

SEOUL'S GREENBELT: AN EXPERIMENT IN URBAN CONTAINMENT

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ABSTRACT—Urban containment policies are considered by some to be a promising approach to growth management. The greenbelt-based urban containment policy of Seoul, Republic of Korea is examined as a case study. Seoul's greenbelt has generated both significant social costs and benefits. Korea's greenbelt policy is currently being revised, largely due to pressure from greenbelt landowners and developers. While there is no definitive answer to the question of whether Seoul would be a more or less "sustainable city" today without the greenbelt, it is certain that in the absence of the greenbelt Seoul would have lost much of its rich natural heritage and essential ecosystem services.

Countries around the world have responded to growing concern about the problems associated with sprawling development patterns by creating a wide range of policy instruments designed to manage urban growth and protect open space (Bengston *et al.* 2004, Richardson and Bae 2004). But the effectiveness of these policies is often questioned. Innovative and effective policies will be required to stem the tide of increasingly land-consumptive development. Out of the array of growth management techniques, urban containment policies are considered by some to be a promising approach. National urban containment policies have been in place for many decades in a few countries, including the United Kingdom and the Republic of Korea. In the United States, local urban containment programs have typically been created by individual municipalities without direction or assistance from state or national governments (Dawkins and Nelson 2002).

Pendall *et al.* (2002) distinguished three types of urban containment policies: greenbelts, urban growth boundaries, and urban service boundaries. A greenbelt refers to a physical area of open space—farmland, forest, or other greenspace—that surrounds a city or metropolitan area and is intended to be a permanent barrier to urban expansion. Development is strictly regulated or prohibited on greenbelt land. Greenbelts may be created through public or nonprofit acquisition of open space or development rights, as in Boulder, Colorado (Pollock 1998), or they may be created and enforced by regulation of private property. Voters in Ann Arbor, Michigan, recently overwhelmingly approved a greenbelt proposal that will involve purchase of both land and development rights (Ann Arbor News 2003). Greenbelts have rarely been used in the United States but have been used much more extensively in large cities in Europe and Asia. London was the first major city to introduce a greenbelt system in the late 1930s (Munton 1983). Other cities that have adopted (or adopted and subsequently abandoned)

greenbelts include Ottawa and three other Canadian cities (Taylor *et al.* 1995); Asian megacities including Tokyo, Seoul, and Bangkok (Yokohari *et al.* 2000); and many large European cities such as Berlin, Vienna, Barcelona, and Budapest (Kuhn 2003).

In contrast to greenbelts, an urban growth boundary (UGB) is not a physical space but a dividing line drawn around an urban area to separate it from surrounding rural areas. Zoning and other regulatory tools are used to implement a UGB. Areas outside the boundary are zoned for rural uses and the area inside is zoned for urban use. A key distinction between UGBs and greenbelts is that the former are not intended to be permanent. A UGB is typically drawn to accommodate expected growth for some period of time, and the boundary is reassessed and expanded as needed. In Oregon, the Land Conservation and Development Act of 1973 required, among other things, the delineation of urban growth boundaries around all of the state's cities and around the Portland metropolitan area (Nelson 1994).

Urban service boundaries, the third type of urban containment policy, are even more flexible than UGBs. An urban service boundary delineates the area beyond which certain urban services such as sewer and water will not be provided. They are often linked with adequate public facilities ordinances that prohibit development in areas not served by specific public services and facilities. Assessments of urban service boundaries have generally found them to be of limited effectiveness in containing sprawl, in part because they tend to be easily and frequently amended in the face of political pressure to accommodate growth (e.g., Dearborn and Gygi 1993, Poradek 1997).

This paper focuses on greenbelts, the most restrictive form of urban containment policy. The idea of surrounding cities with a belt of agricultural land or other open space is an ancient one, dating back at least to the 13th century B.C.

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and the Levitical cities of Palestine (Ginsberg 1956, Osborn 1969). In more recent times, greenbelts were proposed in the influential work of Sir Ebenezer Howard in 1898 (Howard 1902), and they have been a widely used policy in some countries for containing urban expansion, protecting agricultural land and open spaces, and achieving other public goals. Greenbelts have long been a controversial public policy because of their purported negative consequences, including increased land and housing prices in the urban area contained by the greenbelt, decreased greenbelt land prices, loss or restriction of development rights for greenbelt landowners, increased urban congestion, and other undesirable consequences. Greenbelts also have been accused of causing sprawl and higher commuting costs as development jumps over the greenbelt. But greenbelts also generate significant social and environmental benefits, including amenity and recreational value, bequest value, and protection of open space, agricultural land, natural resources, and life-supporting ecosystem services.

We examine the longstanding greenbelt surrounding Seoul, Republic of Korea. Some have suggested that, overall, Seoul's greenbelt is a rare success in urban containment: "The greenbelt in Seoul, so far, may be evaluated as one of few successful greenbelt experiences in Asia," (Yokohari *et al.* 2000: 163). Others claim the social costs of Seoul's greenbelt have overwhelmed the benefits and the policy should be abandoned. The debate about Seoul's greenbelt policy is part of a broader debate among urban planners about the desirability and sustainability of compact cities (e.g., Gordon and Richardson 1997, Jenks *et al.* 1996).

The following sections describe the context and history of Seoul's greenbelt, briefly summarize its costs and benefits, and discuss recent major reforms in the policy. A concluding section discusses lessons from the Korean experience and relevance for growth management in other countries.

SEOUL'S GREENBELT POLICY

Korea's greenbelt system was introduced in 1971 during the authoritarian government of President Park Chung Hee. The social context for this policy was extremely rapid economic and population growth (Song 2003) and a high rate of rural-urban migration. Seoul grew more rapidly than any city in the world from 1950 to 1975, growing at an average annual rate of 7.6 percent (UN Population Division 2002). Seoul's population grew from just over a million in 1950 to more than 6.8 million in 1975. By 2000, the population of Seoul was about 10 million, but the population of the entire Capital Region (Gyeonggi Province, including the city of Incheon) had ballooned to more than 21 million.

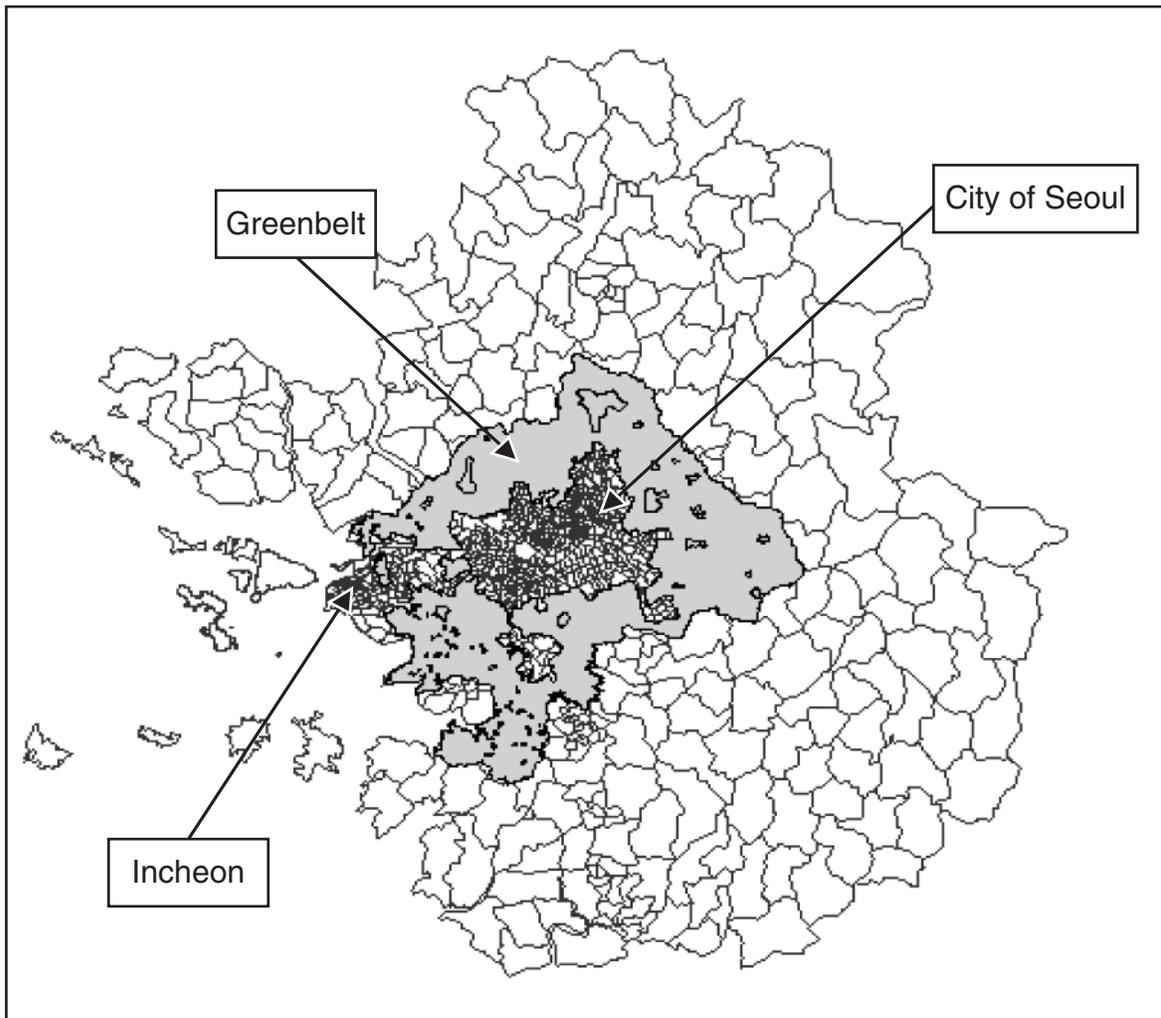
Seoul's greenbelt was patterned after the greenbelt of London (Bae 1998) but adapted in the Korean context. Greenbelts, formally referred to as Restricted Development Zones (RDZs) in Korea, were introduced in the City Planning Law of 1971 and shaped by the 1972-1981 National Comprehensive Physical Plan of 1973 (Lee 2000, 2004). Greenbelts were designated around Seoul and 13 other cities between 1971 and 1973.

Seoul's greenbelt is very large, consisting of a band averaging about 10 km wide that begins about 15 km from Seoul's central business district (fig. 1). After being extended four times by 1976, Seoul's greenbelt contained 1,566.8 square km, about 13.3 percent of the Seoul Metropolitan Area. The population living within the greenbelt is small, however, accounting for only 1.66 percent of the Seoul Metropolitan Area's population (Bae and Jun 2003). Most development has been strictly prohibited on greenbelt land and greenbelt landowners have received no compensation for their loss of development rights (Bae 1998, Lee 1999). The economic hardship imposed on landowners has been contentious from the beginning, because nationwide about 80 percent of the land within greenbelts is privately owned (Lee 2000, 2004). The boundaries of Korea's greenbelts were hastily drawn without public input and without serious consideration of widely accepted criteria for the designation of greenbelts. In one case, a village was divided down the middle by the greenbelt boundary (Choe 2004b).

Bae (1998) identified seven objectives for the establishment of Seoul's greenbelt. First, unlike greenbelts in most countries, national security was originally a dominant objective. Given the perceived threat of invasion from North Korea, the greenbelt allowed the government to strictly control development near the Demilitarized Zone north of Seoul. Choe (2004a) noted that more than 40 percent of South Korea's population was living within range of a ground artillery attack from North Korea in the early 1970s. Second, greenbelt regulations were used as a means to eradicate illegal shantytowns on the outskirts of Seoul. Third, the greenbelt was viewed as a way to control urban sprawl. Government efforts to control the rapid expansion of Seoul during the 1960s had been ineffective (Kim and Kim 2000). A fourth objective was to reduce rapid growth in population and industrial concentration in the Capital Region. Fifth, expansion of the greenbelt was viewed as a way to limit land speculation in the metropolitan region. Sixth, the greenbelt was intended to protect agricultural land and promote food security. Finally, environmental and natural resource protection also was an objective of the greenbelt policy.

The relative importance of these objectives has changed over time. For example, the importance of environmental protection as a rationale for the greenbelt has grown significantly as environmental awareness and economic prosperity in Korea have increased (Lee 2000, 2004). An additional and increasingly important rationale for Seoul's greenbelt is the provision of recreational resources to a city short of parks and nongreenbelt open space. Almost three-fifths of Seoul's greenbelt consists of mountains and forests that are heavily used for recreation (Bae and Jun 2003).

Korea's greenbelt policy has enjoyed great support from the general public (Kim and Kim 2000). Lee (1999) cited several surveys conducted in the 1990s that found strong support from citizens, environmentalists, and Korean planners, but opposition from most greenbelt property owners who viewed the policy as seizure of private property. A 1998 survey conducted by the Ministry of Construction and Transportation (MOCT) found that most government officials and academics preferred to retain the greenbelt, but they felt reforms were

Figure 1.—The Capital Region (Gyeonggi Province) and Seoul's greenbelt.

needed to ensure the achievement of development goals (MOCT 1998). Lee (2004) carried out a multivariate analysis of the data from the 1998 MOCT national survey to account for variation in greenbelt support. He found greater support for the greenbelt policy by individuals with higher incomes and educational attainment, and lower support by individuals residing in regions with strong development pressure and in the Capital Region. Surprisingly, he did not find a statistically significant relationship between opposition to the policy and ownership of land within greenbelt boundaries.

COSTS AND BENEFITS OF SEOUL'S GREENBELT

Cheshire and Sheppard (2002) noted that most economic research on land use planning has focused on the costs and neglected the benefits. This is true for economic research on Seoul's greenbelt policy. Most of the economic studies of Seoul's greenbelt have focused on its social costs, especially higher land prices, housing prices, and commuting costs. Several studies have examined the decrease in the price of nongreenbelt land and housing that would result from either a partial relaxation or complete elimination of the greenbelt (e.g., Choi 1994, Kim 1993, Kim *et al.* 1986). These studies found relatively modest

effects of the greenbelt on land and housing prices. For example, Choi (1994) estimated that land prices in the greenbelt in 1987 were about 30 percent below non-greenbelt land values, a much smaller price differential than suggested by anecdotal reports. Choi's analysis also indicated that if Seoul's greenbelt had been completely eliminated in 1987, greenbelt land prices would have risen by an average of 32.1 percent and nongreenbelt prices would have fallen by 7.5 percent.

It is important to recognize that Seoul's greenbelt policy is but one of many supply-side restrictions that put upward pressure on land and housing prices. A variety of other government policies may restrict land and housing supply, including multiple layers of urban zoning, agricultural zoning, a virtual public monopoly on urban land development, the system of land and housing taxation, and an inadequate system of housing finance (Choi 1993; Kim 1990, 1993). Hannah *et al.* (1993) concluded that the government's tendency to underallocate land to urban residential use was responsible for a substantial part of the increase in urban housing prices. Demand-side factors, such as the local and regional amenities provided by greenbelts, also put upward pressure on land and housing prices by shifting the demand curves for land and housing outward.

Several studies have examined the additional costs incurred by commuters who live beyond the greenbelt and work in Seoul. For example, Han (1997) estimated the social costs associated with Seoul's greenbelt and found increased travel costs were the largest component. Additional travel costs—excluding the value of commuters' time—were estimated at \$192 (250,000 won) per person per year, or \$3.6 billion (470 billion won) total per year. A lower estimate of the additional travel costs, including the value of commuters' time, was about 365 billion won per year in the late 1980s (Kim 1993). See Jun and Bae (2000) and Jun and Hur (2001) for additional estimates of commuting costs associated with Seoul's greenbelt.

Greenbelts may provide three broad categories of benefits: (1) amenity value related to scenic beauty, recreational opportunities, and bequest/heritage value; (2) fiscal savings due to increased efficiency in the provision of public services and infrastructure associated with more compact development; and perhaps most significantly (3) a wide range of ecosystem services such as air purification, habitat and biodiversity protection, flood control, and water supply and quality. The few studies of the benefits of Seoul's greenbelt have looked only at part of the first benefit category and neglected the other two categories.

Strong evidence has been found that greenbelts generate an amenity value to nearby urban land (e.g., Correll *et al.* 1978; Knaap and Nelson 1988; Nelson 1986, 1988), and a large body of literature documents the significant impact of open space on residential property values (see Fausold and Lilieholm 1996, and studies cited therein). A few studies have explored the amenity benefits of Seoul's greenbelt. An econometric analysis by Lee and Linneman (1998) found significant amenity value, although the benefits began to decrease after 1980 due to congestion effects. Lee and Fujita (1997) demonstrated theoretically that, depending on the nature of the greenbelt amenity, there are circumstances in which residential development jumping over a greenbelt could be economically efficient (i.e., the social benefits of the greenbelt outweigh its social costs). This is due to the amenity value to residents living both inside and outside the greenbelt.

The bequest and heritage values of Seoul's greenbelt and the desire of many citizens to pass on this natural heritage to future generations are likely to be significant (Jin and Park 2000), but they have not been studied. Seoul's greenbelt has an ancient historical precedent: the first king of the Choson Dynasty (1392-1910) prohibited all types of land utilization and development on the mountains around Seoul by royal proclamation in 1397 (Han 1992). In addition, village groves have an ancient history in traditional Korean village life (Park and Lee 2002). For many centuries these groves had great spiritual, social, and ecological significance. Village groves served as small greenbelts, separating villages from agricultural fields and preventing the encroachment of villages into farmland. Thus, the current greenbelt system is linked to Korea's history and deeply held cultural values.

No studies have estimated the fiscal savings attributable to Seoul's greenbelt due to increased efficiency in the provision of public infrastructure (such as roads, water and sewer systems, and schools) although this may be a significant source of benefits.

There is general but not universal agreement in the empirical literature on the costs of urban sprawl that development density is linked to infrastructure costs, with lower costs associated with higher density (Burchell *et al.* 1998, 2002). Seoul is among the most densely populated cities in the world in part due to its greenbelt, and hence the fiscal savings may be substantial.

Finally, although the ecosystem service benefits of Seoul's greenbelt have not been analyzed, an abundance of other literature suggests the importance—and perhaps the primacy—of this category of benefits. Yokohari *et al.* (1994) identified 26 ecological functions of farmland and forests that provide benefits to urban areas, all of which are relevant for greenbelts. Greenbelts of various types have been recognized for their flood control benefits (Yokohari *et al.* 2000), their effect on controlling summer heat in surrounding residential areas (Yokohari *et al.* 1997; see also Koh *et al.* 1999), air pollution abatement (Khan and Abbasi 2000a, 2000b), and their use as habitat for endangered species (Mortberg and Wallentinus 2000). The well-known case of the New York City watershed (Daily and Ellison 2002) suggests the substantial economic value of watershed services (water quality and quantity) that may be provided by greenbelts.

In a rare study that examined whether Seoul's greenbelt provides a net benefit, Lee (1999) estimated the net social gain arising from a marginal release of greenbelt land for development. Lee calculated net benefits at four points in time: 1975, 1980, 1984, and 1989. Although this analysis required many simplifying assumptions and did not include important benefit categories, it did shed light on how the economic effects of a greenbelt change as the metropolitan area grows and the impacts of an increasingly restricted land supply and growing congestion are felt. Lee found that Seoul's greenbelt policy was inefficient in 1975 (i.e., the benefits of a marginal release of greenbelt land outweighed the costs), was efficient in 1980 and 1984 as amenity benefits increased significantly, and became inefficient again in 1989 as continuing urban growth created congestion costs that overwhelmed the amenity benefits. He concluded that a fixed greenbelt cannot provide net benefits indefinitely in the context of rapid urban growth, i.e., "... a greenbelt is just a congestible local public good," (p. 49). Lee did not consider benefits associated with greenbelt recreation, greater efficiency in providing public infrastructure, or ecosystem services, however, which are all likely to increase with continued urban growth.

GREENBELT POLICY REFORM

From its beginning in 1971, Seoul's greenbelt policy remained essentially unchanged for almost 30 years. Public discussion of problems associated with the greenbelt was prohibited during the Park regime (Lee and Linneman 1998), which lasted until 1979. Subsequent military governments continued the greenbelt policy. Hence, opposition to the greenbelt was rarely expressed in the early years. But opposition from greenbelt landowners began to be voiced after the current civilian republic was established in 1988 (Park 2001). During the presidential election of 1997, opposition party candidate Kim Dae Jung made a campaign promise to review and reform the greenbelt policy (Choe 2004a). After winning the election,

Kim Dae Jung established a National Committee for Green Belt Policy Reform early in 1998. The committee, chaired by Prof. Choe Sang-Chuel of Seoul National University, consisted of three greenbelt residents, one environmental group representative, twelve scholars, three government officials, and three journalists (Park 2001).

After a difficult, yearlong process of meetings and deliberations, the committee submitted a draft report to the MOCT on November 24, 1998. The report recommended the following reforms (Choe 2004a): (1) The greenbelt policy should be maintained as a growth management tool, but greenbelts should be lifted around small and medium cities with little development pressure and replaced with conventional zoning regulations; (2) in large cities that retain greenbelts, the boundaries should be re-delineated based on environmental assessments and consideration of other local factors; (3) a scheme for the government to recoup windfall benefits due to abolishing or relaxing greenbelts should be introduced to prevent land speculation; (4) landowners in areas that remain greenbelts should be compensated for their loss of development rights or offered the option of having their land purchased by the government at a fair price; (5) villages above a certain size within greenbelts should be given special permission for developments needed to improve their communities.

Release of the draft report generated conflict. On the day the report was issued, a group called National Action for Greenbelt (NAG) was established (Park 2001). NAG supported preservation of the greenbelt and used diverse tactics in an attempt to derail reform. For example, NAG investigated members of the MOCT committee of the National Assembly to find out if any of them owned greenbelt land, and they found that 6 out of 30 members were indeed landowners. They also used the press effectively to gain public support for preserving the greenbelts.

The MOCT held a series of public hearings to discuss the draft report in greenbelt cities across Korea in late November and early December of 1998. Greenbelt residents who were unhappy that the report did not recommend complete removal of Seoul's greenbelt disrupted the public hearing held in Seoul. In response to the growing conflict, the MOCT requested a commentary on the draft report from the British Town and Country Planning Association (TCPA) on December 12, 1998.³ The TCPA commentary was released on June 3, 1999, and generated divergent views about whether or not it supported the reforms recommended by the National Committee for Green Belt Policy Reform (Park 2001).

While conflict among greenbelt stakeholders raged, a committee consisting of delegates from the MOCT, the Korea Research Institute for Human Settlements, and other research institutes was established to work out practical and legal details of greenbelt reform (Choe 2004a). But because they were unable to reach agreement among stakeholders, the MOCT unilaterally announced the new RDZ policy on July 22, 1999. The committee recommended eliminating greenbelts around seven small and medium cities and rezoning the

land as either conservation-green areas or natural-green areas, zoning categories from Korea's City Planning Law. Greenbelts in the seven larger cities would be maintained but redrawn based on environmental assessment that included factors such as topography, land suitability, ecological sensitivity, and environmental vulnerability (Choe 2004a). In these seven cities, the greenbelt boundaries are to be redrawn using metropolitan area-wide planning. Trying to reach agreement between the many municipal governments in the Capital Region has proven to be difficult. An effort to develop a metropolitan area plan for the Capital Region began in 2002 and may not be completed until 2005 or 2006 (S.C. Choe 2004, personal communication). In the meantime, a total of 112.5 square km of Seoul's greenbelt has been proposed for release. This land would be made available for development according to the 15-year metropolitan plan rather than all at once (Bae and Jun 2003).

Opposition to the release of land from Seoul's greenbelt from environmental groups and many residents of Seoul has continued in recent years as proposals for development have moved forward. This is reflected in news media discussion of greenbelt reform. For example, an editorial discussing a plan by the Seoul Metropolitan Government to construct 100,000 apartment units on land currently in the greenbelt mentioned the protests that have taken place and stated

... city hall and the central government should have first considered the unavoidable damage that will be done to the greenbelt, which acts as the lungs of the city. Needless to say, if the greenbelt turns into a forest of apartments under the development project, the overpopulation of the capital city will certainly worsen, while residents will also lose the small amount of natural environment that still exists (Korea Times 2003).

An editorial in another newspaper stated that "... Seoul's greenbelt has been protected so far because there are more merits than demerits in maintaining it. We have to continue to be careful about damaging it. Destruction of nature for housing development and subsequent traffic congestion is not a net gain in our welfare" (JoongAng Daily 2003).

CONCLUSIONS

Bruegmann (2001) characterized the effectiveness and effects of London's greenbelt system—the main inspiration for Seoul's greenbelt—as follows: "This system... did in fact stop much, although not all, of the growth that otherwise might have invaded the greenbelt around London. It was not nearly as successful in containing growth beyond the belt. In fact, growth beyond the greenbelt eventually scattered across much of southeast England" (p.16,090).

This statement could have been written about Seoul's greenbelt except that Seoul's strictly enforced policy has been much more effective at keeping development (other than agricultural use) out of the greenbelt. But Seoul's urban containment policy largely failed to keep development from invading the Capital Region beyond the greenbelt. The intense pressure of exceptionally rapid urban growth was simply too much to

³ Founded in 1899 to promote Ebenezer Howard's Garden City concept, the TCPA is Britain's oldest non-governmental organization concerned with planning and the environment.

contain. The result has been a physical footprint (the area of land taken up by the entire metropolitan region) that is probably larger than would have been the case in the absence of the greenbelt (Bae and Jun 2003). But Seoul's greenbelt has been remarkably successful at protecting important agricultural land, providing badly needed recreational resources in a megacity with few parks, protecting the beauty and natural heritage of the ancient capital of Korea, and maintaining vital ecosystem services.

A lesson of this review is that urban containment policies lead to both significant benefits and costs, and that these costs and benefits change over time with population and economic growth. A number of researchers have concluded that the social costs of Seoul's policy could have been reduced if the greenbelt had been more flexible and had accommodated growth, similar to most urban growth boundaries in the U.S. For example, in discussing the implications of Seoul's policy, Dawkins and Nelson (2002: 6-7) stated that "... urban containment boundaries should be periodically re-evaluated and extended to allow for sufficient land release. If the boundary is not periodically revised, net social benefits will be offset by the increased social costs associated with congestion externalities and land supply constraints" (see also Jun and Hur 2001: 158, Lee 1999: 50). This view represents the conventional wisdom of the urban planning profession: growth accommodation is always the preferred policy (Zovanyi, this volume).

But this view fails to account for what are likely the most significant categories of benefits associated with Seoul's greenbelt: the life supporting ecosystem services and recreational resources it provides to residents of the Seoul Metropolitan Area. The value of these benefits will likely rise with continued growth and urbanization. Therefore, whether or not Seoul's greenbelt has provided net benefits to society remains an open question. Few studies have empirically examined the benefits of Seoul's greenbelt policy, and no studies have attempted to measure the economic value of its ecosystem services, recreational value, or bequest and heritage values.

Would Seoul be a more or less "sustainable city" today without the greenbelt? There is no definitive answer to this question. Despite the importance of moving toward more sustainable cities in our increasingly urbanized world, there is no consensus about the nature or dimensions of urban sustainability (Burton *et al.* 1996). Assessing urban sustainability is an extraordinarily complex task because of the complexity of cities: they consist of many layers of constantly changing economic, social, legal, cultural, political, and ecological systems. But we do know with certainty that in the absence of the greenbelt, Seoul would have lost much of its rich natural heritage and essential ecosystem services.

ACKNOWLEDGMENT

The authors thank the Organisation for Economic Co-operation and Development (OECD) Co-operative Research Programme, Biological Resource Management for Sustainable Agricultural Systems, for a fellowship that enabled Dr. Bengston to participate in this research effort. We also thank Professors Kai Lee and Casey Dawkins for helpful comments on an earlier version of this paper.

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