

# **Improvement for Environmental Conservation Value Assessment Map (ECVAM) of National Land in Korea**

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**ABSTRACT:** This study was performed for improving the Environmental Conservation Value Assessment Map (ECVAM) of National Land in Korea. The ECVAM items are composed of legal assessment and environmental/ecological assessment. An assessment method applied to ECVAM is basically an overlay method for environmental/ecological assessment items. The purpose of this study is to offer complement items of the ECVAM by examining assessment items. For this, our study was preceded as follows;

In this study we assessed the ECVAM by 4 kinds of method. Method 1 is Comparing overlapping areas of each assessment items Grade 1, 2 and Permission of each assessment items' duplication, Method 2 is Grade 1, 2 areas by only singular assessment items, Method 3 is Only Grade 1 areas of Method 2 and Method 4 is Only Grade 2 areas of Method 2.

As results, Method1 showed 93.4% of diameter Grade II(standard for stability), forest diameter item was accounted for 99.9% by Method 2, Method 3 showed 95.7% of forest diameter and forest density was accounted for 66.4% by Method 4. From now on, this study will contribute to reduce the complexity in the process of manufacturing ECVAM of National Land, and to raise the pliability in the process of managing and updating this map.

## **I . INTRODUCTION**

The purpose of this study is to offer the devise to complement items of the ECVAM by examining assessment items. For this, our study was preceded as follows;

First, we caught on to the overlapping degree among assessment items of the ECVAM of national land. For this, we grasped the grade distribution of the environmental conservation value assessment and analyzed the overlapping degree among assessment items to be applied to

this map. On the concrete, we investigated the grade distribution on legal items and environmental/ecological items classified by each administrative district, and scrutinized the propriety on environmental/ecological items to affect more powerfully the assessment result than legal items.

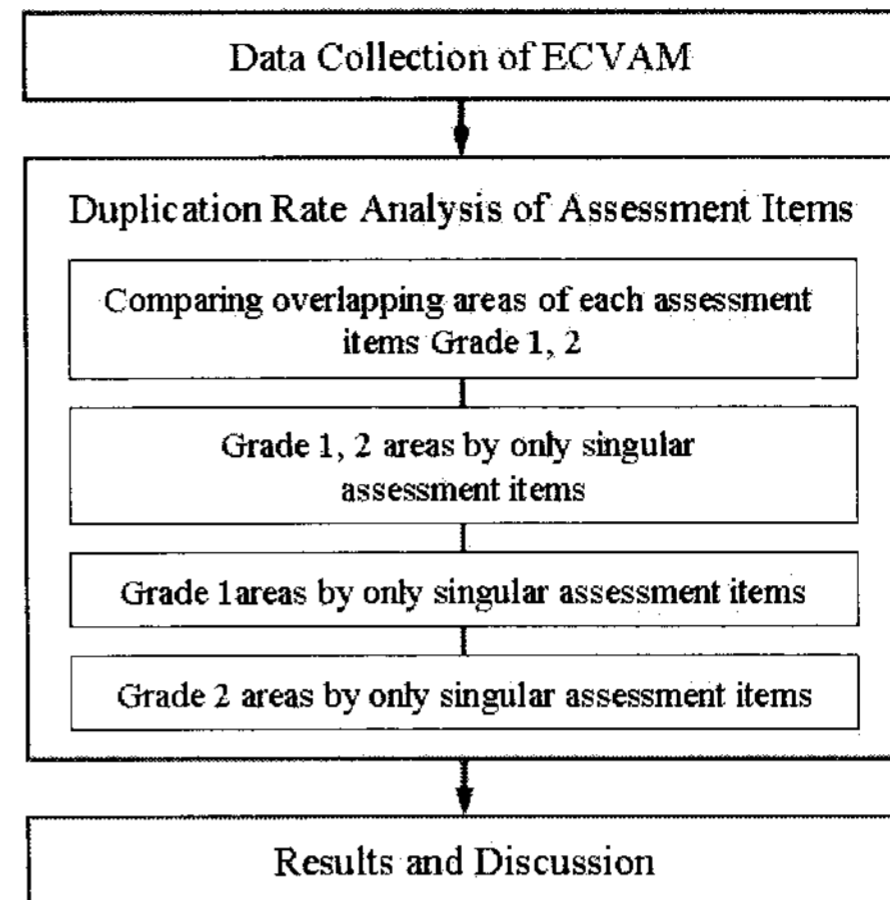
Second, we gripped results to be assessed by various items, which were overlapped each other. In order to reflect effectively each assessment item to the environmental conservation value

assessment map of national land, we analyzed the overlapping degree on environmental .ecological items, and investigated the grade distribution by the field survey.

## II. STUDY SCOPE AND METHOD

### 1. Study Area and Method

An environmental/ecological item makes a rather deep impact on the final results of the assessment since theme map construction of a single item is implemented nationwide. There are eight items for analysis of characteristics: the rarity (a rarity discovery area), the variety (Species diversity), the naturality (the degree of green naturality, the degree of natural ecology, age), abundance (ecological change observation area), stability (diameter, density). We composed a theme map from these eight and the legal assessment items, and then compared them with each environmental/ecological item. One of the frail among the environmental/ecological items involves an evaluation of grade for the distance from roads and urban areas. Since it is a counter-application against the least indicator method and its character is different from other evaluation items, we exclude this item from our comparison list. We applied Overlapped analysis on the environmental/ecological assessment items in Grade I and II regions. In order to analyze environmental/ecological assessment items' data, we classified them by using GIS DB. GIS DB is already constructed. For details of the analysis method see <Table 1> and <Picture 2>.



<Fig. 1> Process of Study

<Table 1> Analysis Method

Number	Analysis Method
Method 1.	- Comparing overlapping areas of each assessment items Grade 1, 2 - Permission of each assessment items' duplication
Method 2.	- Grade 1, 2 areas by only singular assessment items
Method 3.	- Only Grade 1 areas of Method 2.
Method 4.	- Only Grade 2 areas of Method 2.

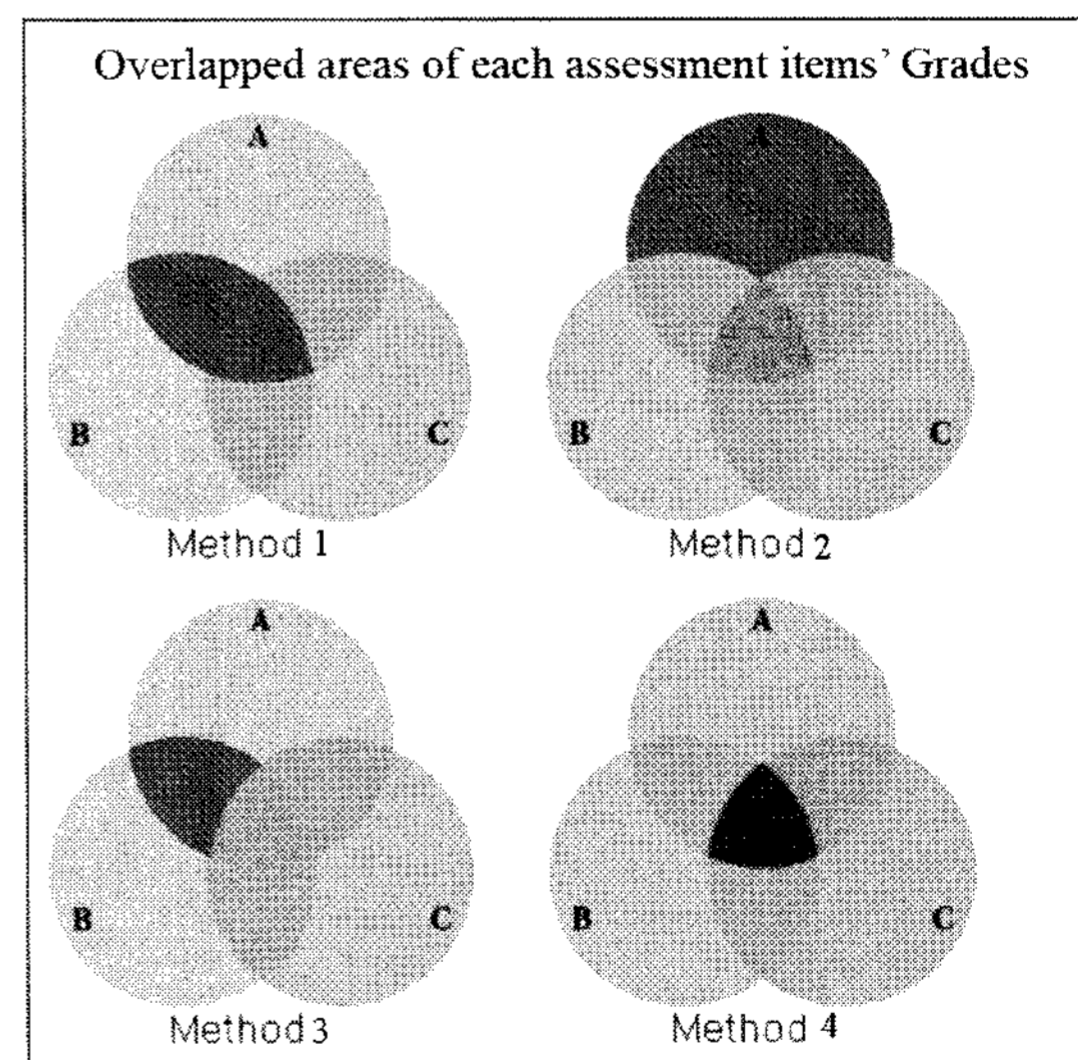


Fig2. Analysis Method Concept

### III. RESULT

#### 1. Overlapped analysis in environmental/ecological item

##### (1) Overlapped analysis in Grade I and II areas

<Table 2> indicates the percentages of areas classified Grade I and II. It compares the degree of overlap by crossing each of the environmental/ecological assessment items. Through this, it confirms each item's degree of overlap by standardizing a single assessment item. Items with the highest degree of overlap in Grade I are as follows: 81.7% overlap between Stability 1 (diameter) and Naturality 3 (age) areas. Items with the highest degree of overlap in Grade II are as follows: 79.9% overlap between Stability 2 (density) and Naturality 2 (ecological map). The proportion of cross overlapping in Grade I and Grade II areas are as follows: 91.0% between Naturality 3 (age) and Stability 1 (diameter).

The proportion of cross overlapping in Grade II and Grade I areas is as follows: 93.4% between Stability 1 (forest diameter).

<Table 2> Results by Method 1. Analysis

Assessment Units (%)	A		B		C		D		E		F		G		H		I		
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	
A	1	100	-	2.1	0.7	10.9	0.7	26.2	39.7	6.6	2.0	15.5	20.7	1.2	14.5	32.9	24.1	31.2	31.6
	2	-	100	0.1	0.2	24.7	0.5	23.4	43.4	5.5	1.2	13.9	22.0	0.9	13.2	35.1	24.5	27.9	35.0
B	1	63.8	2.8	100	-	2.2	0.4	2.2	27.2	23.9	3.0	1.0	21.1	0.1	22.0	2.6	23.8	58.4	24.6
	2	11.5	4.7	-	100	2.9	0.1	2.7	5.6	29.7	9.4	1.8	3.8	0.2	1.7	5.8	5.0	16.0	20.4
C	1	4.9	18.0	0.0	0.1	100	-	17.8	39.0	1.8	0.8	11.0	35.2	0.4	28.8	47.9	31.3	38.1	33.8
	2	15.7	18.6	0.3	0.1	-	100	34.7	36.4	6.4	3.0	15.7	19.9	0.4	16.3	35.7	27.0	28.2	25.5
D	1	12.3	17.7	0.0	0.1	18.5	0.7	100	-	0.6	0.9	4.9	39.2	2.0	36.0	47.9	33.1	40.5	32.9
	2	4.7	8.3	0.1	0.0	10.3	0.2	-	100	2.5	0.4	4.4	31.8	0.2	4.9	44.8	38.8	22.4	52.2
E	1	11.9	16.2	1.4	3.3	7.2	0.5	2.3	38.0	100	-	1.1	22.5	0.4	12.8	29.2	18.9	30.3	34.7
	2	12.7	12.3	0.6	3.5	10.8	0.8	11.4	18.7	-	100	6.1	10.2	0.2	6.3	16.0	10.3	26.4	18.8
F	1	12.4	18.0	0.0	0.1	19.7	0.5	8.4	30.1	0.5	0.8	100	-	4.5	91.0	43.2	43.6	42.3	28.7
	2	5.8	9.8	0.2	0.1	21.7	0.2	23.3	74.3	3.4	0.5	-	100	0.0	2.1	63.8	34.0	29.0	50.8
G	1	17.3	21.5	0.0	0.1	11.9	0.2	61.7	20.8	2.9	0.5	81.7	0.2	100	-	57.4	25.8	63.7	14.8
	2	11.9	17.6	0.6	0.1	52.8	0.6	63.6	34.2	5.8	0.8	93.4	6.2	-	100	53.9	43.4	39.5	29.0
H	1	6.4	11.1	0.0	0.1	20.7	0.3	20.0	73.8	3.1	0.5	10.5	44.8	0.8	12.7	100	-	29.4	48.9
	2	5.9	9.6	0.2	0.1	16.9	0.3	17.3	79.9	2.5	0.4	13.2	29.9	0.4	12.8	-	100	24.9	51.3
I	1	7.5	10.9	0.5	0.2	20.4	0.3	20.9	45.5	4.0	1.0	12.7	25.1	1.1	11.5	36.3	24.6	100	-
	2	4.4	7.9	0.1	0.2	10.5	0.2	9.8	61.3	2.7	0.4	5.0	25.5	0.1	4.9	34.9	29.3	-	100

A : Rarity discovery area, B : Species diversity, C : Degree of Green Naturality, D : Ecological Map (Vegetation), E : Ecological Change Observation Area, F : Forest Map - Wood Age, G : Forest Map - Wood Diameter, H : Forest Map - Density, I : Legal Assessment Items

#### (2) Overlapped analysis in a single assessment item

The results in <Table 2> evaluate the Overlap between two assessment items. For this reason, we cannot confirm the Grade I and II areas from a single item. So we carried out analyses, shown in <Table 3>, <Table 4> and <Table 5>, in order to assure the defined areas as Grade I and II, and the grades were decided, respectively, by a single item, overlapping two items, and three or more items.

<Table 3> indicates the degree of overlap of integrated Grade I and II areas. It shows the proportion of the Grade I and II areas in each of one, two, and three items. An individual item of Grade I and II is 24.2% of the abundance (ecological change observation area) Grade I and II areas. Two items of Grade I and II regions are 19.2% of Diversity (Species diversity) and Abundance (ecological change observation area). These percentages are the highest among the items. Three items of the Grade I and Grade II regions are 99.9% of Stability 1 (diameter).

<Table 4> indicates the degree of overlap in the Grade I area. The highest proportion and items in Grade I (defined by a single item) are as follows: 45.4% of Stability 2 (density). 12.8% of Naturality 1 (the degree of green Naturality) overlapped with Stability 2 (density) in the Grade I area (defined by two items). With more than three items of the Grade I region, 95.7% is assessed as Grade I for Stability 1 (diameter).

<Table 5> indicates the degree of overlap in the Grade II area. Grade II which is identified by a single item shows a high percentage as follows: 51.8% of Abundance (ecological change

observation area). Also, defined as the Grade I area within two items are as follows: 20.5% of Stability 2 (density) overlapped with Naturality 2 (ecological map). The Grade 2 region of three items or more is 66.4% of Stability 2 (density), 60.7% of Naturality 3 (age).

<Table 3> Results by Method 2. Analysis

Assessment Units (%)	A	B	C	D	E	F	G	H	I	J	K
A	17.8	0.1	0.5	2.9	1.1	0.0	0.0	0.4	10.5	15.4	66.8
B	1.8	19.9	0.0	-	19.2	0.0	-	0.6	11.6	33.2	46.9
D	0.6	0.0	2.0	1.8	0.1	0.0	-	0.1	2.3	4.9	93.1
D	0.7	-	0.4	5.6	0.1	0.1	0.0	6.8	5.4	13.5	80.9
E	3.9	2.5	0.2	1.2	24.2	0.0	-	0.1	10.4	18.3	57.4
F	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.8	0.0	1.1	98.9
G	0.0	-	-	0.0	-	0.0	0.0	0.0	0.0	0.1	99.9
H	0.1	0.0	0.0	7.8	0.0	0.4	0.0	0.7	0.5	8.8	90.4
I	2.4	0.1	0.4	5.0	0.6	0.0	0.0	0.4	25.5	9.0	65.5

A : Rarity discovery area, B : Species diversity, C : Degree of Green Naturality, D : Ecological Map (Vegetation), E : Ecological Change Observation Area, F : Forest Map - Wood Age, G : Forest Map - Wood Diameter, H : Forest Map - Density, I : Legal Assessment Items, J : Duplicated Area of 2 items, K : Duplicated Area over 3 items

<Table 4> Results by Method 3. Analysis

Assessment Units (%)	A	B	C	D	E	F	G	H	I	J	K
A	35.9	0.2	3.0	1.9	1.6	0.7	-	9.5	9.5	26.5	37.6
B	7.5	4.4	0.1	0.1	5.6	0.0	-	0.7	4.0	18.0	77.6
C	1.3	0.0	13.8	5.5	0.5	1.4	0.0	12.8	3.9	25.5	60.6
D	0.9	0.0	5.7	10.0	0.3	3.3	0.0	9.8	3.9	23.9	66.1
E	2.9	0.3	1.9	1.0	38.7	0.4	-	10.2	8.3	25.1	36.2
F	0.5	0.0	2.5	5.7	0.2	8.5	0.2	6.8	2.7	18.7	72.7
G	-	-	0.0	0.0	-	4.2	0.0	0.1	0.0	4.2	95.7
H	1.9	0.0	5.6	4.1	1.1	1.6	0.0	45.4	14.3	28.6	26.0
I	2.3	0.0	2.1	2.0	1.1	0.8	0.0	17.7	47.8	26.0	26.3

<Table 5> Results by Method 4. Analysis

Assessment Units (%)	A	B	C	D	E	F	G	H	I	J	K
A	27.4	0.1	0.1	8.4	0.6	4.1	5.0	1.2	7.9	27.5	45.1
B	2.4	61.8	0.0	1.4	7.6	1.0	0.5	1.2	14.4	28.6	9.6
C	4.7	0.0	22.5	9.1	0.8	4.1	3.5	2.0	7.7	32.0	45.5
D	1.6	0.0	0.0	18.9	0.1	8.0	1.1	10.2	17.1	38.2	42.9
E	6.2	2.9	0.2	4.6	51.8	1.9	2.0	0.6	8.2	26.5	21.7
F	1.8	0.0	0.0	18.4	0.1	9.0	0.2	3.8	5.9	30.3	60.7
G	6.7	0.0	0.1	7.3	0.3	0.7	22.5	15.4	6.6	37.1	40.4
H	0.5	0.0	0.0	20.5	0.0	3.4	4.6	2.9	1.7	30.7	66.4
I	1.8	0.1	0.0	19.7	0.2	2.9	1.1	1.0	28.0	26.9	45.1

#### IV. DISCUSSION

As above, this study enables us to grasp the relationship between ECVAM and environmental/ecological assessment through the repetitive analysis in Grade I and II regions of each assessment item. As a result of field research into the degree of forest items, the accuracy of its general construction is high. However, we found a different condition of the age and diameter's distribution in the Density. In fact, we verified the Grade I density region and then we were able to find that there are thickness of forest's areas of Grade II and III for diameter and age. The density item of the degree of forest map reveals a high proportion of overlap. Therefore, applying this item onto ECVAM requires a supplementary study.

#### V. REFERENCE

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