

How to Keep the Sustainability of the Landscape Resources of the East Coast in South Korea

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(Manuscript received 7 November, 2003 ; accepted 24 February, 2004)

The purpose of this study is to present the conditions and methods for keeping the sustainability of the landscape resources of the East Coast of Gangwon province, the Republic of Korea by investigating the landscape resources management in the area and pointing out its problems. The unit of analysis in this study is four cities and two counties located along the national road route seven in Gangwon province. The classification and characteristics of the landscape resources in this area was analyzed by a literature review, and we surveyed the tourists visiting the area and statistically analyzed the data in order to examine their satisfaction with the landscape resources management and make recommendations.

The problems of the landscape resources management are: 1) the disturbance of the persistence of life by reclamation, the population reduction in the ecosystem due to the overload in environmental capacity, and the severance of space between land and water. 2) the reduction of the benefits from indirect experience by interfering with the conservation of fluxes --- the manipulation of horizontal arrangement of the landscape resource, the visual disturbance by the construction of high-storied buildings, and the disharmony between the color/image and the environment.

The means for keeping sustainability of the landscape resources include the regulations of development and use, the change in the recognition of the value of landscape resources and the moral system, and the improvement of resource management skills.

Key Words : Coastal Landscape Resources, Sustainability, Persistence of the Life, Preservation of the Fluxes, Landscape Resources Management, Non-material Factors

1. Introduction

The coastal areas give us the aesthetic and symbolic benefits in the harmony of physical facilities, natural environment, and water. The East Coast in Gangwon is of great value of landscape resource because of retaining a gift of the heaven, the nature which are formed with the coastal line in lengths of 212km and having abundant historical and cultural resources. Those places, however, are facing the danger of losing their value as the result of the imprudent tourist development and human habitat

along the coast.¹⁾

Under these critical situations, this study investigates the present conditions of the landscape resources on the East Coast, Gangwon province, South Korea, to suggest alternatives for keeping the sustainability. We are raising several points of landscape resources through the research on the actual conditions and establishing the sustainable conditions and ways of them through the survey for visitors' satisfaction.

This study deals with the scenery of the nature and art, the former contains the topography, the surface of the sea water, a dune, an ecosystem of the coast which are related to the actual state of the east coast and the latter includes scenery of cities, fishing villages, streets, bridges, and harbors. Furthermore,

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the mental factors such as view, stability, and pleasantness are also the object of analysis. The coast can be defined as the space where the various occasions of the nature happen and where the land, the sea and the air areas meet, whose definition is similar to that of the shore.

The artificial landscape resources on the coast covers a scope within 1 km from the both side the coast dune because they are located in the coast area and because it is not necessary to contain all area coming within the field of the vision. There are a few uninhabited islands on the east coast, but this study includes things we can see with the naked eyes even though they are far from the scope within 1 km.

The east coast is restricted to the four cities (Samcheok, Gangneung, Donghae, Sokcho) and two counties (Goseong, Yangyang) among Gangwon province which are formed along the line route seven in the surface street. We are examining the sorts and characteristics of the landscape resources which are distributed in these areas using the established literatures and are carrying out the survey for visitors who are taking a sight-seeing on the east coast in order to make counterproposals and to take a census of their satisfaction about landscape resources policies. The frequency analysis and the regression analysis are applied for this investigation using the SPSS 10.0.

2. Theory Review and Research Design

2.1. Theory Review

2.1.1. The Value and Types of the landscape resources on the coast

In general, the word, landscape, is a compound word of the word, 'land' and 'scape' and means the figure of the land. As the related notion, the seascape is the figure of the sea, that means the scenery creating in the space where the land and sea meet.²⁾

The coast consists of the oceanic resources such as the space of the ocean, oceanic lives, oceanic energy, sea water (including fresh-water, agricultural water, and livestock water), oceanic mineral (including a fossils, an inorganic mineral). The land of the coast is made up of the natural resources and the artificial resources; the former contain the land plant and the animal ecosystem, the latter include the streets, the

establishments, and the buildings. In addition to that, there are some islands which are dealt with the land but are located in a board of the sandy shore and the sea.

The value of the coast area is at large divided into two; the direct and indirect value. At first, the former gives us the firsthand advantages such as the food supplies, the raw material provision, the utilization of the land, and the latter includes the life habitation areas, recreation centers, a scientific value, an aesthetic function.³⁾

The scenery of the natural resources is comprised of the scene of the land, the scene of the sea, and the scene of the watercourse : the first means the background of the coast, mountains, vegetation, the mouth of a river forming a low, the second contains things with an outlook over the sea such as the surface of the sea, waves, tidal-waves, sea gulls as well as the places with the range of the possibility for recreation, and the third includes the structure of the coast and the form of the space.

The scenery of the historical and cultural resources is fixed by the human behavior regardless of tangible or intangible one. In this place are there the scene of the harbor, the scene of the ocean village, the scene of the historical area as well as all kinds of the streets, the special buildings in that area, various breakwaters.

These resources forming the landscape on the coast bring about the loss of the original form and decrease of the value by the natural and artificial actions. The landscape resources, in other words, are destroyed by the tourist development, the building of an apartment complex, a large building sheltering from the nice view of the sunrise, sunset and the sea.

2.1.2. Criteria to Keep Sustainability of the Landscape

We need to reach an agreement with permitting human beings' limited access and with maintaining the value of the tangible and intangible landscape resources. Otherwise, the frequency and the intensity of human being's artificial intervention will increase because of the preference to the direct benefit and it is possible to ignore indirect value like a spectacle.

It is also necessary to attain the sustainable environmental justice through the growth management

Table 1. The Established Literatures of the Sustainability Criterion⁴⁾

section	The contents of the criterion
Seattle	An environment, population and resources, culture and society
Delft	Structure and movement of the urban, the feedback of the nature and material within the city,
Merton	Waste and natural resources, pollution, resources, local demand, basic desire, work, health, access, security, education, participation, leisure and culture
Ecopolis	Environmental ecosystem(variety, security, self-reliance, circulation), the quality of the life(pleasantness, convenience, security, health, social economy), balance(equilibrium, opening), the distribution of the role(allotment)
A residential district	Co-existence of the human and the nature, the reflection of the ecological principal, the maintenance of the nature and material circular system, a minimum of the environmental pollution
The quality of the city life	A healthy life, a secure life, an educational life, a economic life, a convenient life, a cultural life
Common factors	A social circumstance(political/administrative circumstance), a physical circumstance, a economic circumstance

developing within the environmental capacity being capable of recovering.

At first, the established literatures are reviewed for reaching an agreement with the sustainability of the landscape resources. The general research of sustainability can be measured by an environmental criterion. Ministry of Science and Technology in South Korea⁵⁾ try to present it after being stimulated by the U.S.A. index development and Gyui-goun, Kim⁶⁾ did from various points of view such as the ecological side, the quality of the life, equilibrium, division of the roles.

The sustainable development index should be developed covering all the cause, effect, response at the same time. This idea is reflected in the OECD's⁷⁾ environmental monitoring index system, 'the process of Pressure-State-Response'. The latest established researches consented to this trend and advocated correlation and synthetic approach about the cause of environmental issue.

Needless to say, it is possible to measure the sustainable landscape resource and make a counterproposal applying the above index. These methods are, however, lack of coping with space disjunction of the subject of study. That is to say, it is impossible to measure all the landscape resources distributed in a vast range even though the subdivided index of density and distance are established.

This research used a mixed way between a wide scope investigation and a scanning investigation which are used in the strategic environmental effect measurement of the natural resource.

2.2. Framework of Sustainability

The landscape resources on the east coast in Korea provide almost Korean people with the value of the landscape in spite of the disadvantageous location condition of national land. It is required to develop the growth management strategy within the permitted environmental capacity for landscape resources sustainability. That gives us vast area benefit as natural resources.

We inquired into the way of managing the landscape on the east coast and the measuring its level at present. The satisfaction analysis for visitor is used for this study because the subjectiveness is intervened in the analysis when the administrative subject judges its effectiveness.

Now some local governments on the east coast are building the all kinds of development projects or are carrying on those business. The street construction and artificial facilities at the border of land and sea result in the sand erosion and the loss of the landscape resource on the coast.

The sustainability of the landscape resources refers to preserve their own ecological property and to maintain harmonious relations one another. That is

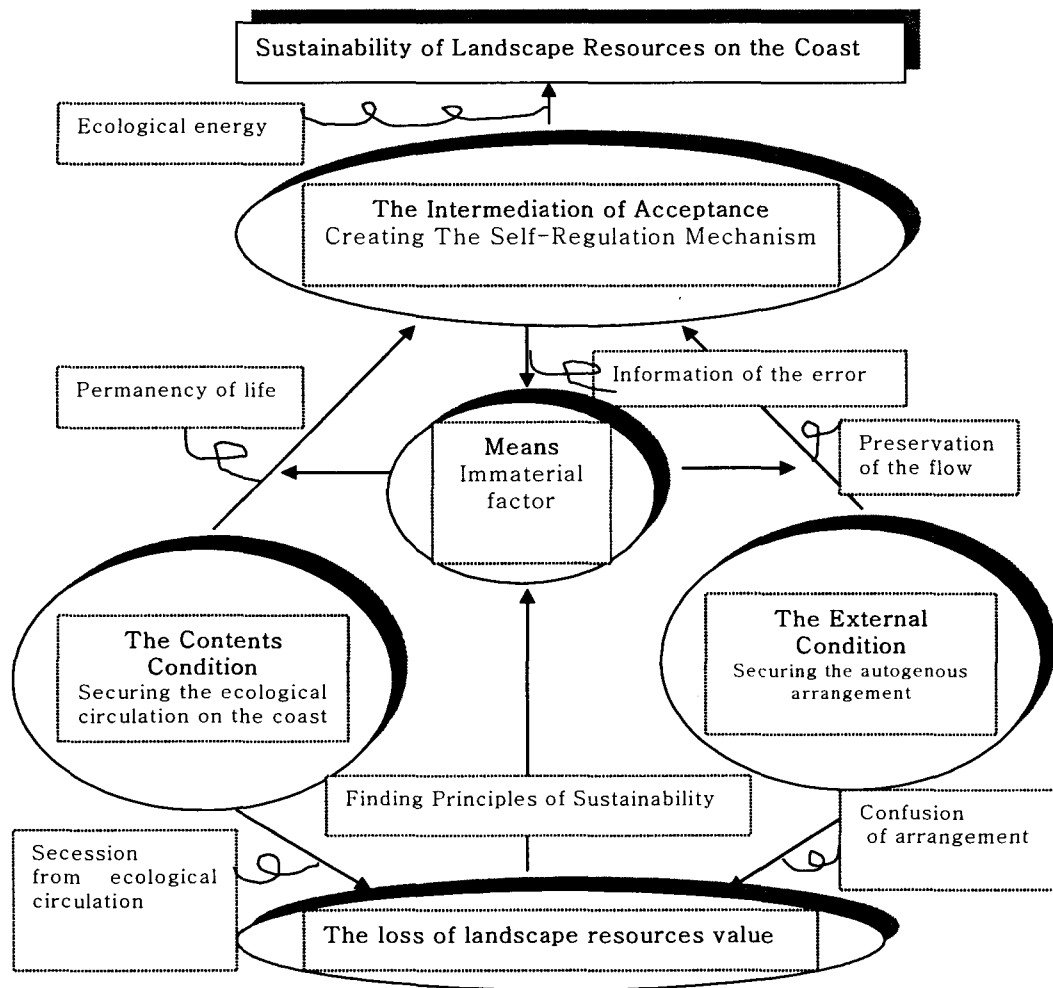


Fig. 1. Model of Sustainability.

regarded as the core of natural resources and is settled by the following two conditions

At first, in the side of contents, the function of resources should not be hindered. That is, the resources between sea and sand, sand and land, land and vegetables etc. should have horizontal correlation with one another. This comes under an indispensable condition because it excludes the artificial intervention and has direct connection with the duration of life, the essence of natural resources.

Second, in terms of external form, the flow of resources should continue. 'Conservation of the flow' cannot be interrupted by the artificial intervention, horizontal disposition which natural resources form with spontaneous generation. This conforms to a sufficient condition have an important effect on visual activities

even though it is indirectly concerned in the existence of life.

What conditions make sustainability of landscape resources sufficient? The landscape resources, an object of sustainability, are mainly physical factors, for example, natural topography, open space, foundation facilities on the coast, streets, buildings, installations, land, water, and trees. The means of getting sustainability of these physical factors are immaterial factors, for instance, a social system, a culture, an institution, administrative law and regulations, intention.

3. Analysis of Sustainability

3.1. Contents of the Landscape Resources on the East Coast

Table 2. Types of landscape resources on the east coast

		Landscape resources
Natural Resources	sandy beaches	Sand on the beach from Goseong to Samcheok getting to 212 Km
	the scene of sea	Sunrise
	Islands	Juk-do, Cho-do, Yanga-do
	rock walls, sea cliffs	Within 10 km on the whole area of Yangyang Juk-do(Hajodae), Naksansa, Jeongdongjin, Samcheok Geunduck, Donghae Chotdaebawi, Goseong Chongganjung, Sokcho si byorakbawi etc.
	land vegetables	Land vegetables on Songjiho, Munam, Chonjin, Naksan, Gyeongpodae, Mangsang, Maebang(a pine forest, a wild rose etc.)
	lakes	Whajinpo, Songji, Youngrangho, Chongcho, Gyeongpo, Bongpo, Gwangpo, Maeho, Hyangho etc.
	rivers	Gwangjungchon, Yeongokchon, Gangneung Namdaechon, Yangyang Namdaechon, Oshipchon etc.
	mountains, hill areas	Guseongbong, Bonghabong, Goseongsan, Nogobong, Gimabong, Mangunsan, Wausan etc.
	sky	The scenery of morning and evening of the sky on the coast
	sunrise	The scenery of sunrise on the east coast
ports or harbors	ports	Donghaehang, Mukhohang, Okgyehang, Samcheokhang, Sokchohang, Jumunjinhang etc.
	harbors	Namaehang, Chogokhang, Simgokhang, Taejinhang, Tongmyonghang, Taepohang etc.
	port facilities	a lighthouse, a ferry each of a port or harbor
fishing villages	fishing villages, fishing ports, small fishing boats, lodging of sea villages	
historical and cultural resources	pavilion of Gwandong Palgyeong	Gwandong palgyeong(Chongganjung, Gyeongpodae, Naksansa, Juksoru), Gumjangdae, Hajodae, Hansongsa, Ujangdae, Younggumjung, Whajinpo, Gyeongpoho
	Sungwhangdang	Oeongchi, Haesindang
	Pungoje(Giwonje) in the fishing village, Odokdogi in Gangneung	
tourist resorts	swimming beaches	Whajinpo, Songjiho, Sokcho, Hajodae, Jumunjin, Gyeongpodae, Mangsang, Samcheok, Maengbang etc.
	raw fish restaurants	raw fish restaurants in Taepohang, Tongmyonghang, Odaljin etc.
	tourist resorts	Gyeongpo and Naksan provincial parks, the Unification Observatory.
facilities resources	coastal roads	national road route 7, local roads on the coast
	railroads	railroads of Yeongdong line
	bridges, tunnels	railroad tunnels of Donghae, Gangnueng etc.
	military facilities	wire entanglements, coastal guard posts
	urban parks	sculpture parks of Sokcho, Jeongdongjin
	buildings	the image of buildings in lodging houses, shopping areas on the east sea
	vessels	scenery of a vessel in ports or harbors, fishing ports

In the natural and geographical characteristics, the east coast is stemmed from the lithosphere. There are lots of sea bathing areas forming from a sandy plain on the east coast in South Korea because the east coast is heaped up well, on the other hand, the west coast is mainly eroded. This was built up by sand and gravel formed from the corrosion of neighboring coast after conveyed and accumulated by the flow of waves or sea water.

In the social and economic features, the primary industry related to fishery has been developed on the east coast, so that makes it possible to preserve the clean coast circumstance while the west and south coast have been fixed in the second industry.

In the humane and cultural sides, the fishing culture has been made progress and the beautiful natural environment has induced the cultural and artistic resources to take place. As a result of that

fact, incorporeal cultural resources such as Pungoje and tangible cultural properties such as Gwandong palgyeong are distributed here with variety. The east coast, Gangwon province, South Korea, was formed with parallel and length along the Tae-back mountain range which play an important role in the Korean Peninsula. Moreover, it has a gift of nature, the landscape resources, joined together with rivers running from west to east, small or large natural lakes, a sand beach, a slope by erosion of the sea, a coastal terrace, a sea bathing area, a pine forest, and a desert island.⁸⁾

As you see above <Table 2>, the constituents of landscape resources are classified into natural resources, a harbor, a fishing village, historical resources, cultural resources, a tourist resort, facilities and so on. There are sand beaches throughout east coast getting to 212.3 Km, and sixty four small or large harbors and ports, sixty nine sea villages and ninety five sand beaches in the cities and towns formed along the coast. There are also five natural public parks, two national security tourist resort, fifteen national tourist resorts, amusement parks and recreation centers connected with clean east sea.

The national ocean environmental preservation policy and the management plan for ocean environmental resources in Gangwon province, reference.⁹⁾

The landscape has direct and indirect beneficial value. In the case of the east coast cultivating production given much weight in the distribution ratio of the primary industry is representative of direct one. That is fishery activities such as fishes harvesting for securing foodstuffs as well as resources gathering, land use, sea water development for producing raw materials.

Resort functions as an indirect one can be emphasized on the east coast because a tourist industry is given much weight. That is to provide the places and opportunities of recreation activities such as boating, fishing, hunting and surfing etc. Especially the natural resources and historical and cultural resources can be their objects because all landscape resources play a role in the aesthetic sense.

3.2. The Present Conditions Analysis of Landscape Resources

3.2.1. Natural resources

There are sandy beaches, the scene of sea, islands, a rock wall, a sea cliff by erosion of the sea, land vegetables, lakes, rivers, mountains, hill area, sky, sunrise as natural landscape resources, the management objectives among them are concrete natural resources, sandy beach, island, a sea cliff by erosion of the sea, land vegetables(a pine forest), lakes and rivers and so on. Intangible natural resources cannot be treated by human behaviors because the result of the former has an influence on them.

The main objectives are sandy beaches, land vegetables and lakes in the landscape resources management if we exclude the intangible natural resources, islands and sea cliffs by erosion of the sea exempted from the list of present development work. All kinds of development works about the three principal landscape resources is primary and control factors for securing sustainability.

The sandy beach is a practically useful space for the coast development. Erosion and sweeping away phenomena of the coast are making rapid progress due to the introduction of artificial structures such as roads, a breakwater, the tourist infrastructure, the port facilities having no concern with environmental capacity. In the regional side, the erosion has been generated in Gangneung, Sokcho while the accumulation has been come into Goseong. The consequences are that ocean current are changing according to artificial facilities conforming to sustainability conditions. Therefore, the introduction of artificial facilities should be minimized to preserve sustainable life and to connect with the flow of sandy beaches and sea water.

A pine forest is the world coastal landscape resource. The construction of streets and railroad to expand traffic equipments, a dwelling by regional residents, and agricultural and commercial business are doing damage to the distributed space of pine forests. These development actions make the tourists uplift their access and allure their sightseeing, so they are exposed to the objects for the use. The pressure of human's activities about the environment brings about the change of environmental state.¹⁰⁾

The access to pine forests should be allowed minimizing because their sustainability has a direct effect on plants and animals. The severance of

crosscutting in an ecosystem caused by the construction of roads should be excluded. Besides, the facilities for eliminating a large scale pollutants reduce the ecological and aesthetic value because the edges of the water are destroyed and changed by establishment of circular roads on the natural lakes lying adjacent to the coast.

3.2.2. Residential districts and the port facilities

The residential districts include the cities, the farm and fishing villages located in the coast areas and the port facilities is the meaning of a port, a harbor and an inlet in the aggregate. We are, therefore, inquiring into the present state of their managements through their landscape arranged in a row above.

The residential districts on the coast area are flooded with the reckless buildings. The skyline leaving around landscape out of consideration, the construction development destroying the natural topography, and the incongruity of a shape, an arrangement, a scale, a color, and the quality and so on injuring the landscape. In case of the urban, a high-rise apartment building, a extra-large lodging and commercial building obstruct the prospects of Korean mountain range. The right of a prospect is damaged by the development of monopolistic buildings over the seascape (a hotel, a transient hotel, an apartment, an office etc.) and insufficiency of the prospect centers. In the farm and fishing villages, the uniform buildings having no concern with regional images and the function-centered artificial constructions are discordant with around landscape. The scenery of a fishing port is spoiled and the images of a special fishing village are deficient by the accommodation facilities such as a resort hotel, a motel etc. and the buildings destroying the natural topography.

The security of the excessive fishing port facilities hinder the landscape and leave the facilities and equipments related to the fishery to chance. The most serious problem is to build the coastal roads and to secure the all kinds of fishery facilities by reclaiming land from the sea. In recent, the present state of a port and a harbor is to build the residents' common institutions imprudently in order to improve the tourist income as an alternative activity in consequence of reduction of a fishing industry. This reduces the value of port seascape because they are

simple in the side of a shape, an arrangement, a scale, a color, and the quality and so on.

The residential districts on the cities, the farm and fishing villages on the coast areas should preserve the mode of living and the facilities reflecting the regional marked individuality and images to keep the sustainability. The mother of a port and harbor, the sea, should keep the original clean form as a site of life. From the point of the preservation of the flow as an external condition, the facilities related to the fishery isolate the sea and a port, the land and around residential districts.

3.2.3. Historical and cultural landscape resources

The representative landscape resources are the pavilions of Gwandong palgyeong, Chongganjung, Gyeongpodae, Naksansa, Juksoru, Gumjangdae, Hajodae, Hansongsa, Ujangdae, Younggumjong and so on. The facilities related to faith are Sungwhangdang in Oeongchi, Sokcho and Haesindang in Samcheok.

From the first, the establishment of historical landscape resources has the optimum about the landscape on the coast, but the development of all kinds of buildings, facilities reduce the value of the right of the prospect. Moreover, a form, a color and the quality of the road, a resort facility, an information equipment etc. deteriorate the value of the landscape.

The permanency of life as a sustainable condition of historical landscape resources can be realized by preserving, repairing and mending the original form of a structure continuously. A neighboring green tract of land, however, is damaged and there is no support of finding and succeeding the historical landscape positively, so the historical investigation data are lack for their restoration.

3.2.4. Water resources

The landscape resources of the East Coast include provincial and municipal parks, swimming beaches, raw fish restaurants, and accommodation facilities. Among the well-known landscape resources are Gyeongpo and Naksan provincial parks, the Unification Observatory, the sculpture parks of Sokcho and Jeongdongjin, the swimming beaches of Whajinpo, Songjiho, Sokcho, Hajodae, Jumunjin, Gyeongpodae, Mangsang, Samcheok, Maengbang.

Table 3. The analysis of the visitors' satisfaction

Indepent. variable	Depent. variable	The satisfaction with management of landscape resources on the East Coast			
		B	Bata	t	Sig.
The adequacy of management system		.217	.191	3.751	.000
The adequacy of management skill		.183	.163	2.922	.004
The environmental intimacy of the coastal land use		.160	.169	4.031	.000
The effectiveness of management policy		.303	.299	6.898	.000
The recognition of the value of landscape resources		.162	.174	4.398	.000
The attitude of tourists		4.282E-02	.042	1.154	.250
The access to landscape resources		.120	.122	3.181	.002
The convenience of management facilities		.106	.108	2.625	.009
The level of regulation on use		-1.304E-02	-.013	-.340	.734
Constant		-.561		-3.827	.000
R square		.803			
F-Value		86.314***			

* p<0.05 ** p<0.01 *** p<0.001

Raw fish restaurants in Taepohang, Tongmyonghang, Odaljin are also popular with tourists. However, the images of these tourist spots are getting bad because of the sea pollution from sewage and wastewater, floating matters, and garbage. Also, coastal military facilities such as barbed-wire entanglements and guard posts defile the appearance of and limit access to landscape resources.

Sea was reclaimed to build convenience facilities such as parking lots, bungalows, and kiosks, and mountains and hills were cut to construct large accommodation facilities.¹¹⁾

To summarize the actual condition of the management of landscape resources in this area, indiscreet development is increasing in land and beach, and signs and convenience facilities are insufficient. Also, the design of the facilities lacks harmony because their shapes, arrangement, size, and color do not match the images of nearby landscape resources.

Road, rail, and other structures which give access to landscape resources have been built along the coastline. Roads have the monotonous shapes of straight line which ignores geographical features and are causing desertization because of the lack of natural plant on roadsides. With the most roads built along the coastline, roadsides serve as habitats for coastal lives and can cut the ecological cycle between land and sea when destroyed.

Rest areas provide opportunities for viewing sea or sunrise and can maximize the aesthetic effect and reduce the environmental disruption when sparsely located. However, rest areas on the national road number 7 are on large scale and densely located.

3.3. The tourists' satisfaction with the management of landscape resources

We conducted a survey between August 15 and August 16, 2003 in order to assess the customer satisfaction with the management of landscape resources. The participants of the survey were tourists whose final destinations were the beaches in the 6 regions of the East Coast. Out of 220 total responses, 20 responses which had maximum or minimum values were considered as unreliable excluded. Because there are lots of insincere responses and no answers. Therefore 200 responses were selected for the analysis.

The survey was conducted in the Gangneung rest area, the crossroad of the 6 regions, by interviews where interviewers briefly explained about the management of landscape resources in the East Coast to the participants and induced their responses. The sample was tourists in every tenth vehicle entered the rest area. Using SPSS 10.0., we conducted regression analysis and frequency analysis of the survey data.

The result of the survey showed that 27% (54 participants) of the tourists were satisfied with the

management of landscape resources, 38% (76 participants) neither satisfied nor dissatisfied, 27% (54 participants) dissatisfied, and 6% (12 participants) very dissatisfied. According to Shin,¹²⁾ the most of the tourists were content with the landscape resources in Gangwon province, with a survey score of 4.09-4.64 out of 5. However, our survey found out that the satisfaction with the management of landscape resources was not high.

This result can be interpreted that local governments in the East Coast do not recognize the value of their landscape resources and consider them only as the object of development, and that the relative value of the landscape resources in the East Coast is regarded as slightly high compared with other regions of Korea.

We selected nine factors which are expected to affect the level of the management of landscape resources in the East Coast: the adequacy of management system, the adequacy of management skill, the environment-friendliness of coastal land use, the effectiveness of management policy, the recognition of the value of landscape resources, the attitude of tourists, the access to landscape resources, the convenience of management facility, the level of regulation on use.

A multiple regression analysis was conducted in order to find out how much the factors presented in <table 3> have effect on the satisfaction with the management. This analysis used nine variables and the consequence is that R square is 80.3%, so the power of explanation is strong. The F value is 86.314 and the significance is $p < .001$. That means that this regression equation has the strong power of explanation because the statistical significance is demonstrated. In the coefficient analysis, the significant probability of T value of seven variables among nine shows us the statistical significance, and that of two variables is insignificant.

When we see the absolute value of β which means the comparative significance of coefficients, the value of 'the effectiveness of management policy' is 0.299, that means this variable has the most strong power of explanation among nine independent variables. The adequacy of management system, the recognition of the value of landscape resources, the environmental intimacy of the coastal land use, the adequacy of

management skill, the access to landscape resources, and the convenience of management facilities go through due formalities according to the β value.

Our research framework lists social factors such as policy, system, legislation, and cultural-psychological factors such as values and custom as non-material factors for the preservation of the life and fluxes of landscape resources. Our analysis shows that the effectiveness of policy and the adequacy of system are the most important means for the sustainability of the landscape resources in the East Coast. However, the adequacy of management skill and the level of regulation on use were not statistically significant and thus did not appear to affect the sustainability.

3.4. The Problems of Landscape Management

The representative areas of being destroyed by the artificial establishments on the beautiful East-coast scenery along the national road no. 7 are centralized on Sokcho-si and Goseong-gun. In detail, Highla beach (Bongpo-ri, Tosung-myeon, Goseong-gun), Koresco (Sampo-ri), Geumgangsari Condominium (Machajin-ri, Hyunnae-myeon), Daemyung, Ilsung, and Grace Condominium (Sokcho-si) come under these cases. Also, the high-rise apartment buildings (Chodang area, Gangneung-si) have resulted in the cutting of ecosystem between the coast level land and the coast forest.

The sandy beaches have eroded away and the reclamation of them has been progressing along the all East-coast. The natural erosion of the coast has resulted by distorted flows of sea water after building a small breakwater. The most representative examples of the damage in the sandy beaches are the development of Goseong's condominium and the establishment of Hajodae (Yangyang)'s tourist resort. In case of the former, the about 66,000m² sandy beach was paved with cement, and the form and quality of the land have been changed. In addition, the outskirts of Gangmun port (Gangneung-si), the swimming beaches of the Sacheon back islet, Dojik-ri (Okgye port), Anin-ri (Gangdong-myeon) come under the representative coast erosion areas.

Representative examples of the damage in a lake scene are the cases of Gyeongpo lake, Chongcho lake, Hwajinpo lake, Youngrang lake and so on. These lakes are surrounded with pavements respectively owing to locating in the downtown areas.

In 1960's Gyeongpo lake was filled up by two third of the gross area in order to increase food production, Chongcho lake was filled up by one third of the gross area and then tourist resorts and facilities were developed.

4. Ensuring sustainability

The means for securing the sustainability of landscape resources are political and economical decision, legislation, policy objective, environment-friendly consciousness, and management skills in sympathy with the nature; people select them in the combining process of non-material factors such as economy, culture, system, management, people, custom, tradition, attitude, favor, and behavior.

By these means, landscape resources can form a self-control mechanism which meets the internal and external conditions and achieve the sustainability. If it does not happen, there must be an error of repetition or a deviation from the ecological cycle, which are serious situation. In this case, the ecological cycle should be restored and the coastal landscape should be protected by the legislations which further regulates the development and use of landscape resources, the change of the moral system and recognition of the value of the resources, and the improvement of the resource management skills.

We should set limits of building architectures and artificial structures bringing about the transformation of the coast line, and preserve the natural sandy beaches and a sand slope. Especially, when we open a temporary port office and fill up the coast, we should preserve the natural coast line and minimize the damage of the scenery. For the alternative plans, it is required to introduce the permeable sea wall and the area protection process.

The filling up of the public surface of the water should be not permitted except indispensable cases and an land aptitude test for limiting exploitation causing pollution should be carried out before anything else. A guide to the scenery management, such as the development prohibition on over a definite slope area for using the hill area around the coast, the regulation over the high buildings on the hill area, the strengthening of the green tract of land, should be arranged.

The available site between the coast road formed

along the national road no. 7 and the coasts should be established with going back over 500-1,000 in order to induce the development of the lower layers and density of the land, to ensure a prospect and a sense of open-hearted, to prevent the road within a housing complex from damaging the coast natural plants.

Lastly, when an empty lot would be obtained as a result of moving the coast facilities, it is required to enlarge the land for public use gradually with making use of this space into open space for public.

5. Conclusions

The landscape resources of the East Coast provides the direct benefits of fishery, natural resources, land use, and seawater development as well as indirect benefits of the habitats of coast ecosystem, academic and historic value, and aesthetic value of view and scenery. As a result of the preference of the direct benefits, however, indiscreet developments are destroying sea, sandy beaches, pine forests, and waterside spaces. This study provides the condition and method of sustainable development as a managerial alternative for the landscape resources of the East Coast.

Policy objectives which can sustain the life of the coastal ecosystem and form beautiful scenery by minimizing human intervention and use are needed.¹³⁾

First, the preservation of coastal landscape resources and the growth management of coastal residential area are required. Landscape resources such as sea, seashore, pine tree, sandy beach, sea cliffs, uninhabited islands, and waves should be conserved. Also, city developments should be allowed only within the limit of environmental capacity of the landscape resources and consider the horizontal arrangement which allows coastal tourist activities including the view of sea and sunrise. The environment around natural resources such as sea cliffs, uninhabited islands, wave, and sunrise needs to be preserved to keep their naturalness.

Second, development plans should preserve coastal ecosystem and reflect locality. Sandy beaches, lakesides, and pine forests most directly affect coastal ecosystem and need to be preserved, and the effect of developments on coastal ecosystem should be minimized. Mass facilities such as harbors, fishing

villages, and fishing ports should form a landscape that can express locality, local image, and the uniqueness of local culture.

These means for keeping the sustainability of landscape resources can function when the life of coastal scenery is protected and the ecological cycle is maintained by the legislations which regulate development and use, the change in the recognition of the value of landscape resources and the moral system, and the improvement of resource management skill.

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