

LAND USE IN SLOVENIA

Franci Petek

In its widest meaning, land use marks and defines human activity in the landscape. The characteristics of natural elements as well as the sociogeographical factors of a landscape are reflected in the distribution of categories of land use.

The study of land use has a long tradition in Slovene geography. In the framework of agrarian geography and the geography of the countryside, land use was studied intensively in the middle of the 20th century by Ilešič (1950, 1971) in connection with research into the distribution of cultivated fields and by Medved (1969, 1974) and Klemenčič (1972) in connection with the transformation of agriculture and of the countryside in general. In the last few years, due to major social changes, land use is again under study in Slovene geography (Gabrovec and Kladnik 1997 and 2001; Gabrovec, Kladnik, Petek 2001; Petek 2002; Urbanc 2002; Kladnik and Ravbar 2003; Hrvatinić and Perko 2003).

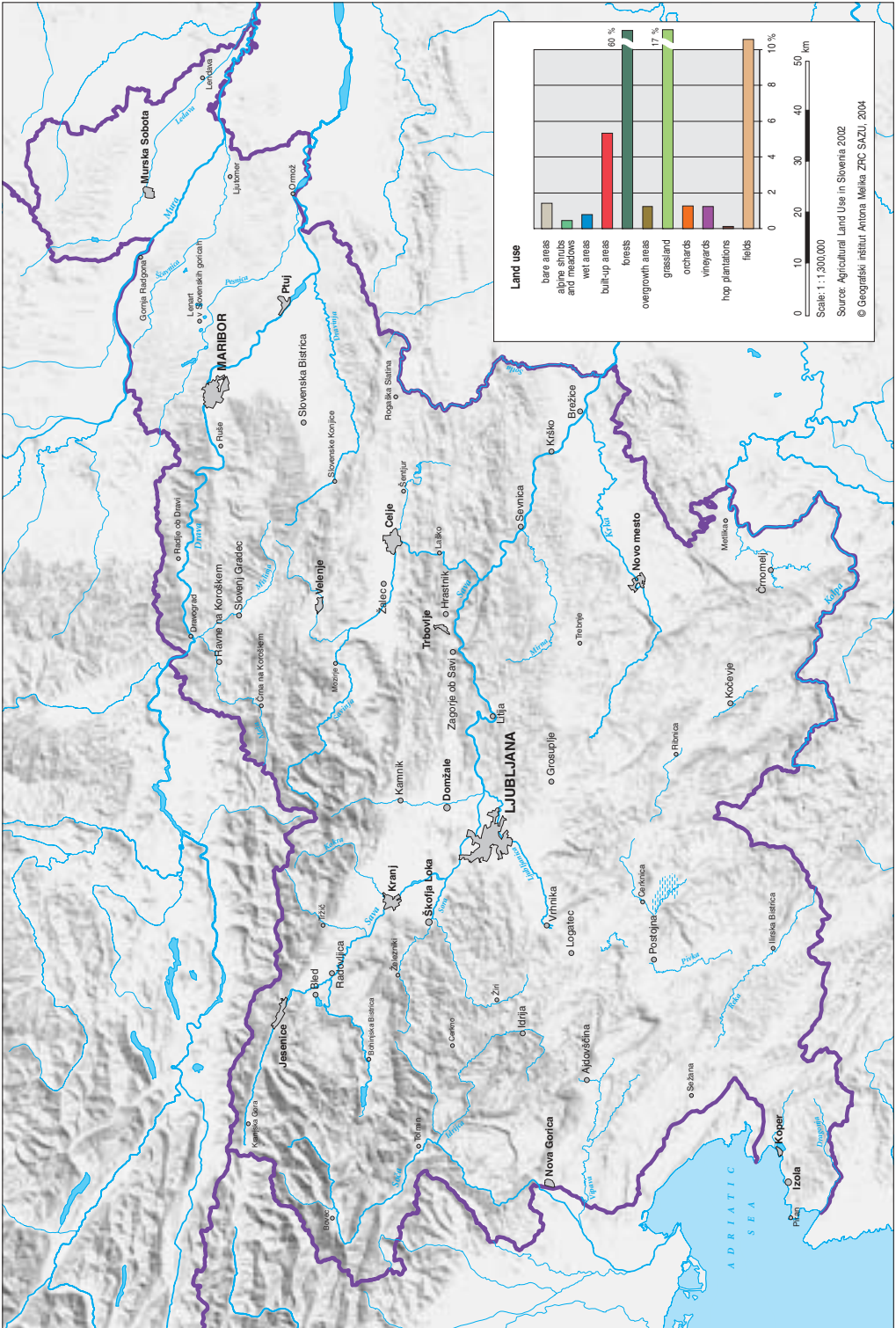
Basic source for the study of land use is the data of the land cadastre. The first stable land cadastre in the territory of Slovenia was the so-called Franciscan Cadastre (1822–1828), which was established in the first half of the 19th century. Using the data from the land cadastre, Slovene geographers can therefore study the changes in land use in the last two centuries and their connection with the changes in sociogeographical factors. The Franciscan Cadastre differentiated five basic land use categories: cultivated fields and gardens, vineyards, meadows, pastures and alpine meadows, and forests. The modern land cadastre adds orchards to these basic categories. In Slovenia, there are more than five million parcels and 2,696 cadastral municipalities. Due to the slow recording of changes in the cadastre, the data lags behind the actual land use situation in the landscape.

With ever greater availability and usability of satellite and aerial photographs, numerous maps of land use were created for various purposes in the last decade that illustrates as closely as possible the actual situation when the data was collected.

At the Statistical Office of the Republic of Slovenia, the first map of actual land use for all of Slovenia was elaborated in 1993 by combining satellite-scanned data, outlines of forest areas made on the basis of aerial photographs, outlines of waters, the 100-meter digital relief model, data on roads and of housing coordinates, and other necessary data. This map had a number of deficiencies, but the upgraded version from 2001 is already more precise and therefore much more useful. (Statistical GIS of Land Cover of Slovenia 2003).

In 2003, the Environmental Agency of the Republic of Slovenia elaborated the CORINE Land Cover (2004) map for Slovenia. This database was created on the basis of satellite photographs from 2000 and according to methodology of data collection is comparable with the databases of twenty-nine other European countries. Due to great relief diversity and the fragmented land and property structure of the surface of Slovenia, the actual situation of agricultural land use in this base is somewhat blurred.

The most detailed study of land use is offered by the map of actual land use that originated in the framework of the Project of Modernization of Registration of Real Estate or its subproject Collecting Data and Monitoring the Use of Agricultural Land, which the Ministry of Agriculture, Forestry, and Food of the Republic of Slovenia took primary responsibility for coordinating. Digital 1:5000-scale orthophoto maps based on black-and-white aerial photographs taken between 1996 and 2001 were the source of data for this map of actual land use. However, the different times the data was collected also poses the greatest weakness of this map. In 2002, all the interpreted orthophoto maps were combined in one map of actual land use (Rotter 2001; Agricultural Land Use in Slovenia/Raba kmetijskih zemljišč 2002). We used the digital form of this source to illustrate the land use situation in Slovenia.



◀ *Figure 1: Types of land use in Slovenia.*

The basic map of actual land use differentiates twenty-one categories, but for the sake of presentation we logically combined these into twelve categories. In comparison with the categories of land use mentioned in the land cadastre, this source also distinguishes several other different categories. It differentiates between intensive and extensive meadows, which due to the problem of distinguishing these two categories were united into one category designated »grassland.« This category is comparable to the meadows and pastures of the land cadastre. Among permanent plantations, along with vineyards and orchards are also olive groves, and specially separated is land in overgrowth, which includes primarily abandoned meadows and pastures in the process of afforestation. On the original map, mistakes in classifications occurred for individual smaller areas of Slovenia, which have been partly corrected for this presentation.

Based on the processing of land use categories (Agricultural Land Use in Slovenia 2002) in the Geographical Information System, Slovenia has 60.3% forest, 17.7% grassland, 10.2% cultivated fields, 5.3% built-up area, 1.4% rock surface, 1.2% each of vineyards, orchards, and land in overgrowth, 0.8% water areas and wetlands together, 0.5% heather and mountain meadow together above the upper tree line, and only 0.1% each of olive groves and hop plantations.

Forests therefore strongly dominate and today Slovenia ranks among the most forested countries in Europe. However, land categories are not evenly distributed throughout Slovenia. Their distribution is defined to a great extent by relief elements (inclination, altitude, and exposition) as well as by climate and soil conditions. Cultivated fields, for example, greatly dominate the Pannonian plains where they occupy some 52% of the surface and the alpine plains where they occupy a good quarter. On the other hand, in the alpine mountains cultivated fields occupy only 0.5% of the surface and on the Dinaric plateaus just 1.5%. Hop plantations only appear in the Savinja plain, while vineyards and orchards occur mostly in the Mediterranean and Pannonian hills. Forests overgrow as much as 81% of the Dinaric plateaus but only one fifth of the surface of the Pannonian plains. Population and economic activity present the greatest pressure on plains, above all in the alpine region, and therefore just under 18% of the surface of these areas is built up. Heather and mountain meadows (2.8%) and rock surfaces (9.1%) are significant land categories in the alpine mountains, the only Slovene region with land above the upper tree line.

Land use is a dynamic landscape element. Changes in sociogeographical factors are reflected in changes of land use. Between 1950 and 1970, grassing over dominated in Slovenia (Medved 1970), mostly the conversion of cultivated fields into meadows. After 1970, afforestation dominated, the spontaneous change of other land categories into forest. In general, it is characteristic of Slovenia that between 1900

Table 1: Proportion of major types of land use in Slovenia in 1900, 1953, and 2000.

	Cultivated fields, gardens, and hop plantations (%)	Vineyards (%)	Meadows, pastures, and orchards (%)	Forests (%)
1900	18.6	2.3	33.3	40.9
1953	17.8	1.6	33.0	42.2
2000	10.3	1.2	20.1	60.3

1900: Leksikon občin za Avstrijsko-Ilirsko Primorje (1906), Kranjsko (1906), Štajerska (1904), Koroško (1905); Mezőgazdasági statisztikája 1897 za Prekmurje.

1953: Land Cadaster/Zemljiški kataster.

2000: Agricultural Land Use in Slovenia/Raba kmetijskih zemljišč 2002.

and 2000 the proportion of agricultural land categories (cultivated fields, meadows, pastures, vineyards and other permanent plantations) decreased, while the proportion of forests and built-up areas increased. The proportion of agricultural land dropped from 54% to 32%, while the proportion of forests rose from 41% to 60%.

In the case of alpine land, we established that the changes in land use in the 19th century were mostly influenced by the change in farming techniques (shift from pasture to barn stock farming, modern rotation without fallow periods, and the introduction of new cultures), the abolition of the feudal system after 1848 and of the servitude connected with it, which increased social differences among the population, and the decline of non-agrarian sectors of the time. In the first half of the 20th century, changes in land use were influenced by economic changes, primarily the development of the first industries and the start of the deagrarianization of the Slovene population. In the second half of the 20th century, along with industrialization, the agricultural policy of the state, then burdened with Communist ideology, also influenced changes in land use. Since 1991 when Slovenia became independent and embraced a market-oriented agricultural policy, we can expect to see the further selective abandoning of farm land, which to a certain degree is already indicated by changes in land use.

Agricultural Land Use in Slovenia 2002 / Raba kmetijskih zemljišč 2000. Ministry of Agriculture, Forestry and Food of the Republic of Slovenia / Ministrstvo za kmetijstvo, gozdarstvo in prehrano Republike Slovenije. Ljubljana. CORINE Land Cover 2004. Environmental Agency of the Republic of Slovenia/Agencija Republike Slovenije za okolje. Ljubljana.

Franciscejski kataster 1822–1828. Archives of the Republic of Slovenia/Arhiv Republike Slovenija. Ljubljana.

Gabrovec, M., Kladnik, D. 1997: Some new aspects of land use in Slovenia. *Geographica Slovenica* 37. Ljubljana, pp. 7–64. (accessible also on: www.zrc-sazu.si/giam/zbornik/Gabrovec_Kladnik37.pdf).

Gabrovec, M., Kladnik, D. 2001: Land use. in: National Atlas of Slovenia. Ljubljana, pp. 138–145.

Gabrovec, M., Kladnik, D., Petek, F. 2001: Land use changes in the 20th century in Slovenia. *Land Use / Cover Changes in Selected Regions in the World Volume I*. Asahikawa, pp. 41–52.

Hrvatina, M., in Perko, D., 2003: Surface roughness and land use in Slovenia. *Acta Geographica Slovenica* 43/2. Ljubljana, pp. 33–86. (accessible also on: www.zrc-sazu.si/giam/zbornik/Hrvatina_Perko43-2.pdf).

Ilešič, S. 1950: Sistemi poljske razdelitve na Slovenskem. Ljubljana, 119 p.

Ilešič, S. 1971: *Le paysage rural en Slovénie*. Leuven, 66 p.

Kladnik, D., Ravbar, M. 2003: Členitev slovenskega podeželja/Division of Slovene Countryside. Ljubljana, 196 p.

Klemenčič, V., Crkvenčič, I. 1972: The social-geographical factors in forming the types of land utilization: (on some examples from the northwestern part of Yugoslavia). Verona.

Land cadaster / Zemljiški kataster 1953. Surveying and Mapping Authority of the Republic of Slovenia / Geodetska uprava Republike Slovenije. Ljubljana.

Leksikon občin 1904–1906. Leksikon občin kraljestev in dežel zastopanih v državnem zboru, Izdelan po rezultatih popisa ljudstva dne 31. grudnia 1900. Dunaj.

Medved, J. 1969: Vpliv velikosti kmetij na način in smer spreminjanja izrabe zemljišča. Ljubljana.

Medved, J., Ilešič, S., Vrišer, I. 1974: Recherches typologiques sur l'utilisation agricole du sol en Slovénie. *Bulletin de la Société languedocienne de géographie*. – ISSN 0373-3297. – T. 8, fasc. 2 (1974). Montpellier, pp. 172–190.

Mezőgazdasági statisztikája 1897. Budimpešta.

Petek, F. 2002: Methodology of evaluation of changes in land use in Slovenia between 1896 and 1999. *Acta Geographica* 42. Ljubljana, pp. 61–97. (accessible also on: www.zrc-sazu.si/giam/zbornik/petek42.pdf).

Rotter, A. 2001: Zajem rabe kmetijskih zemljišč v okviru Projekta posodibitve evidentiranja nepremičnin. Zbornik Uporaba informacij o porovnosti in rabi prostora pri varstvu okolja in trajnostnem razvoju. Ljubljana.

Statistical land cover GIS of the Slovenija/Statistični GIS pokrovnosti tal Slovenije 2003. Statistical office of the Republic of Slovenia/Statistični urad Republike Slovenije. Ljubljana.

Urbanc, M. 2002: Kulturne pokrajine v Sloveniji/Cultural landscapes in Slovenia. Ljubljana, 224 p.