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Fengshui theory in urban landscape planning

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Abstract The spatial configuration of urban landscapes results from cumulative interactions between human activities and the physical environment. Traditional philosophies and cultural legacies have had important influences on urban development and planning in East Asia. In Seoul, traditional land use practices based on 'Fengshui' have significantly contributed to human-mediated patterns of landscape changes, in addition to the role of the socio-economic background (development) and other human activities. The concept of Fengshui was originally founded upon people's empirical cognition of natural landscape patterns. Recently, however, advanced economic development, westernization and urbanization have been rapidly altering the old traditions of the holistic landscape systems through changing urban planning practices. Since the type, scale, frequency, distribution and spreading pattern of environmental and human disturbances have been changed, a new paradigm for urban landscape planning is necessary to maintain the ecological and cultural integrity of landscapes in Korea. In this paper, we discuss recent concepts and methods of landscape ecology and urban planning from the viewpoint of Fengshui, the traditional land use patterns in Seoul, whose application has so far been restricted only to traditional land evaluation. We conclude that, to maintain the sustainability of the urban landscape, it is necessary to develop a new urban planning framework for the region that is based on the integration between landscape ecology principles with the traditional concepts of Fengshui.

Keywords Asian landscape pattern · Fengshui theory · Landscape ecological planning · Land use policy · Urban ecology

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Introduction

The compositional diversity and spatial configuration of land mosaics reflect the influences of natural, socioeconomic, and cultural processes in a given region (McHarg, 1969; Forman, 1995; Zonneveld, 1995; Zipperer et al., 2000). In East Asian countries, socioeconomic and cultural influences are particularly important for understanding the structure, functioning, and dynamics of many of the ancient landscapes (March, 1968; Holzner et al., 1983; Needham, 1986). For example, the land use pattern of Asian countries, including rapidly expanding urban areas, has been significantly influenced by the nature-oriented, ancient theory of landscape arrangement, Fengshui (or wind-water) theory (Choi, 1991; Forman, 1995; Hong, 2000).

Fengshui theory was originated from the oriental human consciousness and attitude toward nature and natural landscapes (Tuan, 1968; Porker, 1974; Needham, 1986). The cognitive and empirical topographical notion of Fengshui seems compatible with modern landscape ecological perspectives. For instance, the notion of ecological sustainability which depends on the combination of adaptability and change in ecological and human systems (Forman, 1989; Zonneveld, 1989; Wu and Loucks, 1995; Niemi et al., 1998; Reid et al., 2002) is consistent with the central tenet of Fengshui theory that has a major bearing on the urban planning and landscape management in Asia (Hong, 2001; Hong et al., 2001). Many items are required to encapsulate ecological-environmental sustainability in risk impact assessment and environmental resource management (Niemi et al., 1998). Protection of biological diversity and ecological integrity to maintain ecological process and systems is important items as other inter-disciplinary principles linked to socio-economical equity in landscape ecology (Forman, 1995; Lyle, 1999).

Current perspectives for assessing ecosystem (landscape or habitat) health are concerned strongly with quantitative measures of spatial structure and function of landscape elements (patch, corridor, matrix etc.) and ecological processes among these elements (e.g. mosaics, spatial arrangement of patches, water quality, material fluxes, etc.) (Forman, 1995; Niemi et al., 1998). In contrast, traditional knowledge for ecological sustainability and environmental capacity from Fengshui theory emphasizes the process-based perceptual experience and holistic understanding of the natural land (scape) as well as its cultural implications (Table 1). Thus, Fengshui theory views biophysical entities through the lens of empirical cultural knowledge, so that holistically-meaningful sustainability is melded with cultural historical aspects of the human environment. Fengshui theory is therefore an alternative tool for environmental assessment and is emerging as a new paradigm for achieving a harmony between humans and nature (Table 1).

With the rapid development of remote sensing and geographic information technologies, spatial data on vegetation and land use patterns can be readily integrated over large areas. The relationship between landscape change, disturbance regimes and historical legacies can also be studied, for example, by comparing a time series of land use maps on various scales and hierarchy (Küchler and Zonneveld, 1988; Zonneveld, 1989; Lyle, 1999; Wu and Hobbs, 2002). These new techniques and multi-scale data can be used to evaluate the habitat suitability of Fengshui theory in landscape and urban planning, and enhance its scientific rigor.

In this paper we present the essential elements of Fengshui theory and its relationship to some modern landscape ecological concepts and principles. We describe how this traditional paradigm of landscape planning has influenced the urban development of the Seoul metropolitan area, Korea. We also discuss how Fengshui theory can be integrated with modern landscape ecological principles to better serve landscape and urban planning

Table 1 Comparisons between Fengshui theory and landscape ecology in terms of landscape elements and their assessment and evaluation procedures

Element		Principle of assessment and evaluation	
Fengshui	Landscape	Fengshui	Landscape ecology
Mountain	Patch	I. Assessment of connectivity, arrangement and shape mountainous range in regional scale (看龍法) II. Assessment of topographical or geographical feature in local or village scale (藏風法) • Macro-climate for temperature and precipitation in regional level, ecological network for large animals (e.g., game reserve) • Micro-scale wind direction, biomass, vegetation	Size, number, connectivity, shape-function relationship, configuration, arrangement, area-perimeter ratio, island biogeography, area-species curve, etc. LOS-SLOSS/edge effect/habitat/peninsula effect/boundary roughness/fractal geometry/ core-buffer-corridor/habitat sink-source, etc.
Water	Corridor' Matrix' Network	III. Assessment of stream connectivity and shape, networking with mountain to village for watershed, rice paddy (得水法) IV. Assessment of suitable location (定穴法) • Flux (energy, material, organisms), water resource management • Porous soil, biological habitat, Hydrological, biogeochemical (nutrient) cycle, air circulation, humidity control	Width, connectivity/vertical-horizontal structure/ heterogeneity, quality/density, circuitry, connectivity of corridor • Energy flux and material transport system/ sink-source habitat/ driftfence effect/vegetation structure/wind-break/grade-up of effectiveness of movement and transport/ habitat quality/landscape tolerance
Direction' Man	Mosaics, Patch-corridor-matrix linkage	V. Arrangement for direction (坐向論) • Guideline for arrangement of architecture and artificial structures VI. Pattern, aspect and appearance of total landscape (形局論): *Jangpung-Deuksu, Baesan-Imsu* • Holistic perception on land and nature base on the empirical cognitive process	Landscape pattern, landscape diversity, isolation, lobe and cove, adjacency etc. • Patch-corridor-matrix shape/habitat arrangement/disturbance dispersal/population dynamics, etc.

(*Continued on next page*)

Table 1 (*Continued*)

Element		Principle of assessment and evaluation	
Fengshui	Landscape	Fengshui	Landscape ecology
	Comparison	• Assessment process of suitable location (habitat) based on Fengshui theory is following principles from I to VI with step by step. Methods for assessment of those steps are also decided by each procedure. The First four procedures (I–IV) are applied to selection principle for location. After those procedures, step V is concerned to artificial structure itself for its suitable orientation and arrangement. • Man's empirical experience on landscape is reflected on the landscape management and sustainable land use (*Bibo, Apseung* as restoration technology). Because empirical expert for decision, evaluation and interpretation of Fengshui is commonly subjective. • Long-time consumed, weak generality lead to hide expectation	• Various scientific methods are developed for evaluating landscape quality and health. All landscape elements are linked each other in the landscape system (patch-corridor-matrix model by Forman 1995). • Assessment items are separated by each elements and landscape analysis should be executed by each landscape element. Analysis methods for landscape system were strongly affected by traditional quantitative ecology of unit ecosystem. Differing to Fengshui, assessment procedure of spatial analysis could be applied each landscape element separately. Process feedback is possible. Evaluation and interpretation of landscape is objective. • Developing RS and GIS can be role of great tool for holistic understanding of landscape
	Cases	• Capital 'Seoul' in *Yi* Dynasty (Fig. 2), Green-space network plan (see Fig. 6), Cheonggyecheon Restoration Project in urban Seoul (see Fig. 7), Wind way based on Fengshui theory • In recent, Fengshui experts as well as landscape ecologists are involved as planning counselor in the various projects in national and local government (ex. decision of new capital location)	• Nature-type stream restoration, watershed management, deciding habitat suitability, eco-road, eco-bridge, suburban development, urban water-space for sinking urban heat, rooftop revegetation, biotope construction, DMZ Biosphere reserve, Baekdudaegan Project (Choi, 2004) • Argument between development and conservation policy could be remained although scientific solution had done

purposes. By examining the recent developments in urban planning in Seoul, we explore how Fengshui theory can help develop an ecologically sustainable urban landscape of Seoul.

Fengshui as a culturally oriented, Asian landscape planning paradigm

The cultural aspects of landscape change and management practices in East Asia have much to do with Fengshui theory (Holzner et al., 1983; Forman, 1995). *Feng* means "wind (風)" and *Shui* "water (水)". They can be interpreted as real entities in terms of mountain shapes, stream networks or drainage basins. The concept of Fengshui, as a planning and design theory, emphasizes peoples' safety, national security and the balance of nature. Ancient oriental people determined optimal or quasi-optimal locations and spatial patterns of landscapes, which were in tune with cultural traditions, religion, social structure, economics, politics, and biophysical features, for purposes of man's safety and prosperity (Choi, 1991; Hong, 2001). According to Fengshui theory, ecologically sound conditions with high energy (e.g., fertile soil, fresh air, clean water, wood) come from optimal spatial arrangement and connectivity of these two elements.

Through visualization of topography and land evaluation (Table 2), locations with the optimal vitality (or living energy, energy flux) called '*Qi*(氣)' (cf. Watanabe, 1990; Choi, 1991, 2000) can be identified. The maximization of Qi is dependent upon active flows of energy, material, species, and information as well as the harmonious interplay between mountains and streams the two elements of Fengshui. An analogy for finding the optimal vitality is searching for land suitability in land evaluation (e.g., Zonneveld, 1995; Niemi et al., 1998). The spatial arrangement and connectivity of mountains and streams can significantly influence the ecological functioning of landscapes. The functioning of degraded or unproductive landscapes can be enhanced by adding new landscape elements (Table 1). Thus, the ideas and methods in "*Bibo Fengshui* (裨補風水)" may be relevant to ecological restoration as well as ecological urban planning which is concerned with landscape pattern, human activities, and ecological integrity of urban systems.

As a spatial theory, principles of Fengshui are similar to the concepts of landscape mosaics and networks (Table 1). Mountains, streams, residential areas, and urban blocks are all landscape elements. Cognitive maps of landscape patterns designed or planned following Fengshui theory integrate biophysical, ecological, and cultural aspects (Fig. 1). The size, shape, orientation, spatial arrangement, and connectivity of patches in a landscape matrix may influence the climate, soil conditions, biodiversity, and ecosystem functioning. Natural vegetation and river-stream networks protect villages against strong wind velocity and maintain moisture. These conditions, consequently, may increase tree growth, rice production, and soil and water conservation. A place surrounded by mountains as in Fig. 1(I) represents a compact and less fragmented landscape with complicated boundaries which is beneficial for wildlife conservation. On the other hand, the fragmented landscape (Fig. 1(J)) has no significant ecological benefits for biodiversity conservation. A landscape pattern (Fig. 1(K)) that has many lobes and coves (i.e. high roughness) may enhance source-sink interactions. However, this type of landscapes can be easily exposed to outside disturbances because of frequent and strong edge effects, and may change to a different type (Fig. 1(L)) without landscape management (as is Bibo Fengshui).

Several types of landscapes based on the predominant spatial patterns between Feng (wind) and Shui (water) can be identified to create "cognitive maps" (Choi, 1991; Han, 1998). A cognitive map can be created from analyzing many real pictures and paintings.

Table 2 Suitability of landscape elements and geophysical attributes of a settlement and its ecological function in accordance with Fengshui theory

Landscape elements & geophysical attributes	Functioning effects related to ecological principles	Human impact on land	Land planning by Fengshui		
			Positive (陽氣)	Negative (陰氣)	Eco-technology (裨補)
Shape					
Mountain (large area of natural vegetation)	Biodiversity Microclimate control temperature Large home-ranged animal corridor/habitat patches	Perforation dissection fragmentation	Sliding • gentle slope	Rugged • steep slope	Pseudo-mountain -plantation
Stream	Transport/corridor local climate/water supply	Rectillinear channalization cement	Clean • gentle• curved	Turbid • speedy • strait	Pseudo-stream -increasing curveness -habitat creation
Road	Transport Corridor	Straitness/habitat crossing/road kill increasing invasive plants	Horizontally • curved	Vertically • direct	-unpaved -eco-bridge -eco-road
Forest (rural small forest)	Productivity Habitat patches for small mammals	Perforation/dissection fragmentation attrition/loss	Sparse	Dense	Pseudo-mountain -plantation/hedgerow -windbreak plantation
Topography	Wind/climate/temperature		Surrounded flat •	Distorted slope •	
Soil	Productivity flora and fauna	Acid/deposition desertification soil pollution/erosion	Condensed • soft • nutrient	Wet • dry • eroded	
Shapeless					
Air	Temperature Humidity	Air pollution	Clear • dry	Impure • wet	Suitable land assessment by fengshui method -planned development after E.I.A
Direction	Productivity' distribution and richness of species	Unplanned development	Sunny place	Shadow place	
Temperature	Biodiversity	High urban heat island greenhouse effect thermal inversion	Warm • temperature	Cold • rough	

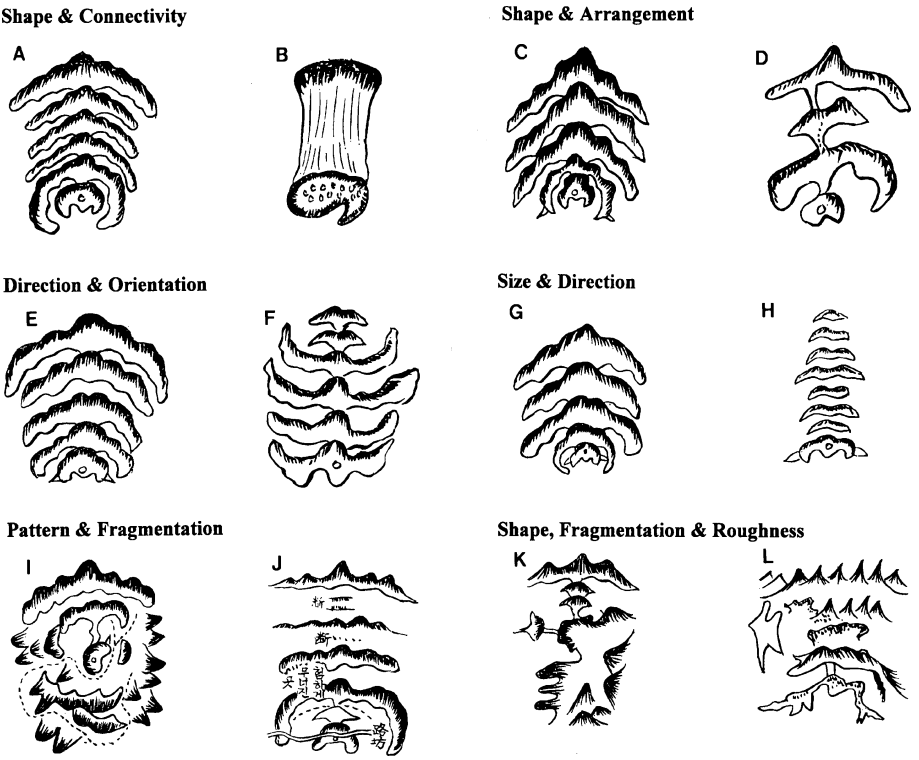

Fig. 1 Land evaluation by Fengshui principles (*redraw from* Choi, 1991). Geophysical and morphological land attributes such as size, shape, connectivity, pattern, arrangement and direction of mountain landscapes relating to land assessment. Left: positive suitability (A, C, E, G, I and K), Right: negative suitability (B, D, F, H, J and L)

Figure 2 shows a real landscape painting of Seoul, and its landscape pattern corresponds to Fig. 1(I) in Fengshui theory (i.e., the compact type). Such Fengshui-based landscape designs are commonly found in urban areas with high mountains and embedded stream and road networks in Korea. Also, many old cities in the Korean peninsula have formed in basins to enhance national security against possible military attacks from foreign countries. These man-dominated landscapes, especially urban landscapes, through the Korean peninsula as the cultural corridor between China and Japan reflect the long-term integration of natural and cultural history.

There are several types of landscape pattern which embody Fengshui principles (Table 1; Choi, 1991; Han, 1998). Two major types of Fengshui-based landscapes are often found in agricultural and forested landscapes in mountainous regions in Korea (Fig. 3). The first type is the "parallel patterning" ('*Baesan-Imsu*' 背山臨水 in Korean), and the second type is the "convoluted patterning" ('*Jangpung-Deuksu*' 藏風得水 in Korean). The parallel patterning is characterized by parallel arrangements of mountains and streams, whereas the convoluted patterning is often related to promoting military security and rice production (Hong, 2001). In the parallel pattern, the high mountain protects against the winter wind and keeps the temperature warm. Convoluted pattern has the fertile soil and water supply required for rice production. A drainage basin in low terrains with fertile soil and abundant water supply are ideal to be used as paddy fields. Sustained food and water are also essential wartime

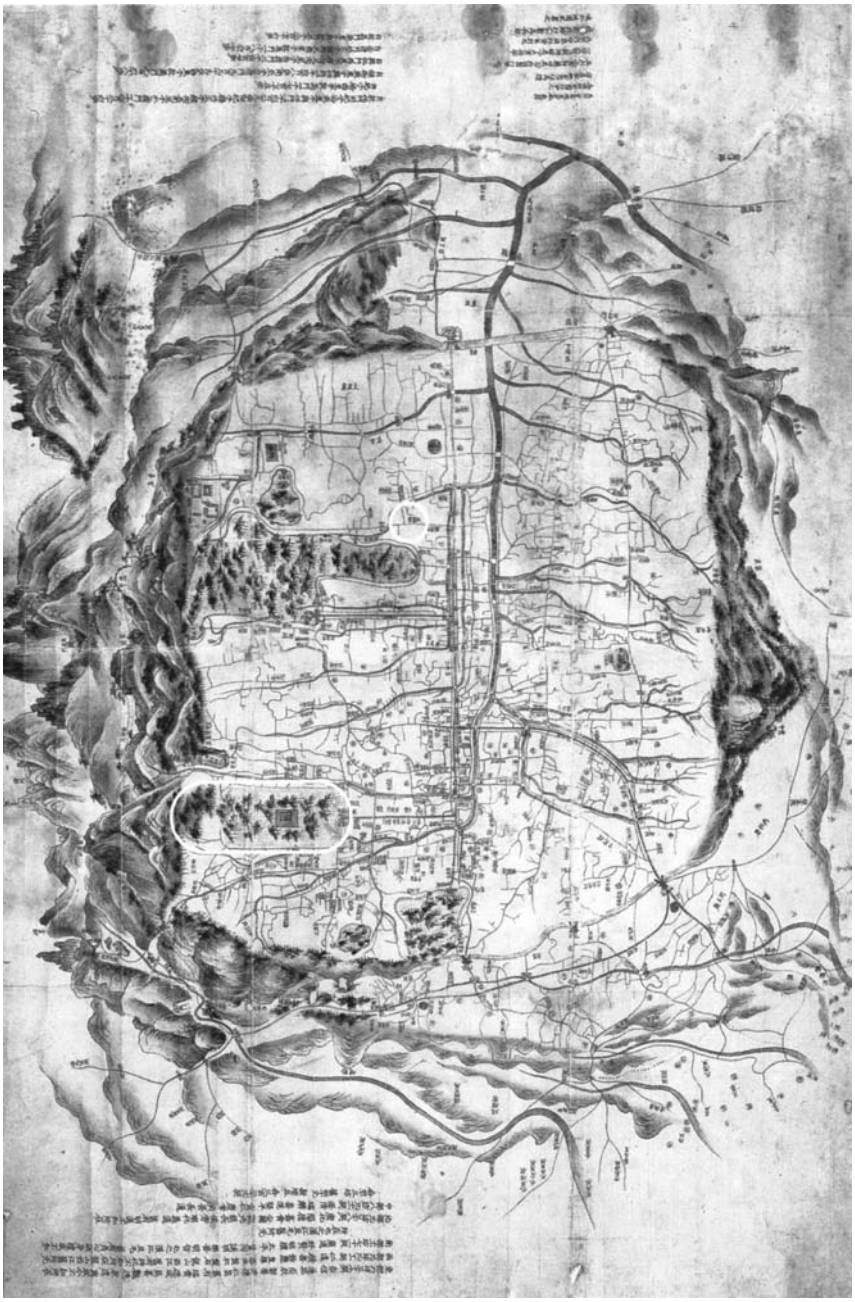

Fig. 2 Real painting of an urban landscape pattern in Seoul of the late of 18th Century. Landscape elements such as river-stream-road network and small remnant forest patches dissected by resident area and crop field are shown in largely connected mountain surroundings. This landscape pattern often appears in cities in modern Korea. In this painting, the west part shows north face

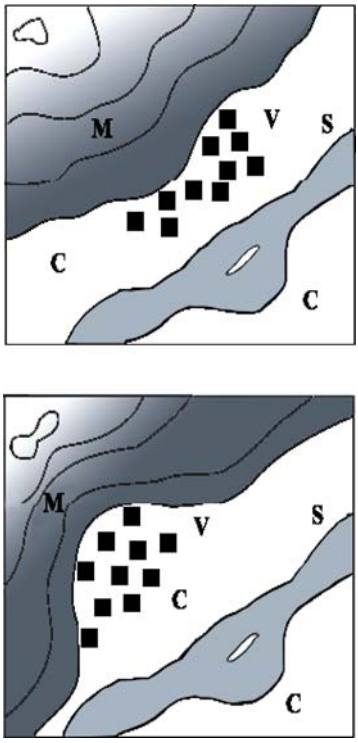

Fig. 3 Two major landscape types often found in agricultural and forested areas with many mountains and streams in Asian countries: Up; parallel pattern (*Baesan-Imsu,* in Korean), Down; convoluted pattern (*Jangpung-Deuksu,* in Korea). M; mountain (corresponding to vegetation matrix), V; village and town, S; stream corridor, C; cultivated area. *Redraw from* Hong (2001)

materials for long-term defense against attacks in isolated areas. Also, as mentioned above, a place surrounded by mountains has complicated boundaries which may render positive ecological benefits (e.g., high habitat diversity). The Seoul urban landscape, surrounded by high mountains, shows primarily a convoluted pattern.

Modern landscape ecology provides both theoretical insights and pragmatic guidelines for maintaining and restoring the structure and functioning of landscape mosaics. Fengshui theory is also concerned with creating and managing Fengshui elements (Table 1), resembling modern ecological restoration technology in some way. There are two main restoration methods in Fengshui. The first method is to strengthen the landscape by adding materials (or element supplementation, "*Bibo* (裨補)" in Korean). For example, adding mountain and forest patches (e.g., windbreak forest may change the local climate and local biodiversity by controlling wind and water systems. Adding streams enhances the landscape connectivity by improving ecosystem function and network stability. Locating a pagoda is important in Bibo Fengshui which was influenced by Buddhist civilization (Choi, 2000). The second method is to modify or remove improper and unnecessary open spaces and other structural elements in the landscape (i.e. element suppression management, "*Apseung* (壓勝)" in Korean).

These two methods are complementary (Table 3), working together to enhance the balance or harmony between man and nature. However, because Korea is a small country with limited natural resources, Bibo has been a more dominant component of Fengshui theory than Apseung. Apseung is usually included as a complementary part in Bibo. This is a major difference in practice of Fengshui between Korea and China. For many decades, Bibo Fengshui has been practiced at multiple scales: national land utilization at the macro-scale (e.g., Baekdudaegan Conservation Project; Choi, 2004), regional and urban planning at the meso-

Table 3 Theoretical comparisons of the selection procedure for the suitable location of urban development in Korea

Scale	Ecological function	Landscape ecology	Fengshui	System of urban planning
Macroscale	• Source corridor for large animal movement (ex. large home-range mammals) • Ecosystem stability • Biodiversity	• Continent or regional context (connectivities of major mountain ranges, vegetation matrices, and river corridors, coastline) • Macroclimate	**看龍法** National wide distribution, scale and connectivity of topographical characters (ex. mountain range)	National land utilization planning
Mesoscale	• Ecological characteristics of large patches and other spatial elements • Wind and water flow (energy, material)	• Landscape context • Component, shape and pattern of landscape elements (ex. aggregation, dispersion pattern of mountain and watershed) • Microclimate condition by local mountain and river • Orientation or arrangement of spatial elements and landscape elements (developed area, field forest)	**藏風·得水** Condition of wind flow and water system according to regional-wide distribution, scale and connectivity of topographical characters (ex. surrounding topography and physical aspect of mountains and river or streams) **定穴·坐向** Direction, arrangement of landscape elements (urban scale)	Regional planning/urban planning
Microscale	• Heat flux • High productivity of plant materials, crops etc. • Local ecosystem function, health • Structure or pattern of spatial elements • Ecological process and function	• Orientation or arrangement of spatial elements and landscape elements (developed area, field, forest) • Shape of spatial elements in the landscape context	**定穴·坐向** Direction, arrangement of landscape elements **形局** Shape of physiognomic topography	Specific planning Building planning

scale (Cheonggyecheon Restoration Project in Seoul, see Fig. 7), and local environmental and housing planning at the micro-scale.

Recent land use change and urban planning in Seoul, Korea

The urban land use of Seoul has been expanding outward since the industrialization in the 17th Century. During the period of Japanese colonization in the 1920's, new transport systems (e.g., railways) were part of the results of, and further facilitated by, urban expansion and land development. The population of Seoul was about 100,000 in 1394 when Seoul was established as a capital city in Chosun Dynasty, and increased to 1,400,000 in 1958 after the Korea War. During the high economic growth period in Korea in the early 1980's, housing projects boomed in the southern part of Han River. Except for certain steep slopes of the mountainous areas of southern Seoul, all lowlands and plains, including crop fields, were converted to developed areas—mostly residential (Fig. 4). In the past several decades, the Seoul metropolitan region has expanded from 268 km^2 in 1958 to 606 Km^2 today, with new developments rapidly encroaching the northern part of the Han River. Now Seoul is one of the mega-cities of the world with a population of about 12 million people. The high concentration of urban human population has been a major driver for the rampant expansion of urban areas in Seoul and throughout Korea.

Land transformation has often led to sociologic, economic and ecological changes (Lepart and Debussche, 1992; Forman, 1995; Zipperer et al., 2000). Rapid urbanization in metropolitan regions has resulted in the shrinkage of green space, habitat fragmentation, impervious surfaces, deteriorating water quality, and introduction of exotic species for economic and aesthetic purposes. In short, urbanization has frequently led to the reduction in native biodiversity and dysfunction of natural ecosystems. At the same time, urbanization also brings about a suite of socio-economic and cultural changes, including human consciousness (Nassauer, 1995). Using land use and land cover change maps, created using LANDSAT TM imagery taken from 1988 to 1997, we quantified how landscape pattern has changed and how these changes are related to the human dimension. Based on data from Seoul Metropolitan Government (1997), between 1988 and 1997 developed areas increased from 50.33 to 60.38%, while forested areas decreased from 42.54 to 28.18%. Biotope mapping and field survey in the Seoul metropolitan area were carried out in order to determine the status of green spaces and assist in ecological urban planning for sustainability (Seoul Development Institute, 2000). In this project, many small green spaces that were not identifiable in LANDSAT TM imagery were added to the updated urban landscape planning database. Seoul Development Institute shows that in 1999 developed areas were 59.5%, agricultural and grassland areas were 7.6%, and forested areas were 26.4% of the total land area. Compared to the 1997 data, the total forested area further decreased. The total area of natural vegetation with relatively high native biodiversity also decreased because much of it was converted to residential areas and erosion control plantations.

It is evident that the area of green space in the urban landscape decreased as the developed area increased. Many forest remnants have been repeatedly fragmented into smaller and smaller patches, most of which eventually were completely lost to other land use types. Except for historical monuments such as palaces, large natural green spaces in the centers of towns either disappeared or have been severely modified into man-made parks. Several reasons are responsible for the environmental problems associated with rapid urbanization in Seoul. They include: the lack of policies that regulate the urban population influx, the failure in implementing the restriction law for high density building construction, the lack

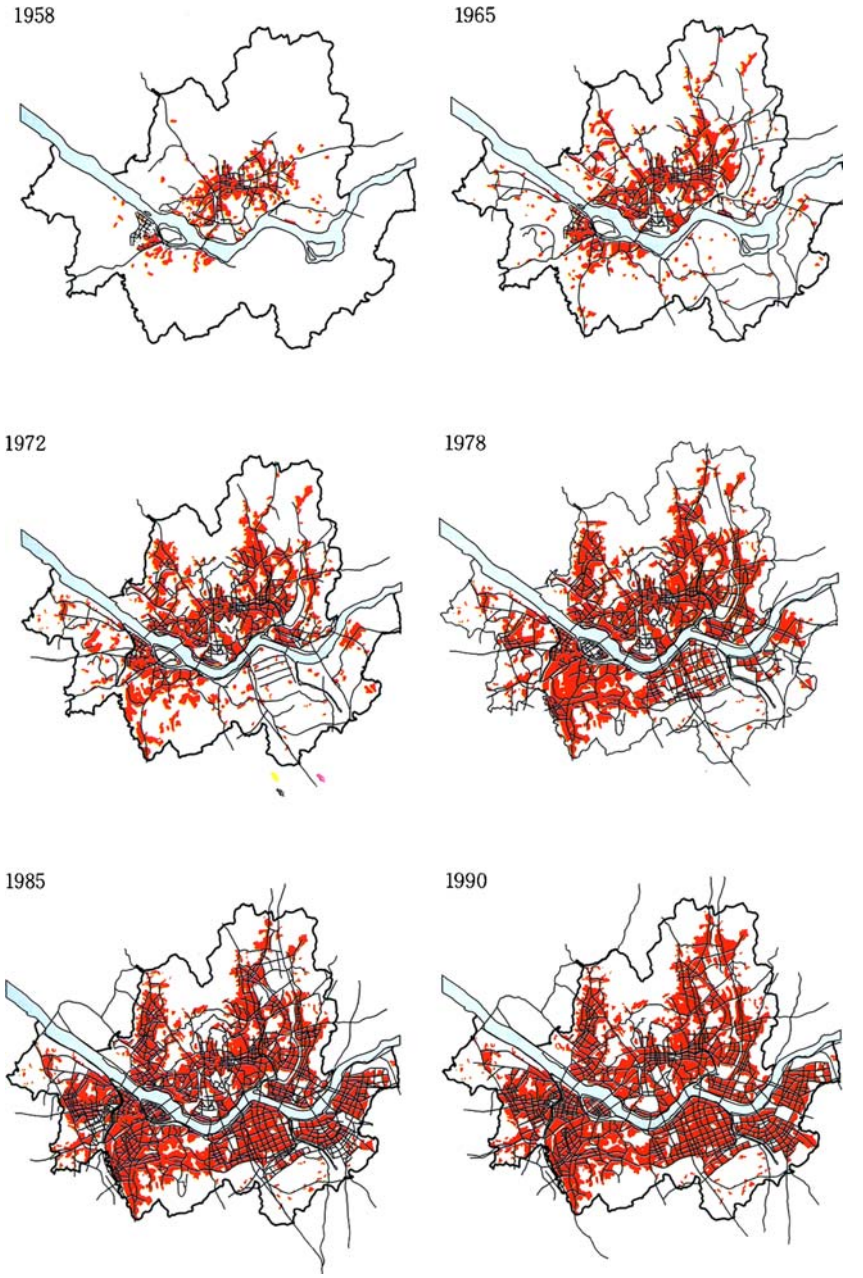

Fig. 4 Expansion of urban areas of Seoul since 1958 (Seoul Development Institute, 1994). Urban areas have expanded toward the northern part (old commercial and resident area) of the Han River since 1950, after the Korean War. Population increase in Seoul, which has accompanied the economic development since the 1970's, is a major driving force of land transformation in the southern area of the River and establishment of new satellite cities (towns)

of urban landscape management strategy that emphasizes the natural ecosystem components and their functioning in the urban environment, and the unplanned exploitation of lowland areas, removing remnant green-spaces, and paving stream banks. This came about from the lack of knowledge and recognition of ecological urban landscape planning in Seoul after the Korean War.

Rapid housing developments have encroached into neighboring forested and cultivated lands, creating a number of satellite cities that are mainly composed of housing clusters surrounded by conserved natural areas (Fig. 5). Such "edge cities" in percolation theory have caused large-scale landscape fragmentation in Korea as well as in other parts of the world (Zipperer et al., 2000). Nevertheless, according to Seoul Metropolitan Government (1995), the future Seoul metropolitan area will be planned to have a multi-satellite town structure with a number of nuclei. In this case, many socioeconomic and environmental problems can and will readily spread into other adjacent cities (Fig. 5). To minimize the negative environmental impacts of this plan, several strategic steps and procedures based on holistic urban landscape ecological planning principles must be followed.

The goal is to create a landscape with high ecological functional integrity and connectivity among nuclear cities, appropriate spacing among cities to reduce possibilities of resource-related conflicts, and effective transportation systems networking all the cities. To achieve this goal, a green-space network approach is necessary. Fragmented and dissected forest patches and other remnant green spaces can be connected or restored through vegetated cor-

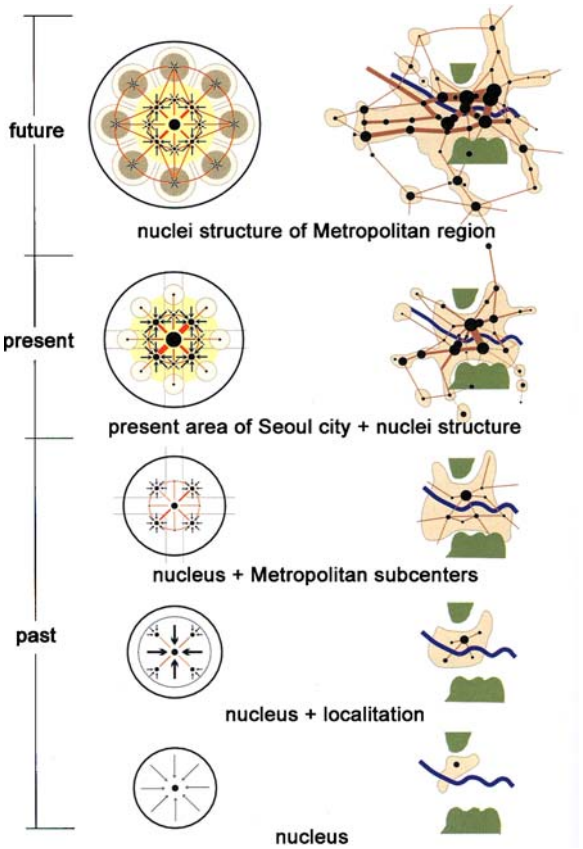

Fig. 5 Changes in the spatial structure of the Seoul Metropolitan Area (Seoul Metropolitan Government, 1995)

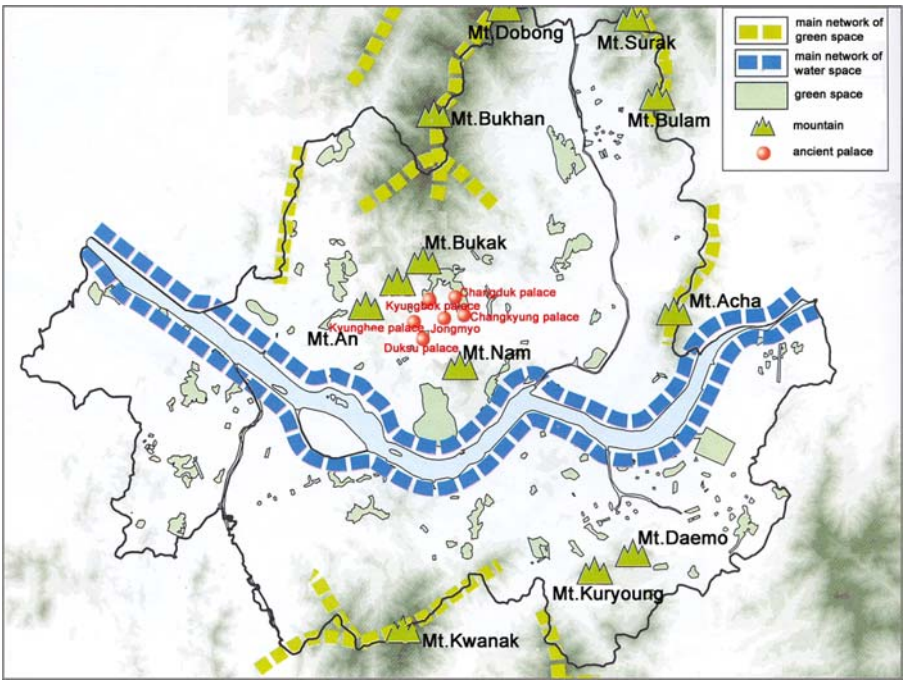

Fig. 6 Seoul Green Network Plan for major green-spaces and its potential network in Seoul (Seoul Metropolitan Government, 1997)

ridors or native plantations (Fig. 6). In addition, the total coverage of green-spaces needs to be increased by revegetation of rooftops, roadsides, and stream banks. Thus, we have suggested the construction of a green space network that connects mountain ranges, watersheds, riparian forests, and isolated forest patches through streams (e.g., Cheonggyecheon (Stream) restoration, http://www.metro.seoul.kr/kor2000/chungaehome/en/seoul/main.htm) associated with the Han River, to help enhance the ecological sustainability of Seoul in years to come (Fig. 7).

Discussion and conclusions

Human perception, cognition, and value systems are important factors that shape the landscapes (McHarg, 1969; Naveh and Lieberman, 1994; Nassauer, 1995; Wu and Hobbs, 2002). Cultural influences are pervasive in both human and natural landscapes at local, regional, and even larger scales (see Table 3). Socioeconomic factors influence human consciousness and appreciation of the landscape. As culture, economy, and politics all change with time, the driving forces of landscape change also change. Although the landscape pattern of Seoul historically has been shaped by time-honored Fengshui, recent changes in cultural traditions with modernization and Western influences have modified, and sometimes been integrated into, the old yet rapidly developing landscapes.

Strictly speaking, Fengshui theory is not a scientific theory; rather, it is a set of empirical principles that integrate cultural and religious beliefs with biophysical idiosyncrasies and regularities (March, 1968; Needham, 1986). While some elements of Fengshui theory

Fig. 7 Cheonggyecheon (Stream) restoration project in urban Seoul (2004). This large restoration project is representative restoration of *Qi* (living energy or energy flux) in Fengshui principle. Up: current situation of area of the stream (2004 year), Down: Designed picture of the same place after completion of the project. Picture source from http://www.metro.seoul.kr/kor2000/chungaehome/en/seoul/main.htm

apparently correspond to those in modern landscape ecological theory, they need to be tested and refined through rigorous scientific studies (see Table 1). On the other hand, given the importance of the respect and understanding of cultural traditions, landscape ecology is not complete without incorporating cultural traditions and heritages in Asia they are well represented in an integrated way in Fengshui. This implies that, although general principles for

landscape and urban design and planning are possible, implementations of these principles in any given geographic location must consider social, cultural, and biophysical peculiarities.

Fengshui theory has long been used for land-use policy and landscape restoration in East Asian countries (Choi, 1991; Whang, 1991). While this theory originated in China, it has diversified in several ways as it has been used in different geographic and cultural settings. In particular, Korea, geographically positioned as a 'cultural corridor' among Asian countries, has applied and adapted this theory in highly populated areas for a long time. There is little doubt that this traditional paradigm will continue to influence landscape and urban planning in China, Korea, and other Asian countries with similar cultural heritage. Thus, it is important to enhance its scientific rigor and integrate it into an Asian perspective of landscape ecology. While there have been many reviews discussing the divide and unification between the European and North American schools of landscape ecology (Lyle, 1999; Wu and Hobbs, 2002), other regional perspectives, such as Fengshui theory, that have influenced landscape design and planning in Asia for centuries, should also be considered if landscape ecology is to become truly transdisciplinary and applicable to different parts of the world.

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