMAF) in August 1996 to manifest its strong will for establishing a coordinated and integrated coastal and marine policy. Ever since, the Ministry has been in motion to enact 'Coastal Management Act' (tentative) where the direction of national integrated coastal management policy will be set out. The Act will cover establishment and implementation of coastal management plan, structure and function of Coastal Management Committee, implementation of coastal projects, especially in hazardous areas, and conflicts reduction and resolution mechanism. As the main tool for an effective and rational use of land resources and conflicts resolution system among multiple uses, the introduction of zoning system onto the coastal and marine areas has been under consideration.

Zoning system is the major technique for implementing land use objectives and policies.¹⁾ Korea has been applying a nation-wide zoning scheme for national land use planning since 1972 and the current system, amended most recently in 1993, has introduced five categories to effectively use land resources. One of the major reasons for this amendment in zoning scheme was to ensure more efficient

1) United Nations, p. 82.

management of national land resources by simplifying the zoning scheme and to implicitly accommodate the notion of sustainable development which lies in the principles of UNCED.²⁾ However, In spite of such efforts by the Korean Government, the current scheme has some problems, especially from the viewpoint of integrated coastal zone management. Mainly, as the current system is still a land-oriented zoning system³⁾. It would not play its role as the major component for an effective use of coastal area that requires an integrated approach across the land/water interface. In this connection, policy decision makers anticipate that the introduction of zoning system onto coastal area is immediately needed. As zoning, in a traditional sense, is a mechanism that creates certain public rights over private land to safeguard the interest of the public, it will be very powerful tool for land use management. It also serves as a tool for managing the conflicts that arise from the different priorities of different institutions in a sectoral coastal management system. At a first glance, zoning seems to be easy to implement. However, it may be too rigid and lacks in flexibility. It will be costly to correct a poorly introduced one and difficult to return it to where it used to be. Moreover, zoning in the coastal areas will be quite different from that in the terrestrial areas, because coastal areas have unique and different environmental characteristics from land. Therefore, it will need an elaborate preparation for applying zoning system onto coastal area. Without these efforts, the zoning would not function in an anticipated manner.

This paper aims to analyze the possibility of applying zoning system in Korean coastal area as a key component of Coastal Management Act to be enacted in the near future. To this end, the paper will find and focus on analyzing critical issues that will arise from the application of zoning system onto coastal area. This requires a logical and practical analysis. This paper also deals with the existing zoning scheme that prevails across the world along with some logical aspects regarding zoning system.

2) UNCED has recommended coastal states to establish an integrated coastal zone management which adopts zoning as one of management tools.

3) Hundred percent of land area has been zoned, while, for water area, only 7.7 percent of Korea's territorial sea area has been zoned.

Literature survey reveals that there have been very few researches into zoning system associated with coastal zone management, ⁴⁾ although quite a lot of study have dealt with zoning issues in urban planning and land-use planning. In association with coastal zone studies, Nagao/Morikawa(1985) has built an allocation model of coastal resources in coastal areas, and Chang(1988) introduced the basic concept of zoning system for coastal zone management in Korea.

II. Overview of Zoning System in Land Area

The concept of zoning is very common throughout the world. The first zoning, in modern sense, is known to have been adopted in Germany for the protection of cities along the Rhine River in 1780,⁵⁾ followed by Prussian Industrial Law in 1845. The first zoning scheme applied for urban area was in California in 1885. Since then, most states and counties in America including New York have been adopting zoning system and many countries in the world have been utilizing zoning systems as a tool for a rational use of land resources, although they are a little different from country to country.

Zoning is the most significant scheme for controlling land use in most countries including United States. By zoning, authorities in charge of land resources divide a municipality into various zoning districts for which only specified uses, or combinations of uses, are allowed, such as residential, industrial, commercial or agricultural uses. Zoning limits particular activities to specified zones, and may be used in some cases to even completely ban certain uses from a municipality.

The purpose of zoning system has been found in a couple of approaches. One approach is based on property value theory, the other approach on planning theory. Many real estate owners, economists and law makers thought that zoning

4) The main reason for that seems to be that coastal zoning has most recently been a matter of concern in the context of ICZM.

5) Korea Planners Association, 1997, p. 117.

would help maximize the value of property right by detaching from the land hazardous components that might drop the value of land, in other words, by removing externality that might be generated when certain land is developed for undesirable use. Zoning system in this approach aims to prevent the decline in property value and to protect residential environment. The initial zoning system in the United States is included in this approach. Zoning regulation in the United States initially started as a tool to protect property values by controlling the infiltration of undesirable activities or races. This tradition still persists, although not very explicitly.⁶⁾ On the other hand, planning theory sees zoning system as a way of implementing comprehensive and long-term land use planning. Zoning in planning theory includes the function of zoning system to create positive externality by producing public amenity. This approach is frequently found among many European countries. To name a few examples; Local Action Area Plans in United Kingdom, P.O.S. in France, Destination Plans in the Netherlands, Bebauungsplan in Germany. Japan has adopted American model in land use planning, although the country has more similarities with European countries as to the size of land and other socio-physical situations. Korea also falls in American approach, as Korea's land planning was initially made in Japan's colonial period, and real substances of present scheme were formulated by its amendment. Today, planning theory is dominating over property value theory across the world.

It was under the Japanese colonial government that the concept of planning (zoning) in modern sense was first introduced onto the lands of Korea. The City Planning Decree of 1934 inaugurated a land use planning with four urban land use zones designated in the new towns of Najin and Jinhae, and two years later, in other major cities including Seoul.⁷⁾ In 1962, the Building Act and the City Planning Act were enacted by Korean government, but they were little different from the previous ones of the colonial times. The nation-wide zoning

6) Lee, Tai il, *Planning the Use of Land in Korea*, Land Policy Problems in East Asia toward new Choices, edited by Bruce, Koppel and D. Young Kim, 1993, p. 219.

7) Korea Planners Association, *Theory of Land Use Planning*, 1997, p. 119.

was adopted when there was major amendment of the City Planning Act in 1971 and the enactment of National Land Use Management Act in 1972, both of which has regulated land use planning and zoning in Korea since then. The National Land Use Management Act regulates zoning scheme as a whole on lands of Korea except zoning in city planning, which are covered by City Planning Act. Article 13 of the National Land Use Management Act enacted in 1972 prescribes a zoning system. When the Act was first introduced, it had six categories for zoning such as urban area, agricultural area, forestry area, industrial area, natural and cultural area and reservation area. When the Act was on a full scale amended in 1982, it adopted 10 categories and current scheme amended in 1993 has introduced five categories; agriculture and forestry area, natural environment conservation area, quasi agriculture and forestry area, urban area, and quasi urban area.

There are also many different zones, areas, districts designated by as much as more than 30 individual acts, for example, natural environment conservation areas and fisheries resources protection areas(see Table 2). However, they are designated within the zoning scheme under the National Land Use Management Act and the City Planning Act. It is noted that these two basic laws ruling land planning and zoning in Korea are dominated by the Comprehensive Plan for National Construction Act, which aims to achieve economic, social, and cultural development of the national territory, and to contribute therethrough to the enhancement of public welfare.

Table1. Chronology of land use planning and zoning in Korea

Year	Contents
1934	City Planning Decree enacted (Zoning scheme was first introduced)
1962	City Planning Act enacted
1971	City Planning Act amended (The first nation-wide zoning scheme was institutionally adopted)
1972	National Land Use Management Act enacted (6 categories in zoning scheme)
1982	National Land Use Management Act amended (10 categories)
1993	National Land Use Management Act amended (5 categories)

Table 2. Zones, areas, and districts designated by selected individual laws
(National Land Use Management Act and City Planning Act excluded)

Name of Act	Zones, Areas and Districts
Natural Park Act	Park Area Park Preservation Area
Special Act for Energy Sources Development	Energy Sources Development Area
Fisheries Act	Preservation Water Area Fostering Water Area
Fishery Resources Protection Act	Fishery Resources Protection Area
Submarine Mineral Resources Development Act	Submarine District
Public Water Reclamation Act	Public Water Reclamation District
Fishing Port Act	Fishing Port Area
Harbor Act	2 Areas including Harbor Area
Sea Pollution Prevention Act	Special Management Area for Sea Pollution
Natural Environment Preservation Act	5 Areas including Marine Ecosystem Protection Area
Tourist Promotion Act	Tourism Area

III. Introduction of Coastal Zoning System : Needs, Principles and Process

The application of zoning system onto coastal areas which combines terrestrial area and water area is assumed to have taken place most recently, as the concept of integrated coastal zone management has emerged since early 1970's. Presently, several countries are known to adopt or attempt to adopt zoning in their coastal areas. In the United States, the initiating state of ICZM, a good example is found in Rhode Island which has 10 categories such as conservation area, high- and low-

intensity areas. Another example is shown in Cumberland, Maine which zoned the shoreland areas into four categories such as districts of resource protection, limited residential, general development, and stream protection. The People's Republic of China⁸⁾ is known to have divided the coast into functional zones⁹⁾. To this end, China has reportedly surveyed the coastal area extending 10km inland from the shore and seaward to the 15m isobath. India has divided shore land along the coast into four categories of zoning to manage coastal areas in accordance with the Indian Notification in Feb 1991. Also, a zoning experiment designed to improve the management of coastal waters quality is taking place on the French Mediterranean Coast. In 1994, the national marine research institute, IFREMER, and the Water Agency, "Rhone-Mediterranee-Corse," responded to the 1992 "water laws" demand for the creation of a management plan for each of the French drainage basin units. The three steps that have taken place so far are 1) breaking down the coastal zone (land/water) into functional units based on detailed criteria 2) classifying these units with regard to unit quality and risk levels and 3) establishing a geographic information system (GIS) for mapping and georeferenced data (still under development). It is known that this work has been implemented through consultation with the users and decision-makers concerned. This plan has given way to a global rethinking of waters monitoring strategy as a whole and as specific to each type of coastal unit.

As mentioned beforehand, since 1972, Korea has initiated a designation of zones for possibly all the pieces of land within the country and there was the latest

8) The State Oceanic Council (SOA) of China which carried out the National Coastal Zone Survey from 1980 to 1988 and began drafting ICZM law in 1983. China has also established a system of coastal ocean space utilization management. Combined with the degradation of the coast, the U.N. Conference on Environment and Development in 1992 has caused China to focus more on ICZM, and China's Agenda 21 notes that CZM shall be improved and a system shall be established to achieve sustainable development in coastal zone.

9) The purpose of zoning program is to map out China's coastal and marine areas according to the 'dominant function' of each area, for rational resource use and optimal benefits from this use. 'Dominant function' is broadly defined as a reflection of the major physical and social characteristics of the area. For example, Shanghai Municipality zoned its coastal and marine area into five categories that comprised of development zone, limited development zone, nature reserve, special-use zone and preservation zone. Yu, Huming, p.193.

amendment in zoning scheme in 1993. The major reason for 1993 amendment was to ensure more efficient management of national land resources by simplifying zoning scheme and to implicitly accommodate the idea of sustainable development in 1992 UNCED. However, In spite of these efforts by the Korean Government, the current scheme has some problems, especially from the viewpoint of integrated coastal zone management.

Mainly, the current system is still a land-oriented zoning system. For terrestrial area, 100 % of land totaling 99,548km² have been zoned into one of above-mentioned five categories, while, for water area, only 5,414km² have been zoned which covers 7.7 percent of Korea's territorial sea area of about 70,000km². (see table 3) The integrated coastal zone management for the sustainable development requires an integration between land and water areas along with integration of various levels of government, inter-sectional integrity and interdisciplinary integration.¹⁰⁾ As integration across the land-water boundary is fundamental in the concept of coastal management, understanding of the effects which traverse the land-water boundary is of great importance. Such transboundary considerations will ensure an integrated planning and management of activities on land and those on waters.

Table 3. Designated area of land under the National Land Use Management Act(as of May 1996)

Categories	Terrestrial Area	Water Area
A. Conservation Use	(57.6)	(88.8)
- Agriculture and Forestry Area	50.6	—
- Natural Environment Conservation Area	7.0	88.8
B. Conservation /Development Use	(27.4)	—
- Quasi Agriculture and Forestry Area	27.4	—
C. Development Use	(15.0)	(11.2)
- Urban Area	14.0	11.2
- Quasi Urban Area	1.0	0.0
Total	100.0% (99,548.1km ²)	100.0% (5,414.1km ²)

10) Robert K. Knecht and Jack Archer, 1993.

Secondly, the present system is a development-oriented zoning system. Among eight areas (zones, districts) covering both shore land and water areas such as Fishery Resources Protection Area, Facilities Protection District, Park Area, Harbor Area, Fishing Port Area, Special Pollution Management Area, Marine Ecosystem Protection Area and Resort Area, only three areas including Fishery Resources Protection Area, Special Pollution Management Area and Marine Ecosystem Protection Area have been designated for the purpose of conservation and preservation of natural environment.

Thirdly, all of the existing areas designated are for single use. Each class of area has received a single use designation such as agricultural use or industrial use. This traditional method is called Euclidean zoning.¹¹⁾ For more efficient use of land resource, especially for countries having limited national land including Korea, overlay zoning is recommended.¹²⁾ Overlay zoning, as opposed to Euclidean zoning is a new method which combines traditional and new technique.¹³⁾ For example, the imposition of special restrictions such as setbacks, retention of wetlands, designation of permitted land uses, may also be combined with traditional land use designations which could be used to allow greater construction density in parts of coastal fringe to encourage development of high priority facilities, such as commercial fishing piers or other maritime commercial uses. The French 1986 Loi Littoral is a good example of this combination of techniques.

Therefore, the current land-oriented and economy-oriented zoning system is assumed not to be adequate or sufficient to implement sustainable development in the coastal area. Moreover, socio-economic pressures on the coastal zone is ever increasing. In Korea, one third of national population lives along the coastal counties which is much higher population density than that of the whole country.

11) In 1926, a zoning system that was legitimated by the Federal Supreme Court and applied in Euclid village, Ohio, USA.

12) Sonja and Cullinan, p. 82.

13) In addition, exclusive zoning, incentive zoning, performance zoning, and others are introduced as new methods. For more details, see Korea Planners Association, pp. 376-385.

Gross regional product from coastal counties accounts for about 35% of whole country.¹⁴⁾ With the development of technologies to be applied in the coastal zone, the use of coastal waters is expanding. For these reasons, more complicated activities will take place in the coastal areas, so it is necessary to establish an order in the coastal zone by building up a zoning system that is applicable to coastal area from view point of ICZM.

Coastal zoning system shall involve three principles. Firstly, the system will have to ensure an efficient use of coastal zone, as coastal zone is an important resource having great economic implications for Korea with a very limited land area. Korea has relatively a long coastline of about 11,542km with more than 3,000 small islands and complicated coastline on the west and south. The area of continental shelf covering of 345,000km is about three times the national land area. However, with the intensive and multi-purpose development of coastal resources during past three decades, taking places are loss of critical marine habitat and fishery resources, continued degradation of coastal environment, decline of coastal water quality, and conflicts among users. These problems are closely related to the ineffectiveness of existing coastal governance system including the zoning system that does not encompass sustainable development of coastal resources.

Secondly, a coordinated use of land resources between national level and local level shall be ensured. In Korea, authority for zoning, land-use planning and regulation rests with central authority. Constraints on development set by the central government may receive a lukewarm reception in coastal communities because they often entail a loss of real income. Instead of having to depend on the funds from central authorities, local communities tend to favor uses and activities that generate income locally. For these reasons, conflicts between local and central authorities are often observed.¹⁵⁾

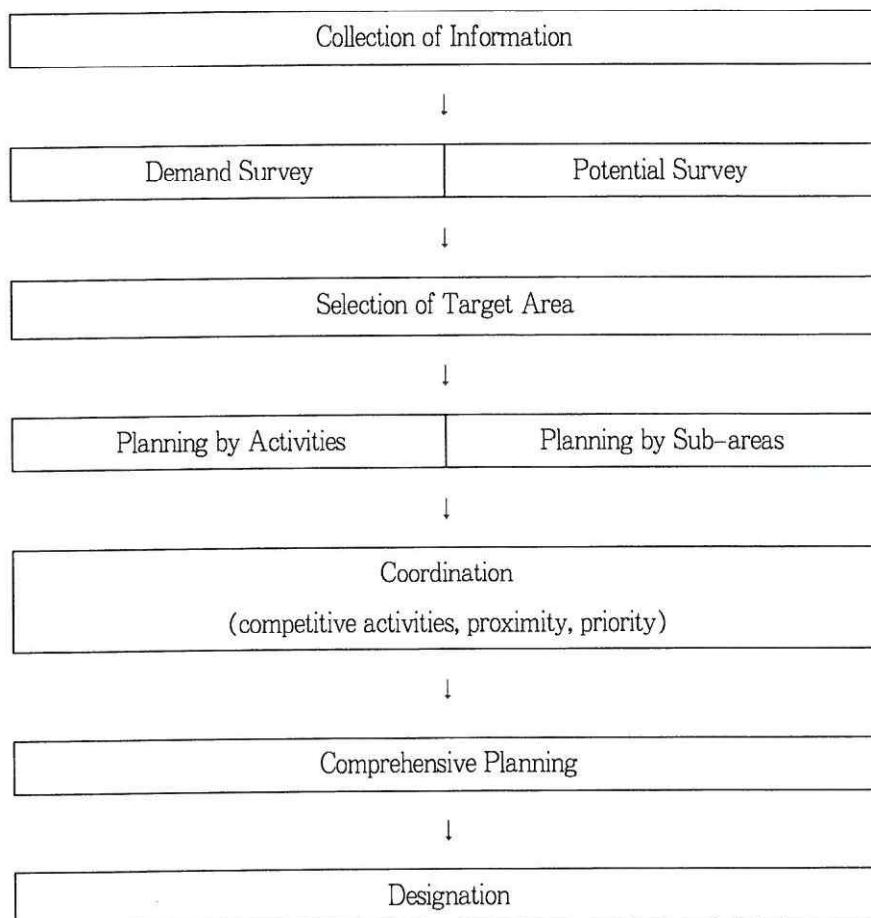
14) Here, the landward boundary of coastal zone was defined as cities and counties adjacent to coastal water and seaward coastal zone as extending three nautical miles from a baseline.

15) Sonja and Cullinan, p. 83.

Thirdly, a new system shall ensure harmonious uses between economic growth and environmental quality. During the past decades, Korea has emphasized the role of coastal resources and spaces for economic development and industrial needs. Economy-oriented use of coastal areas has resulted in degradation of coastal environment and in turn has damaged the sustainable development of coastal resources.

Zoning is a process comprising of several steps. The first step for coastal zoning is to collect data and information on natural environment and socio-economic environment. Based on these data, current situations of concerned area(target area) are addressed before identifying future demands and potentials of each activity such as fishing, recreation, and housing in the target area. Potential analysis is to evaluate factors affecting each activity such as natural environmental factors, socio-economic factors, and legal factors. The natural environmental factors include topography, gradient, type of coastline and so on. Good examples of socioeconomic factors are number of fishermen, and distance to major cities. Legal factors are concerned with institutional aspects of marine parks and fishery conservation areas. Land-use planning by activities is established based on the comparative analysis between demand and potential in the target area, which is also converted to land-use planning by sub-area. When there is an overlap among different activities, it can be coordinated by using competition matrix, proximity matrix, and priority matrix and the coordinated plan is called comprehensive land-use planning in the concerned area.¹⁶⁾ Finally, designation will be set out according to the comprehensive land-use planning aforementioned under the framework of related laws(Fig. 1).

16) For details, see Nagao and Morikawa.



<Fig.1> The Process of Coastal Zoning

IV. Issues on the Introduction of Zoning Scheme onto Korea's Coastal Areas

The issues to be considered are as follows, when a new zoning scheme is adopted in the coastal areas. These issues have been identified based on Korea's current coastal situations, and legal and institutional aspects.

A. The position of Coastal Management Act (tentatively) in the hierarchic scale that will regulate coastal zoning system.

The type of approaches to integrated coastal zone management differs from country to country according to its coastal situation, legislative structure and etc.. As the Ministry of Maritime Affairs and Fisheries seems to enact Coastal Management Act that includes zoning scheme to be applied to whole coastal areas, it falls into the same type of approaches to ICZM legislation as the one found in USA and the People's Republic of China.¹⁷⁾ Therefore, Coastal Management Act to be enacted shall be placed on the same level as the National Land Use Management Act. In this case, some individual acts related with land use planning and zoning such as the Public Water Reclamation Act shall be placed under the Coastal Management Act, which may cause conflicts with, and is anticipated to make it difficult to coordinate with other Ministries in charge of individual acts. On the other hand, to avoid this conflict, if the Coastal Management Act be placed under the level of the National Land Use Management Act, it would not function in a desirable manner. The main component of the successful legislation of Coastal management Act seems to depend on how to invite cooperation from other Ministries.

17) The type of approaches to integrated coastal zone management is classified into four categories such as 'national integrated coastal management approach', 'national economic planning or resource management approach', 'extended land-use planning approach', and 'special region approach'. The first approach is adopted by the United States, China and possibly Korea, where a specific legislation is enacted to implement ICZM policies. The second approach is applied to New Zealand, Indonesia and Thailand where ICZM is given rise to as part of a larger project extending beyond coastal areas. The third approach is adopted by France, which is characterized by attempts to modify terrestrial planning techniques to achieve more integrated management of coastal areas. The last approach is characterized by the implementation of integrated management of coastal resources within particular region of the coastal area to achieve specific objectives which are usually limited in scope. The examples of this approach include early attempt to reduce bureaucratic inefficiency in harbor areas in USA. For more details, see Sonja and Cullinan, pp. 42-61.

B. Integration with the existing zoning scheme that is mainly applied to terrestrial land

Coastal zoning shall encompass not only terrestrial but water areas in the coastal zone. As there already exists zoning in terrestrial areas, it is needed to integrate a new zoning system with existing one. Sometimes, integrating with existing one would be more complex and difficult than creating a new one. The possibility of integrity needs to be reviewed based on two guidelines.

One guideline is that the use of waters should be directly linked with the characteristics of the shoreline, since the activities on the adjacent mainland are the primary determinants of the uses and the quantities of any specific water site. For example, when a shore land is designated as urban area and is very susceptible to land-based pollution, the waters adjacent to this shoreline are preferred to be designated as an area in need of prohibiting further development or as an area in need of improvement in polluted environment.

Another guideline is that less number of categories are desirable. Many categories often lead to a rigidity in the land-use planning. In earlier times when zoning system was introduced for the purpose of regulation, more categories could be preferred. However, as zoning system is applied with more emphasis on planning-purpose, reduced number of categories is recommendable. Four or five categories are recommended in zoning the coastal area. Fortunately, the present zoning in land area that has five categories provides favorable condition for integrated zone scheme in the coastal area.

C. Availability of socioeconomic and scientific information on the water areas

In order to zone any area, a number of scientific, social, economic and cultural data and information are required. As described in the process of zoning,

18) Korea Planners Association, p. 123.

comprehensive land use planning should be established before an area is zoned. As zoning is a tool for enforcing land-use planning, an area can not be zoned without any land-use planning.¹⁸⁾ In turn, as discussed in the process of zoning, demands survey and potential analysis should be carried out to produce a comprehensive land use planning. Usually, although items to be surveyed will be depending on land-use pattern, at least common items to be identified or surveyed are as follows. Table 4 shows that data and information on current type of land use, legislation, natural environment, socioeconomic environment and scientific environmental conditions are needed to define current issues, potential for future development, and constraining factors in planning and zoning of land use. Among these data and information, some are easily and regularly obtained, but, others not. Especially it will take time and cost to obtain some oceanographic data in water areas. As Korea has comparatively a short history in oceanography, oceanographic data is available only in a specified Marea. Moreover, they are separately managed by individual institutions and agencies who produced them. Recently, Oceanographic Data Center has been set up to collect, process and distribute these data, but it will take time for the center to efficiently function. The lacks in scientific data in water areas will become a critical factor that makes it difficult to immediately zone water areas.

D. Right to set zones

In general, the authority of setting zone can be given central government or local government. In most countries, the authority has been given to local governments for zoning, planning and regulation of land-use planning, particularly, in European countries.¹⁹⁾ On the contrary, for Korea, the authority is given to central government through the National Land Use Management Act. It may cause conflicts with local governments who are more concerned about development-oriented use of coastal zone that will be the source of local government's finance. The solution to this problem can be dependent on the capacity of fund assistance from central government to local governments.

18) Korea Planners Association, p. 123.

19) Sonja and Cullinan, p. 83.

Table 4. Major Survey Items for Zoning Land and Water Areas

	Land areas	Water areas
Current land use	type of land use(field, rice field, forestry), houses, structures	fishing ground, sea farming, beaches, aggregate, marinas, tidal power energy
Legislation	upper plans, related laws, city basic planning	upper plans, related laws, related planning
Natural environment	topography(slope, altitude), boundary, soil, climate (propensity, temperature, wind), natural resources, water resource, water quality	marine topography, current, temperature, salinity, turbidity, plankton, benthos, fishes distribution, primary production, seabed mineral resources,
Socioeconomic environment	price of land, population, employment, financing, industry, gross regional products, communication, welfare facilities	fishery population, fish price, fishery production, tourist, salt production, reclamation and landfill, energy consumption
Environmental conditions	natural hazard, air pollution, traffic accident, density of greens, noise, water pollution	water pollution, maritime traffic accident, oil spills, red tides, flooded area

E. Nature of Coastal Management Act

Under the paradigm of integrated coastal zone management, a harmonious approach between environment and economic development is important. However, it would be extremely difficult to practically produce such results. Therefore, if the Coastal Management Act is to be successfully implemented, the Act needs to be enacted with more emphasis on environment. In other words, more 'aggressive'

Act is needed for Korea. Because the national coastal environments and situations of Korea are different from those of the United States from which the concept of ICZM emerged. It should be noted that United States has relatively low pressure on coastal area and higher quality of coastal environment compared with Korea. As Korea is already facing a lot of threat to the coast including pollution, overexploitation, seashore erosion, loss of marine species, population pressure, irrational uses and conflicts among competitive uses, it needs a mechanism with more emphasis on environment.

F. Relation between zoning and land use planning

Zoning is just one of the tools for managing coastal resources. However, there often exists misunderstanding of zoning by some practitioners. Occasionally, They have some confusions between land-use planning and designation of zoning. In the past, even some professionals see zoning as to be identical to land-use planning.²⁰⁾ It should be pointed that land use planning is prerequisite for zoning and zoning is a vehicle to enforce land-use planning.

G. Use of other tools

As mentioned earlier, zoning system is just one of tools to manage coastal resources and areas. In addition to zoning, coastal setback, acquisition of private land along the coast, control of private ownership, environmental impact assessment, environmental compensation and fiscal incentives are introduced to efficiently manage coastal zone. For more efficient management, the use of more than two of these tools are recommended. For example, the merge of zoning and acquisition program can produce synergy effects. At present, the tentative Coastal Management Act is known not to include these instruments except zoning. Of course, It would be impossible to introduce all of them in the Act, but including some other instruments in the Act seems to be desirable.

20) Korea Planners Association, p. 123.

H. Setting criteria for each category.

Setting criteria for different categories in zoning will be one of the most difficult tasks in practice. The inclusiveness of any criteria will be depending on the availability of data and information of an area to be zoned. Insufficient data will lead to a vague expression of zoning scheme, and in turn will be ineffective in implementing the system. On the other hand, too detailed criteria may lose the flexibility of the laws and delay the implementation of integrated coastal zone management to the time horizon when integrated management is of no use. If zoning system will play key role in implementing Coastal Management Act, it will be needed to design categories and set the criteria of categories in advance.

V. Conclusions

This study has focused on addressing and analyzing the issues to be raised when Korean Governments enacts 'Coastal Management Act', the critical component of which is application of zoning system. Zoning is one of efficient tools for coastal zone management. The use of zoning in modern sense has history of about one hundred years in land area, its application onto coastal area has been taking place since 1970.

This study has detected a few issues that should be deliberately considered in enacting Coastal Management Act. Some of them seem to be easily tackled, while others not. The most critical issue is how to set position of Coastal Management Act in the hierarchy of laws regarding land-use planning and zoning. It may produce not only problems on the legislative structure, but practical difficulty in cooperating with other ministries. To solve this problem, more time and efforts than anticipated will be required. Another critical problem is the availability of sufficient data and information on socioeconomic and natural environment of water areas. As Korea has relatively short experience in oceanography, oceanographic data is limited in water areas surrounding Korean peninsular,

except for a certain water area where oceanographic survey has been carried out for its specific purpose. Therefore it will cause difficulty in zoning water areas.

In sum, considering the degradation of coastal environment and the need to manage the coastal resources in a sustainable manner, it is desirable for Korean government to create Coastal Management Act and to adopt a coastal zoning scheme. However, authority concerned needs to recognize the unfavorable environment surrounding this task in a practical sense and give more attention to dealing with the critical issues so that the zoning scheme to be adopted in an anticipated manner. In this regard, it is recommended that application of zoning system in a demonstration site is needed. That will reveal more detailed issues and difficulties to be encountered in the process of zoning, which will ensure the success of application of zoning system for sustainable development of coastal resources in Korea.

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