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Evaluation of varying trajectories of cultural landscape development

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DIPLOMA THESIS ASSIGNMENT

B.Sc. Zafer Karakaya

Landscape Planning

Thesis title

Evaluation of varying trajectories of cultural landscape development

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Objectives of thesis

The goal of the diploma thesis is to evaluate and compare the historic development of three cadastral areas with contrasting dynamics (e.g. agricultural intensification, its extensification and land abandonment). The results will be discussed in the context of landscape changes on Czech and European scales, and they will serve as data source for landscape planning in the study areas and for broader analyses of landscape development in the Czech Republic.

Methodology

The author will perform an analysis of historic development of 3 study areas, using GIS. The evaluate attributes will include e.g. the proportion of individual land use types, length of ecotones in the area, area and characteristics of landscape vegetation in study areas. The results will be interpreted in landscape-ecological and in socio-economic contexts. The author will formulate recommendations for the further use of types of landscape included in the study, following the principles of sustainable land management.

The proposed extent of the thesis

40 pages of text, graphical supplements

Keywords

landscape dynamics, landscape vegetation, sustainable land management

Recommended information sources

ČESKÁ ZEMĚDĚLSKÁ UNIVERZITA V PRAZE. ÚSTAV APLIKOVANÉ EKOLOGIE, – LIPSKÝ, Z. *Sledování změn v kulturní krajině : učební text pro cvičení z předmětu Krajinná ekologie.* Kostelec nad Černými lesy: Lesnická práce, 1999. ISBN 80-213-0643-2.

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Authors Declaration

I hereby declare that this thesis was written solely by the author under the direction and with advice from the thesis supervisor Ing, Kristina Janečková Ph.D.. All sources and literature the author acquired information from, has been cited in good faith and is beholden to the academic guidelines of the Czech University of Life Sciences in Prague.

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Abstract

The landscapes are dynamic. Human activities and natural disasters are constantly changing. These changes change the shape and size of the landscape elements in the landscape mosaic, sometimes completely destroy or cause the formation of new elements. As a result, deterioration occurs. This means that living spaces are shrinking and biological wealth decreases. Thus fauna and wildlife are directly affected. Forman and Godron (1986) describe the patches in the landscape as the areas covered by the plant and animal communities. For this reason, nature conservation, which is one of the most important working areas of landscape planning.

Horní Záblatí, Sviňovice and Zdenice are growing and developing due to migration due to various reasons where you can find around the Prachatice. This growth has led to the formation of a new center that brings together many business and social spaces that have developed and expanded with the spread of the sites as well as the village centers, which preserves its old structure. The villages are growing towards the old square of this rural settlement, a positive impact in terms of development of the village by the local people while creating at the same time also brings the disadvantages. Horní Záblatí, Sviňovice and Zdenice are studied as an example in this study because of the ever-increasing urbanization and consequently increasing population and settlement being one of the places where the effects on rural areas and natural resources.

The aim of this research is to investigate the use of land/land cover changes between 1950-2011 by Svinovice, Horni Zablati and Zdenice by using ArcGIS to examine the landscape change with landscape metrics, developing recommendations for sustainable urban growth and land use planning for the study area.

Keywords.

Landscape, Land cover/Land use, Prachatice, Sustainable, ArcGIS,

1. INTRODUCTION

Today, cities are designed to meet the needs of millions of people, changing various physical, socio-cultural, economic, technological and so on. As a result of these changes, people want to get away from the crowded construction of the city and flee to the more quiet and peaceful rural areas of the city, which are rich in green space and which are intertwined with nature. Therefore, as a result of the increase in rural areas in time, their unique identity structures are changing, and due to the increasing crowd, their natural structure is also deteriorated.

Understanding human relations with Earth is becoming more and more important. The importance of environmental and ecological relationships has been demonstrated by agreements such as the Kyoto Protocol, the European Union Biodiversity Strategy, the European Landscape Convention (Lechner, 2010) in order to better explain the societies and plan and take measures if necessary. In these agreements have been emphasized the importance of taking measures and planning on a global scale. One of the most important disciplines in creating a strategy on a global scale is Landscape Planning. In landscape studies, the most commonly used method is remote sensing for detecting plants or objects that cannot be distinguished or distinguished by the human eye, especially in large areas.

As a result of unplanned land use, the land will be transported to the lower parts of the basins in a short time. Changes in land cover in the upper areas (e.g., deforestation) change the flow of matter and energy, as a result of the uncontrolled flow of surface floods. These processes lead to a gradual decrease in soil thickness in the upper sections, the emergence of the bedrock and consequently the land's water retention and storage capacity decrease. The use of unplanned land, resulting in desertification, loss of growing environments, an increase of rural poverty, a concentration of migration from rural areas to cities, decrease of the visual value of land, etc. it creates many ecological, social, economic and cultural problems. These processes result in a deterioration of the environmental resources, leading to the danger of sustainable development.

In order to prevent the adverse effects of land use, forestry, agriculture, pasture, settlement, industry, tourism, transportation, etc. need to be precisely identified and mapped into a land use plan depending on biophysical, social, economic, cultural and environmental variables, the existing working areas of the sectors. This planning, based on scientific principles, should balance the demand, needs, and expectations of the growing population and the protection of the current and future productivity of ecosystems, and thus ensure sustainable land use.

The determination of the change in time provides great benefit in making rational decisions for the future. In this context, it is possible to determine the temporal change by comparing the historical data and the current data. (Skalet et al. 1992)
In this study, models that could be used to present alternative change scenarios for land use/land cover changes, which is one of the vital landscape indicators, were

examined and models were made using the land use/land cover changes approach of Zdenice, Horni Zablati and Svinovice districts determined as a research area.

1.1.The aims of the thesis

This thesis aims to test the multi-time landscape characterization and automated change detection methods based on remote sensing satellite data in the Prachatice district case to be used to effectively monitor the dynamics of land use in ecosystems in order to contribute to the effective and sustainable use of land. For this purpose, aerial photos / satellite photos from two different dates (1950 and 2011) have been applied to the process of identification and exchange. Using Object-based classification methods, land cover maps of all three dates were created in the classification of satellite data sets with arrows, and these maps were compared in binary in order to determine the changes occurring during 1950-2011. In determining the changes at the landscape level, numerical comparisons were made by applying image-based methods to different input data, and the results produced from these methods were determined with the accuracy of the highest change detection procedures. Also, in order to increase the applicability of the research results in different geographies with similar characteristics, the above-mentioned exchange detection procedures were evaluated comparatively concerning their success in identifying different exchange types.

2. Literature Review

In the literature review, many studies were researched on different issues which related to "Landscape Change." In this Section, some of these studies are discussed in chronological order, and their approaches are mentioned.

For the first time, about 200 years ago, the German geographer Alexander von Humboldt introduced the concept of landscape as "all the characteristic features of a piece of land." This concept of landscape has been introduced in different interpretations over time. (Farina, 2006; Turner et al., 2001).

The concept of landscape has been shaped in line with the physical environment issues discussed in order to understand nature until the 1950s. (Forman, 1995). For example, Schmithusen (1936) described the landscape as "all the characteristics of any part of the earth that can be perceived as a unit of all its properties" and divided it into two main groups as cultural and natural landscape according to its landscape state. (Volk and Steinhardt, 2002).

As a result of its interaction with human beings, integrated approaches to planning have been introduced in the definition of landscape after the 1950s. (Forman, 1995). In this period, the ecologist Danserau (1957) described the landscape as "the highest integrative level of environmental processes and relationships," and in his work, he discussed the land and land resources to investigate the impact of man on a landscape.

Troll (1970) defined the landscape as "total spatial and visual presence of Geosphere, biosphere and human habitat" (Volk and Steinhardt, 2002).

Since the 1980s, the spatial dimension of the landscape has gained importance, and the landscape has started to be considered as a planning issue. During this period, Forman and Godron (1986) described the landscape as "a heterogeneous earth part consisting of interacting ecosystems and repeating in similar forms." Wiens and Milne (1989) (1989) focused on the spatial dimension of the landscape, as well as on the dynamic role of man concentrating on the landscape, and used the term "areas on large scale where [a] human interacts with his environment."

Forman (1995) indicates that there is ecological integrity at every point of the landscape. Green et al. (1996) define the landscape as "a special configuration for topography, vegetation cover, land use and settlement patterns that determine the suitability of natural and cultural processes and activities."

Research on landscape inventory and change detection based on Information Technologies has shown a significant increase in recent years. Because the numerical approach aimed at identifying land cover inventory and changes based on Information Technologies supports the production of healthy plan decisions, which are the primary objective of monitoring, by reducing the cost of reducing the dependence on the human factor, being reproducible and being able to use the result products as inputs for other analyses Various topics related to numerical change detection methods have been discussed in detail by Ridd and Liu (1998), Mas (1999), Zha et al. (2003) and Coppin et al. (2004).

Landscape characterization and change detection an vital part of the research is based on the comparison of spatial statistics on thematic maps produced by digitizing or classifying aerial photographs and satellite data on the screen.

Lyon et al. (1998) to determine vegetation and land cover changes, they produced seven vegetation indices from the Landsat MSS data from three different dates. When comparing the results of these methods, they explained that they obtained the best results from the NDVI index in determining vegetation change.

Nagaike and Kamitani (1999) have tried to demonstrate the change in landscape diversity based on their research, especially on the relationship between land ownership and the spatial distribution of landscape changes and changes in landscape diversity. They also used some landscape metrics to reveal spatial patterns in the areas.

Zaizhi (2000) investigated the changes in landscape patterns and dynamics between 1970 and 1990 at the Nanhua State Production Farm in southern China, in his research entitled "Landscape change in rural areas of China In this study, land use maps of 1/20,000 scale and three different years (1972, 1985 and 1995) were digitized using the GIS systems of eleven land use categories. Structure, shape and pattern indices were measured, and landscape patterns and dynamics were analyzed by determining the size and amount of patches in the active area types. As a result, the landscape of 1972 shows high dominance and low diversity. The 1985 landscape pattern shows high diversity and division. Until 1995, there was a decline in dominance and diversity. The results of the study show that field management decisions taken in different periods are the main reason for the change in the spatial pattern of the landscape.

Hayes and Sader (2001) reported that the use of land cover/land use in tropical forests in Central America by using NDVI, PCA, and RGB-NDVI determination methods produced from three different historical Landsat TM datasets showed that the RGB-NDVI method was the best result with 85% accuracy.

Lausch and Herzog (2002) have tested the availability of landscape metrics in the monitoring of landscapes in an area of 700 km2, where coal mines have caused serious field changes in eastern Germany. In the study, maps were used between 1912-2020 (topographical maps, aerial photographs, satellite images). The landscape measurements in the area were made for the whole area and the ecological sub-regions; for class and patch levels. Researchers, in their study in the southern part of Leipzig in the early twentieth century, the use of agricultural areas of the area were more dominant. The arable areas became more dominant than the lowlands, pastures in the river valleys and floodplains. Forests are small patches, and this has changed dramatically in the late 1980s. Mines and settlement have begun to replace arable lands and meadows. Between 1990-1996, due to the restriction in mining activities in the study area, these areas were re-coated with leading plants.

Apan et al. (2002) worked with the Landsat image of 1973 and 1997 in a study conducted to measure the amount and nature of structural change of river-side landscape in the Lockyer Valley of Queensland, Australia. Digital image processing techniques have been used to produce field cover maps from satellite images. Patch Analyst software was used to calculate the landscape pattern and to estimate the riverside region. The results showed a significant decrease in woody vegetation due to the conversion to meadow areas. The riverside vegetation corridors have become more divided, isolated and smaller patches. Excessive deforestation on steep slopes or first-degree riverside has raised concerns about the health of the basin and the deterioration of the area over the long term. This study clarifies the use of satellite image and GIS in the mapping and analysis of the change in landscape structure, as well as the measurement of spatial resolution, stream buffer width and field change are clarified.

Haines-Young et al. (2003) explained how rural surveys conducted between 1984, 1990 and 2000 could be used to develop a holistic view of land cover, landscape and biodiversity at a regional scale in Great Britain. Between 1984 and 1990, there was a significant increase in agricultural areas, vineyards and gardens, wide-leaved forest habitats, and a significant decrease in pastures in the lowlands of to the south and west of England and Wales. At the same time, there was a marked decrease in the grassland on the high plains of England and Wales. In Scotland, large habitats were found more stable. Contrary to regional density changes in habitats, the habitat quality change between 1990-1998 was more regular. The quality of freshwater habitats has increased. Although some terrestrial biotopes were reduced in quality, there was a decrease in species diversity of agricultural habitats and an increase in semi-natural habitats with less diversity of species such as grasslands.

Bunnell et al. (2003), conducted a study to determine the landscape change in the U.S. Pineland National Reserve, Mullica River basin between 1979-1991. In the study, detailed field cover maps were prepared to determine the change, to measure the changes in the structure and composition of the landscape (such as the size of the patch, the patch area, and the number of patches). As a result of the study, the number of patches increased, total forest area and patch size decreased; It was also seen that all area cover types were affected by the division of the landscape. As a result of the study, an increase in the number of patches, a decrease in the total forest area and the size of the patches were determined, and it was observed that all types of land covers were affected by the division of the landscape.

Yue et al. (2003) have interpreted satellite imagery classified for three different years of the Yellow River Delta together with four models of land cover, including unit connectivity, ecological diversity, human impact intensity, and average center area. In this way, they have analyzed the landscape change in the delta in many ways.

Herold et al. (2003) studied urban growth with the help of remote sensing spatial metrics and spatial modeling techniques in their work. They measured the impact of urban development with spatial metrics. The model calibrated to multi-timed data sets was used to find urban growth for years not included in the time series. In addition, this model helped them make predictions on urban growth till 2030.

In the study by Luna and Robles (2003) was revealed the change in the level of the lower land cover class was discussed and the change in pressure on the coastal lagoons.

Antrop (2004) the researched on the urbanization process in Europe, focuses on the importance of the data obtained by the change analysis so that the decision-making mechanisms in the urbanization process can be guided precisely.

Chust et al. (2004), in the automatic classification processes, some landscape metrics, and topographic features, as new channels (neo-channels), have added Landsat TM images to prevent errors, especially in the form and size of land In this way, they developed the accuracy of land cover classification with the help of metric values.

Eetvelde and Antrop (2004) surveyed the changes in traditional landscape areas in southern France. In this study, the characteristics and mechanism of the landscape change are discussed at the level of residential areas. Aerial photographs covering the 1960-1999 periods were compared with population statistics and site availability. It has been found that all these components have very different properties and that in independent trajectories, each has complex interactions between the different propulsive forces.

Wimberly and Ohmann (2004) analyzed the changes in forest cover to reveal the richness of forest habitats and the human influence on patterns. Also, for vast coniferous forests, linear regression models were established at spatial levels of lower basins, basin borders, and sub-basin borders to determine the proportional changes.

Im et al. (2005) have developed a change detection model based on the Neighborhood Correlation Image (NCI) logic and have combined image classification using multi-level NCI-based classifications and trained decision trees in software. They have compared classifications that are not combined with classifications, and as a result, they have achieved superior results than classes that are combined by Kappa value.

Bender et al. (2005) investigated cultural landscapes in Southern Germany in order to develop appropriate techniques for analyzing and measuring landscape changes since 1850. They have developed methods for landscape change analysis with the help of GIS by using cadastral maps and land registry. The study is essential in bringing a parcel-level approach to nature conservation purposes in changing cultural landscapes. In the study, it was determined that in the period 1830-1870, 40% of the working area in the Bavarian forests was composed of forest areas, 33% was from meadows, 20% was from arable areas, and the remaining areas were from grasslands. At the end of the 19th century, the use of agricultural land was less and more forestation work was done. However, up to the 1940s, there was not much change in the ratio of arable land to grassland. From this time to World War II, arable lands have been partially converted into meadows, while most of the fertile agricultural lands have turned into wooded areas, and almost all agricultural activity has ceased. Landscape change after World War II has not been as prominent as previous periods.

Fujihara and Kikuchi (2005) examined the change in landscape structure in the Nagara River basin in Japan. In the research, they tried to explain the change in the patterns of use of space for 80 years. Over this time there has been a decrease in broad-leaved forests, which are proportionally more dominant over the study area, an increase in coniferous forests and settlement areas. A decrease in broad-leaved forests in the upper river basin and an increase in coniferous forests has been determined. In the middle of a river basin, coniferous forests decreased while broad-leaved forests increased.

Prato (2005) proposes an ecological landscape modeling system (ELMS) to assess the potential ecological and economic impacts of future landscape changes. This system consists of four components: economic model, land use change model, ecological impact model, and policy model.

Morawitz et al. (2006) used NDVI to determine the changes in the pattern and quantity of greenfield vegetation in 42 basin management units consisting of 3 different spatial scales in the study areas in the north of the United States. They have stated that large areas in most basins are continuously and intensively affected, due to human activities and development in a short period. They concluded that changing patterns and processes on multiple scales can be detected using the changes in NDVI values.

Ellis et al. (2006) studied on Landsat Satellite Imagery in the period between 1950 and 2002, and they discussed ecological changes in urban and semi-urban areas according to the classification of landforms, land use, and land coverings.

He et al. (2006) found that in their study of landscape change between China and the Upper Minjiang River Basin between 1974 and 1995, they found a decrease in forest areas, increase in agriculture, bushes, meadows, and settlements. The hydrosphere has the most impact on the change in forest areas, bushes, and grasslands. Analysis of the change between 1974 and 1995 revealed that there was a decrease in landscape linkage, as the heterogeneity of landscape and the increase in the landscape divide were observed. The Principal Component Analysis technique was used in the study. According to the results of these analyzes, economic reasons and population factors are the main factors on the change, and it is concluded that the Principal Component Analysis is the most appropriate method to investigate the forces causing the landscape change.

In Weng's (2006) studied the changes caused by industrialization and urbanization in the coastal regions on the Zhujiang Delta of China and made stochastic modeling. The landscape change process has been introduced In this way.

Mallinis et al. (2008), in their study of forest vegetation polygons in Mediterranean coastal areas, they used the closest neighbor identification to determine the image segments of the classes and compared the results by developing pain in the continuation of the multi-segment segmentation. In addition, they calculated the textural images and used them to improve the classification and found that the best results were achieved by considering the textural images. However, they have stated that the accuracy of the resulting map does not exceed 80% and that the classification tree according to the highest likelihood algorithm gives better results. Considering the primary operational use of the object-based approach in mapping the Mediterranean forest ecosystem, both of the advantages and limits are observed.

Walz (2008) focused on spatial indicators in order to identify the environmental impact of changes in field use in the study of landscape changes in the Saxony state of former East Germany. As a result of long-term observations, structural changes in the use of the site and their impact on the function of the landscape have been determined in rural areas in Saxonyabohemia Swiss National Park. Besides, the influence of the transport infrastructure on the landscape division is also determined on the whole of the state of Saxony. In the study carried out, aerial photographs taken at different periods were examined for spatial variation for long periods, taking into account biomass and ecosystems which have been registered. As a result, the arable fields have changed over time into small meadows.

On the other hand, arable fields in very shallow fields have become larger meadows over time as more labor is needed and yields are lower. If we examine the development of land use in Saxony Switzerland by years, in 1780 there were 1.5 hectares of grassland, this figure increased to 2.45 hectares in 2000. The agricultural area was 7.2 ha in 1780 and reduced to 5.5 ha in 2000. Similarly, forest areas decreased from 10.5 ha in 1780 to 6.1 ha in 2000.

Hersberger and Burgi (2009) discussed the change in Switzerland's traditional cultural plains due to agricultural concentration and urban development. They investigated urbanization, agricultural intensification and green field change in 5 settlements around Limmat valley, near Zurich. The main objectives of the study are to determine urbanization, agricultural concentration, and green field change; to determine factors that encourage landscape change; to determine the indirect impact of socio-economic, political, cultural, technological and natural spatial; and to determine which level of management and spatial scale are the most critical factors in the change. The changes between 1930-1956, 1957-1976 and 1977-2000 were determined by comparing printed maps. The work done on the documents and interviews with the experts revealed that 52 items were the effect on the change of landscape. Urbanization was identified as the most crucial factor in landscape change in all three of these three periods. Economic factors and political factors are followed regarding urbanization in three periods, and they constitute the essential factors in the change of landscape.

Rayburn and Schulte (2009) evaluated the landscape change between 1940-2002 in the Clear Creek basin of Iowa State, USA. The most significant change in the basin was the increase in the density of settlements and forest cover, and the decrease in the agricultural product area and the average patch area. While the average patch area was increased, there was a 21% decrease in the number of patches by connecting the previously isolated small patches. Settlement density increased rapidly, and settlements were gradually clustered during the study period. New buildings have been added to the settlement areas. The results show the dynamics of field uses in the basin, which is the basis for the development of future field-use scenarios and the restoration plans.

Feranec et al. (2009) use CORINE field cover data to provide information on the changes as well as the processes in which they study the changes that took place in European landscape between 1990-2000. As a result of statistical analyzes and produced maps, changes such as urbanization, the concentration of agriculture, widespread agriculture, afforestation, deforestation, construction of water structures were observed. In the

Netherlands, urbanization (2.1% of the total area of the country), concentration of agriculture in Ireland (3.3%), widespread agriculture in the Czech Republic (more than 3.5%), afforestation in Portugal (more than 4%), deforestation (more than 3.5%), increase in water construction (more than 0.1%) in the Netherlands and Slovakia. In 24 European countries between 1990 and 2000, the area covered change is about 88,000 km², corresponding to 2.5% of the total area.

Munsi et al. (2010) demonstrated the change in these classes with the help of the Markov Analysis, integrating remote sensing land use/land cover class data into GIS. They used landscape metrics to measure the spatial-temporal variation in the area.

Gil-Tena et al. (2010) investigated the link between the disappearance of forest bird species in the Mediterranean Region and the change in forest structure.

Schulz et al. (2010) questioned the hypothesis that in the Mediterranean Region, mostly evergreen vegetation-covered natural landscapes have turned into large-scale cultural landscapes, researching with four different satellite images.

Mendoza et al. (2011) conducted a multi-time analysis of Land Cover / Land Use classes covering 28 years for basins. This analysis is based on the stages of mapping, evaluation of change matrices and determination of change rates in land use.

Recanatesi et al. (2011) conducted a change analysis based on the land cover class for the time interval 1930-2010. Then, with the help of landscape indexes, they tried to reveal the landscape structure of the area.

J.Skalos and I.Kasparová (2012) used 1839’s Stable Land Registry maps and 2002’s aerial photos of Cisleithan to define land cover changes by time.

Orpsal et al. (2013) used a series of historical and contemporary aerial photographs of all three municipal cadastral areas in Moravia, the Czech Republic of land taken in the years 1937, 1984 and 2009 to define land use/ land cover changes and their relationship during this period.

Santruckova et al. (2015) conducted a change analysis based on the natural habitats cover classes in Central Bohemia to define threat on biodiversity time interval 1780-2010. As can be seen from all these studies, there are examples of landscaping change analysis constructed in different disciplines in the literature. Landscape Change can be combined with a variety of analysis and evaluation methods, depending on the content of the investigated matter, and it has become one of the leading indicators of the interaction between the biotic-abiotic factors of the landscape.

Landscape change analysis, which consists of the comparison of the area covered by specific land use/land cover types over different periods, now allows landscape quantities to be derived in landscape evaluation using landscape indices, models developed in different topics and statistical analysis methods. These studies also give impetus to the use of landscape change analysis as an effective tool in many areas.

3. General Parts

3.1. Landscape Components

Çepel (1990,1994) A space with a characteristic of separating landscape from other land parts with certain ecological characteristics (climatic, edaphic, physiographic, biotic), a part of the land and an ecosystem part with its own ecological characteristics or a place with various ecosystems the unit has defined it.

Landscape is a field that is the result of the action and interaction of the character's natural and / or visual elements. (Anon, 2003) Forman and Gabron (1986) describe landscape as a heterogeneous piece of land consisting of a repetitive ecosystem of a group of interactions and similarities. Landscape formation or development occurs as a result of three mechanisms (structure, function and change) operating within a landscape boundary.

A) Structure: Spatial relationships between different ecosystems and "things".

B) Function: Interaction of spatial elements, ie the flow of energy, materials and turkey throughout the entire ecosystem.

C) Change: It is the differentiation of ecological mosaics over time in terms of structure and function.

3.2. Landscape Structure and Spatial Components

The spatial pattern of a landscape or region is entirely composed of three element types. Units, corridors and matrices. These universal items are tools for comparing different landscapes and for developing general principles. They are also tools for land use planning and landscape architecture, because they also tightly control spatial models, movements, flows and changes. The whole landscape or region is a mosaic, but the local environment is the building of units, corridors and matrices (Dramstad et al., 1996).

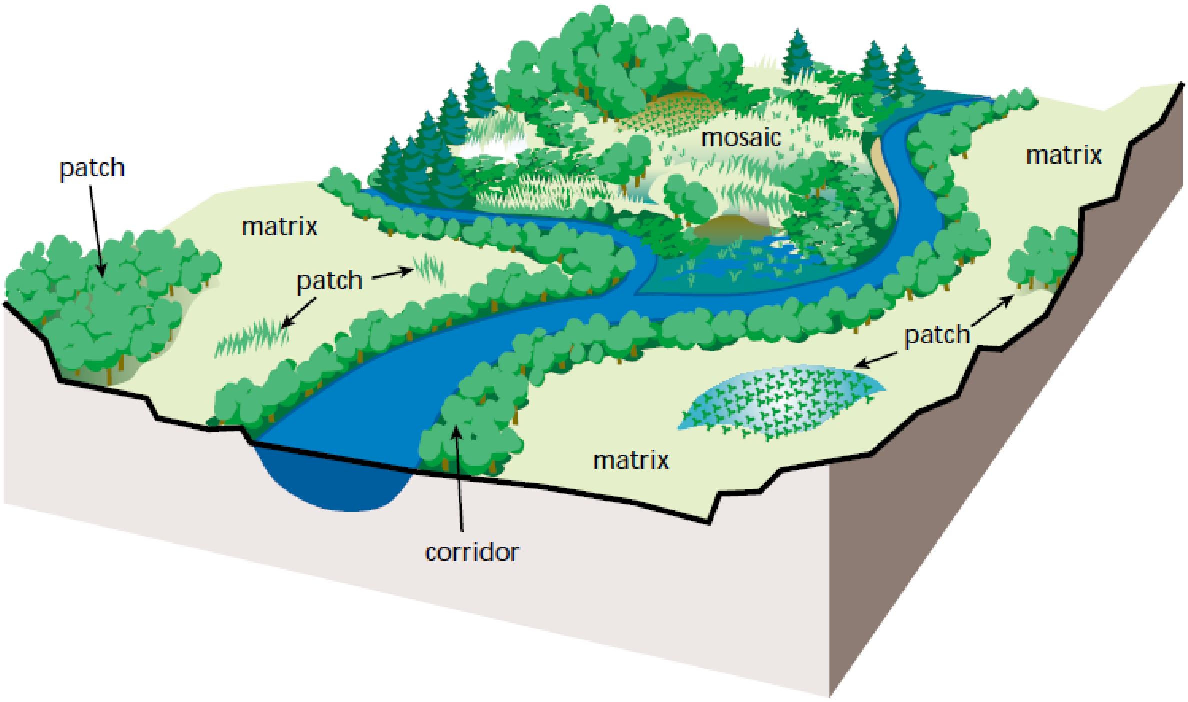


Figure-2.1- Patch,Corridor,Matrix at Landscape

https://www.intechopen.com/source/html/45411/media/image1.png

3.2.1. Patch

Patch; are relatively homogeneous areas that differ from their environment (Forman, 1995). Ecologists first compared the habitat patches to the island and regarded the matrix they contained as odd and ineffective (neutral) (Dramstad et al., 1996). This idea was slowly abandoned because the organisms did not take into account the interaction with the landscape pattern and accepted the matrices in the landscape as one and the same (Cushman and Huettmann, 2010).

The patches differ from each other in terms of size, number and position and are analyzed depending on them. A large number of patches can be found in a landscape. The patches are dynamic and show differences depending on the time-space scale (Dramstad et al., 1996). Landscape involves not a single spot but a hierarchy of speckle mosaics (McGarigal, 2015).

3.1.2. Corridor

Corridors are aquatic or terrestrial areas that connect two or more landscapes together and generally lie in strips. The matrix in which they are present is different but similar to the patches they link to each other (Odum and Barrett, 2005).

Corridors are spatial connections between landscape elements that have many important functions such as the displacement of species and the flow of matter, energy and information (Bastian and Steinhardt, 2002). Many definitions related to corridors have been proposed. One of the first definitions is corridors; (Perault and Lomolino, 2000 'athen Hilty et al., 2006), where biotin among the regions spread rapidly. Soulé and Gilpin (1991) define the corridor as linear landscape elements that connect two or more natural habitat patches and provide motion functioning (Hilty et al., 2006).

Corridors are a way to ensure the connectivity between the patches (Hilty et al., 2006). Functionally, the living environment for living beings provides a space for movement and diffusion, and sometimes there are effects that limit the movement of organisms (Nurlu, 2011). Corridors; currents, pathways created by animals, etc. (Forman, 1995), as well as many artifacts, such as roads resulting from human intervention, electric lines, ditches and walking tracks.

Corridors have the function of providing ecosystem services values, cultural heritage protection and recreational facilities other than the aesthetic function in the landscape (Ahern 1995, Fábos 2004 Hilty et al., 2006). Corridors mainly have 5 major functions. These are habitat, conduit, filter, source and sink function. (Forman, 1995).

3.1.3. Matrix

The matrix is the name given to a large area of similar ecosystem and vegetation types. It forms the main skeleton of landscapes, patches and corridors (Odum & Barrett, 2005). Typically the combination of landscape elements, usually patches. Matrix plays a dominant role on the landscape function (McGarigal, 2015). The area within a mosaic that provides dominant control over dense cover, high connectivity and / or dynamics is the usage type or background ecosystem. (Forman, 2013). As a result, the landscape mosaic model; stain-corridor and matrix (see Figure 2.2) (Forman, 2013).

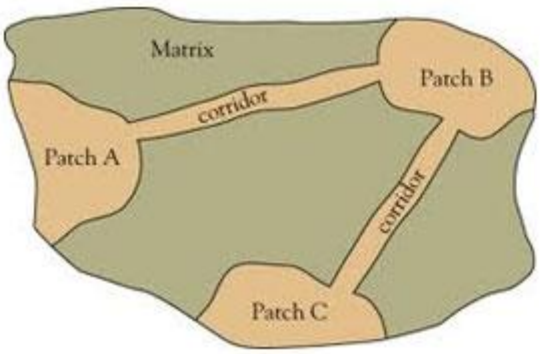


Figure 2.2 Patch,Corridor,Matrix

https://biodiversityconservationblog.files.wordpress.com/2016/11/01.gif

3.3. Landscape Function

Landscape function; the interaction between spatial elements, flow of matter, energy and species between the elements of the ecosystem. Ecological objects (animals, plants, biomass, heat energy, water, nutrients) constantly move and change among landscape elements (Kor, 2011).

The change in the landscape structure affects the function. The change in the process also affects the landscape structure as a cycle (Forman and Godron, 1986). This dynamic interaction between structure and function plays a decisive role in the existence and continuity of living communities (Deniz et al., 2006).

A full understanding of the landscape function is needed to reveal the relationship between the landscape elements and the current flow (Ayaşlıgil, 2002). Landscape function refers to the services (production, protection, regulation, etc.) in different categories provided by the landscape (Kor, 2011).

3.4. Landscape Change

Landscape change can be defined as a structural and functional change of ecological mosaic depending on time (Ayaşlıgil, 2002). Landscapes are constantly changing (Bastian and Steinhardt, 2002). Landscapes vary by following the same process on similar patterns in different parts of the world.

In the work of Lindenmayer and Fischer (2006), two landscaping change categorizations have been dealt with to describe how individuals and communities respond to landscape change (see Figure 2.3). These are the landscape change model proposed by Forman (1995)

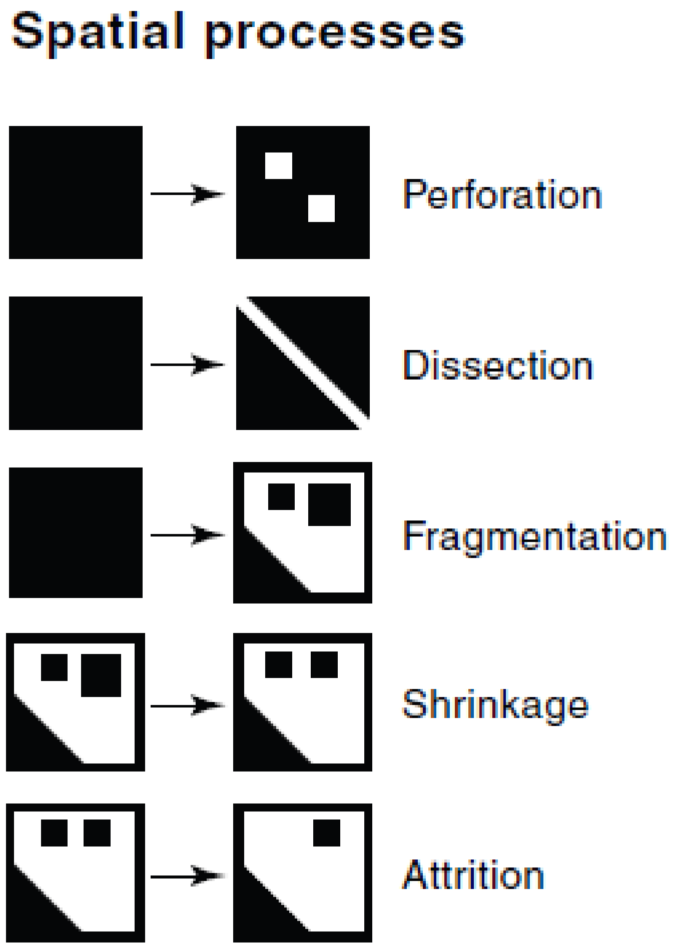


Figure 2.3 Phases of the fragmentation process (Forman 1995)

http://docplayer.cz/docs-images/24/2585370/images/24-0.png

Forman (1995), under the five classes, collects the spatial change that has taken place in the landscape due to human influence. These are perforation, dissection, fragmentation /

subdivision, shrinkage and attrition. These changes cause different patterns in the landscape. In addition, ecological processes alter the spread of plants and animals.

Forman (1995) notes that landscape changes and increases with time components (Lindenmayer and Fischer, 2006).

Perforation; habitat loss and fragmentation. Transformations resulting from different land uses (agriculture, housing development, etc.) include the drilling of natural habitats due to the direct losses that result.

Dissection / slicing; second stage. It arises from the resulting linear landscape elements (Cushman and Huettmann, 2010). The alternative way of starting the land conversion is to divide the land with equally wide lines or to separate the parts (Aksu, 2012).

Fragmentation; third stage. It occurs by dividing the different parts of the landscape that contain physically related habitats. Fragmentation can completely cut off the physical connection of the habitat and disrupt the movement path of the organism.

Shrinkage and Attrition; habitat loss and fragmentation. In some cases, the target habitat may disappear completely. Here the landscape is critical to the viability of the target habitat. The function of the landscape is seriously endangered by the organisms associated with the target habitat as the size of the habitat patches begin to diminish and become isolated from each other (Cushman and Huettmann, 2010).

McIntyre and Hobbs (1999) define the landscape situation in the 4 major classes during the landscape change process. Landscapes; intact, variegated, fragmented and relict. According to Forman 1995, these different classes correspond to different landscape patterns in the landscape. McIntyre and Hobbs (1999) suggested that increasing the anthropogenic landscape change would reduce the amount of intact habitat and increase habitat degradation (Lindenmayer and Fischer, 2006).

3.4.1 Landscape Changes Factors

Abiotic factors such as solar energy, water, wind, landslide and biotic factors originating from the competition of bacteria, viruses, plants and animals cause deterioration in landscape. These distortions can deeply affect the landscape (Farina, 2006). Landscape change is a complex process of ecological and socioeconomic factors in addition to cultural factors (Bastian and Steinhardt, 2002). The change of landscapes is due to numerous and different reasons (Lindenmayer and Fischer, 2006). Natural landscape changes can take quite a long time and take place slowly, depending on the nature (volcanic eruptions, floods, droughts, earthquakes, avalanche etc). Mainly, the development of human communities has become a dominant factor in landscape change over natural processes (Bastian and Steinhardt, 2002). Among these effects, the most common according to Landsberg (1999) and Daily (2001) are agricultural growth and urbanization according to Luck et al. (2004) (Lindenmayer and Fischer, 2006).

Bernhardt and Jäger (1985), Bastian and Bernhardt (1993) found that four major factors in the study of Central Europe have historically been influential on landscape change. First factor; agricultural uses and economic gains. Agricultural development has resulted in the formation of large rural areas, water balance and regional climate change, migration of changing animal and plant species, and so on. The second factor is; (holistic) developments that are used extensively by all the natural resources and potentials presented by the landscape outside of agriculture. They are used for ore mining to establish settlements, transportation and communication networks, to generate energy, to transport goods and use water for fishing, forestry activities (lumbering, hunting, etc.) of natural forests. The third factor is the industrial revolution. In the fields developed by the industry, it was seen that the resources were largely exploited and they were clearly piled up in settlement. It limits agricultural areas and forest areas. The surface of the world began to settle with industrial development, transportation routes and mining. With the development of new techniques, the intensive use of fossil fuels and the chemical production industry have begun to develop. Mechanization in agriculture has reduced the need for human power, which has caused migrations.

Agricultural land; fertilization, land development and the attempt to increase the used soil layer. This has adversely affected biodiversity in the landscape. The fourth major factor is the development of science and technology. The development of science and technology has been adversely affected by the use of natural resources as intensively as the positive effects of the environment. Landscapes have been exposed to human influences and have begun to appear everywhere in nature as foreign matter accumulates in solid, liquid or gaseous form. The rapid increase in the use of the sea has begun to be seen and the biodiversity has been further reduced (Bastian and Steinhardt, 2002). These factors are the stages that have been effective in all landscapes from past to present.

The five main driving forces are influential in order to list the elements that cause the landscape change. These,

• Socioeconomic constraints: Urbanization, industry, industrial activities.

• Political enforcers: Political decisions are the result of misapplications.

• Technological constraints: Vehicle paths, infrastructure facilities

• Natural stressors: flood, avalanche, landslide

• Cultural constraints: Accessibility, human interventions, fire

According to Antrop (2005), accessibility within these forces is the most important. When people arrive in a space, they are beginning to change it quickly.

3.5. Landscape metrics

Numerical description of the landscape structure is essential for determining the changes in landscape functions and landscape, and various metrics for this purpose have emerged (McGarigal and Marks 1995, Leitao and Ahern 2002).

Landscape metrics define the spatial structure of the landscape. For example, they provide information on the proportions of each landscape element in a landscape mosaic or the shape of the components of the landscape elements. Landscape metrics are important tools that characterize the spatial characteristics and geometry of a patch or its mosaic (Leitao and Ahern 2002).

Landscapes are dynamic and therefore always change. Landscape change indices that differ from landscape metrics define information about the changes that took place over time in the landscape mosaic (Leitao and Ahern 2002).

The structure of the landscape has two basic qualities as composition and configuration (Farina 2000, Leitao and Ahern 2002).

<u>Landscape composition:</u> The composition is a non-spatial quality and can not be measured. Landscape describes the quality of the patches scattered within the mosaic. The landscape composition is not a definite description of the mosaic structure but is an effective display that reveals the suitability of the habitat for some species (Farina 2000). Composition measurement reveals landscape qualities such as proportion, dominance, diversity and richness. Diversity measurements are made using indices such as Shannon and Simpson (Leitao and Ahern 2002).

<u>Landscape configuration:</u> Configuration refers to spatial characteristics and spatial characteristics such as spatial distribution or layout of land cover or use patterns (Farina 2000). Configuration measurements; size and shape, as well as spatial dimension measurements, as well as edge quantity and type. For example, the relationship of patches to each other, such as the relationship between contagion and contamination (Leitao and Ahern 2002).

Landscape metrics are considered very useful and important tools in the implementation of ecological concepts in planning. Numerous metrics have been developed for the analysis of landscape structure. According to many researches and evaluations, landscape measurements are often related to each other. (Leitao and Ahern 2002). In the calculation of landscape metrics, the program named FRAGSTATS, which performs a spatial pattern analysis for categorical maps in general, is used. FRAGSTATS makes it possible to simply measure the spatial size and spatial configuration of landscaping patches (McGarigal et al 2002).

Landscape metrics may not be a solution for all plans. The aim here is to enhance the communication between planners and ecologists, and to support numerical approaches that will make it possible to define landscapes and plans. In Table 2.1, landscape metrics are associated with some basic ecological processes such as loss of landscape diversity, division and diffusion of degradation. Metrics are suitable for certain applications, and on the other hand, it is important to understand the boundaries to ensure correct use (Leitao and Ahern 2002)

Landscape metrics related to selected ecological processes

Ecological processes	Landscape metrics
Landscape simplification (or reduction of diversity, heterogeneity), e.g. an agricultural landscape composed solely of corn fields (Midwest, USA)	PR: measures the number of classes present in the landscape. At its lowest limit, there is only one land use or land cover class and the landscape lacks diversity. As PR increases greater diversity/heterogeneity is present. CAP: measures the proportion of each class in the landscape. If one class dominates completely the landscape then it will provide little support for multi-habitat species.
Fragmentation: a fragmented landscape provides less connectivity, greater isolation, and higher percentage of edge area in patches	NP: measures the total number of patches of a specified land use or land cover class. If NP is too high it indicates that the patch class is highly fragmented.
	MPS: measures the average patch size of a class of patches. If MPS is small it indicates a fragmented landscape. NP and MPS should be used complementary since high NP and low MPS values reinforce an interpretation of a fragmented landscape condition.
Spread of disturbance, e.g. disease, fire	MNND, and proximity (PROXIM) both metrics measure the relative distance between patches of the same class and can be used as a surrogate for connectivity. The spread of disturbances such as disease and fire are greater when MNND is low, and when PROXIM values are high. Contagion (CONTAG) measures the relative aggregation of patches of different types at the landscape scale. High levels of CONTAG may indicate a potential for disturbance spread.

PR-Patch Richness; CAP-Class Area Proportion; NP-Number of Patches; MPS-Mean Patch Size; MNND-Mean Nearest Neighbour Distance; MPI-Mean Proximity Index.

Table 2.1 Landscape Metrics Releated to Selected Ecological Processes (Leitao and Ahern 2002)

3.6. Corine land cover classification system

There are many techniques used in the land cover class on the world. The most prevalent of these are the US Anderson Geological Survey (USGS), the Coordination of Information on the Environment of the European Union (CORINE) and the European Union's European Nature Information System (EUNIS) (Şatır and Berberoğlu 2012).

Nowadays, as land use changes rapidly, these changes need to be identified quickly so that rational use of resources and environmentally sensitive land use decisions can be taken. For this reason, the European Union's CORINE Landfill Program has been launched under the Global Monitoring Program for Environment and Safety (GMES). From 1985 to 1990, an environmental information system (CORINE System) was created by the European Commission, the terminology and methodology of this system was developed and the system was accepted at European Union level. The implementation of the system in the Central and Eastern European countries was initiated within the framework of the decision of the Dobris Conference in 1991 and the European Union Assistance Program and the CORINE databases were completed in 13 countries (Anonymous 2012a).

Within the scope of the CORINE study, the study scale is 1 / 100.000 and the smallest area is 25 hectares. Classification of land cover was done at three levels. Five classes are defined at the first level, fifteen subclasses at the second level and forty-four subclasses at the third level (Table 2.2).

Table 2-2 Corine Land Cover Classes

http://clc.gios.gov.pl/images/clc_ryciny/clc_classes.png

4. MATERIALS AND METHOD

This section describes the materials and methods used in the research process. In the material section, information about the history, position and structure of the research area is given. In the method section, the methods and stages used to realize the study objective in the research field are explained.

4.1. MATERIAL

4.1.1 Prachatice

The territory is located in the southwest part South Bohemia Region which analyzed by this master thesis. On the west, it is adjacent to the Klatovy district, the northern part of the České Budějovice district, in the southeast, has a common border with the Český Krumlov district. In the southwestern part of the city, the border is common to the federal state of Bavaria. From a physical geographic point of view, the area is predominantly mountainous and sub-mountainous, belonging to the province of Czech Highlands. There are two sub-provinces in this territory , Šumava and Bohemian-Moravian provinces. Šumava subprovince is located here in the Šumava Mountains, specifically Šumava (900 - 1 380 m) and Šumava foothills (500 - 1 110 m). The Bohemian-Moravian sub-province intervenes in the South Bohemian Basin, and that namely Českobudějovická pánvi. Here are the lowlands with ponds (450 - 550 m). In terms of settlement systems, it is a territory of predominantly small settlements. The border of 1 000 inhabitants exceeds only 10 municipalities (Čkyně, Husinec, Lhenice, Prachatice, Stachy, Vacov, Vimperk, Vlachovo Bresze, Volary, Zdikov). The solved territory has a total area of 1 375 km2 (2007), which is 13.7% of the South Bohemian Region area, making it the fourth place within the districts of the South Bohemian Region. If we compare this area with other districts of the Czech Republic, we will find that the largest district in the territory of the Czech Republic is the district of Klatovy with a total area of 1 946 km2 which is a total of 571 km2 larger than the Prachatice district.

The order of the district by area	District	Area (km^2)
1	Klatovy	1946
2	Jindřichův Hradec	1944
3	Příbram	1692
4	České Budějovice	1638
5	Olomouc	1620
…		
16	Prachatice	1375
…		
73	Ostrava – město	332
74	Plzeň - město	261
75	Brno - město	230

Table 4.1: Status of district Prachatice according to area (to 2007) Kolektiv (2007)

However, if we look at the next table, we find that the Prachatice District is ranked the last places of all districts in the population. It has only 51,409 inhabitants (to 2007). Less populated are the districts of Rokycany and Jeseník. Most people have on the contrary, the district of Prague with 1 188 126 inhabitants.

The order of the district by Population	District	Population
1	Prague	1 188 126
2	Brno	366 680
3	Ostrava	337 197
4	Karviná	275 754
5	Olomouc	229 171
…		
71	Rakovník	52 882
72	Tachov	51 917
73	Prachatice	51 409
74	Rokycany	46 117
75	Jeseník	41 827

Table 4.2: Status of Prachatice district by population (2007) Kolektiv (2007)

According to the density of settlements, the district ranks last among the districts. Density the population is only 37 inhabitants / km^2 . If we compare this figure with the fastest populated district of Prague, where population density reaches 1,593 population / km^2

The order of the district by Density	**District**	**Density Person/km2**
1	**Prague**	**1593**
2	**Brno**	**1017**
3	**Ostrava**	**774**
4	**Karviná**	**684**
5	**Plzen**	**684**
…		
71	**Jindřichův Hradec**	**48**
72	**Klatovy**	**45**
73	**Český Krumlov**	**38**
74	**Tachov**	**38**
75	**Prachatice**	**37**

Table 4.3: Status of Prachatice district by population density (2007) Kolektiv (2007)

4.1.2 Physico-geographic characteristics

The Prachatice District represents a diverse landscape in its entirety. The territory covers Šumavská and Českomoravská province. Šumavská subprovince is located here in the Šumava Mountains, specifically Šumava (900 - 1 380 m) and Šumava foothills (500 - 1110 m). Its large part is formed Vimperk and Bavarian Highlands, intersected by the upper flows of the Volyňka and Blanice rivers. The foothills gradually pass into the Šumava strip with the catchment of Vltava basins. Whole territory is made up of a set of wooded ridges and hills separated by the valley of the river and streams that gradually descend to the Budějovické basin. The Bohemian-Moravian sub-province intervenes in the South Bohemian Basin, and that namely Českobudějovická basin. Here are the lowlands with ponds (450 - 550 m).

Most of the district is situated at an altitude of 600-800 m above sea level. Netolicko (410 - 450 m) is situated above the sea, while the highest places are in Vimperk and Volary (most of the settlements are 700 m and above). The highest settlement is Kvilda (1,062 m), the lowest part of the Podeřiště village in Malovice (410 m).

4.1.3 Water Sources

The landscape is full of small and larger watercourses, which form one of the green roofs of Europe. Most of the area falls into the Elbe basin and therefore to the North Sea (part of the Vltava river basin), only pieces of the southwest at Bučiny the Black and Čertovou stream of water among the Danube basin and therefore to the Black Sea. The Vltava river is dominated by the border areas, which originate from the two the sources of the Teplá and Studená Vltava and at the Soumarský Bridge begin its boating section. Together with the River Řasnicí, the waters flow from north and west to the east. The northern tributaries of the Vltava River are Vydří, Račí and Volarský stream. They take water to the southern, central and northern parts of the region. It belongs to the sub-basin of Otava and its tributaries, Blanice with Zlatý and Dubský stream drain the area towards Strakonice. The north-western part drains Volynek with tributaries flowing towards the north east to Strakonice. From the eastern part of the region, the waters of Stružka and Netolický Creek go to the northeast into the pond basin of Českobudějovická. Between Černá mountain and Stráží, there is the spring of Teplé Vltava. The so-called Schwarzenberg Canal - a 19th-century waterway for rafting, a technical monument that overcame the Elbe and the Danube. The whole area of Prachatice is characterized by a number of lakes, peat bogs, streams and rivers, wet meadows and meadows. Netolicko is a landscape of ponds, which can be found also at Vlachov Březí. We can find water reservoirs in the area. On the Blanici River is the Husinec Reservoir, part of the Lipno Water Reservoir on the Vltava river.

4.1.4 Climate

Climate conditions change altitude and terrain, so they are very different. At an altitude above 800 m above sea level, the climate is slightly cold, in the area below 800 m to slightly warm.

The average temperature reaches 7 ° C in lower places (Husinec, 504 m n.m.), but in mountain areas only 3.7 ° C (Kvilda, 1062 m above sea level). Snow the coverage according to long-term measurements is on average more than 130 days. Average annual rainfall ranges from 500 mm in lower positions to 1 100 mm in mountain areas, up to 1 500 mm on ridges. The climatic regions of Prachatice County from the environmental point of view, Prachatice is ranked among the cleanest of the whole Czech Republic.

4.2. Socio-geographical characteristics

4.2.1 Population

In 1869 there were 86 297 inhabitants in the area of Prachatice. This number did not any noticeable changes until 1930. After the Second World War there was a drop thanks the expulsion of the German population. This decrease was 47,742 inhabitants. It is currently population 51 409 (2007), which is the least in the South Bohemian Region.

Population density is only 37 inhabitants per km^2. Population density is low especially in the border part of the district, where after the German population was removed there was no full settlement of this area, and a number of smaller settlements completely disappeared. In the towns of Netolice, Prachatice, Vimperk and Volary, 52% live in the district. The population of the district accounts for 8.2% of the total population of the South Bohemian Region and the number of the whole Czech Republic 0.3%.

Prachatice district belongs to the districts with an increase in the total population. In all The population of the South Bohemian Region is an average increase of 0.35%, which is in absolute terms represents 2 240 inhabitants. The age structure is somewhat against the county average younger. At the age of 0-14, the county has 8,943 inhabitants (ie 17.4%, the county 16.6%), aged 15-59, 33,924 inhabitants (ie 66.0%, county 65.4%) and aged 60+ 8,497 inhabitants (ie 16.6%, county 18.1%) (to 2007).

4.2.2 Population development

Šumava has been inhabited since ancient times. However, the adverse climatic and natural conditions that prevented permanent settling were hampered by greater upheaval.

The first minor findings, proving human occurrence, come from the late Palaeolithic period, the early Stone Age, the Bronze Age, and the Iron Age. The people were probably coming along the rivers. Colonization reached in the Middle Bronze Ages up to the area of today's Stožce, Libínský Sedl and Sušice. However, this settlement was not too dense. Only the Celts settled the Šumava region to a greater extent foothills. It has attracted gold here. We have proof of settlements: Obří hrad u Studence - Riesenschloss (910 m above sea level), Wreath near Lcovice, Sedlo at Albrechtic or fortifications at Kubo Huti.

Due to the Germans' campaign, the Celts had been expelled from the country, and their settlements were burned until the arrival of the Slavs in the 7th and 8th centuries. We do not have any more accurate news about settling. We assume that the then population did not leave its headquarters and gradually merged with newcomers. Since the Šumava terrain has not been explored so far, the news and knowledge of the development stages of the settlement are inaccurate. But we know some foothills and burial grounds from the foothills.

Village headquarters are often neglected. However, it is proved that at the end of the 1st millennium this area is already relatively populated.

The great reversal occurred at the time of the migration of the peoples in the 7th and 8th centuries, with the advent of the Slavs, who created so-called half-huts - huts partially recessed into the country. As archeological research shows, their new territory was protected by four fortifications - Kněží Hora u Kunětice, Hradec u Řepic, Hradiště near Sousedovi, Hradec u Němětic. Further findings come from the present sawmill of Čeňka, Kubova Huti and Vlachova Březí (John, 1979).

Significant changes took place in the 10th century. These were mainly connected with the centralization of the Czech state and feudal relations. Agricultural settlement was very long and slow due to unfavorable terrain. Nevertheless, there are already many rural settlements.

An important role for settlements in this period is the network of roads, especially the commercial trails around which larger settlements appeared, and gradually became towns. The Golden Path played the most important role. The original route was probably here in the prehistoric times, but the first mention we have since the 11th century. The route traveled from Pasov to today's Prachatice and after three centuries it has grown to 3 main routes.

1. Lower Gold Path from Passau to Prachatice via Waldkirchen and Volary.

2. Middle Gold Path from Passau to Vimperk via Strazny.

3. Upper Gold Path from Passau to Kašperské Hory via Freyung and Kvild.

Today, only remnants have survived. Between 1993 and 1998, research took place on the Vimperk route called "Zlaté stezky" and it was found that the remnants of the Golden Path are remarkably preserved on the slopes of Boubín around Kuba Huti, on the slope of the Gulf of Zlín between Strážný and Horní Vltavice and between Strážný and the state border.

The main trade item on the Golden Path was salt. The Czech lands lacked it and had to be imported. From the salt deposits in the Eastern Alps in Reichenhalla, Hallein or Hallstatt, the salt was transported along the rivers to Passau and thence on the backs of the Shamar Horses along the Golden Path through the Šumava to Bohemia. In addition to salt, precious substances, southern fruits, spices and wine were imported into Bohemia and in the opposite direction mainly grain and hops, honey, wool, leather, beer and other food products.

If we map all three branches of the Golden Paths and the villages near them on the territory of the solved territory, we find that a number of municipalities originated in the 14th century. These are the municipalities: Kvilda, Strážný, Horní Vltavice, Solná Lhota, Klášterec or Volary. At the late of 15th century, Albrechtovice and Perlovice were founded. Currently, both settlements are present due to the displacement of the German population, was partially destroyed. However, there is an effort on the renewal of these settlements. In Perlovice, many houses are being renovated, in Albrechtovice there are currently 2 houses.

Other settlements, which originated mostly in the 18th century. These are the centers of Kořenný, Žlíbky, Havránka, Arnoštka, Kubova Huť and České Žleby. These settlements were created in connection with the extraction of wood in the big villages, when the Golden Trail lost its importance and started with the construction of woodworking and glassworks.

Glassworks are the second factor contributing to the development of the population. One of the main centers of these mills was Vimperk today.

We do not know much about the 12th century development, but in the 13th century, as in other Czech lands, there is a colonization wave. By this time, only the Church, later the secular feudal, was involved.

Current archaeological finds prove the existence of settlements (Sedlec, Bošice, Čábuze, Vnarova, Sklára, Lipka, Šerava) and market centers, which gradually formed cities. The original titles prove that the first settlers were Czechs, but they were just coming in to pontificate some places (John, 1979).

In the 14th century a wave of colonization continued. Due to the transformation of the feudal economy, newly organized farms - Čkyně, Zálezly, Lčovice, Rohanov, Přečín, Dobrš, Češtice are created. Not only did the tide of colonists, but also miners, into the emerging cities, thanks to the development of precious metal mining. At that time a large number of German colonists came here, but the ethnic character remained still Czech. The Germans settled mainly in the upper cities.

This basically ends the first settlement stage. The inhabitants have reached middle positions and some have penetrated more into the mountains.

The Hussite period did not mean any significant change in settlement. Of great importance at this time was the expansion of the villages and their agricultural fund. There was a deeper penetration into the mountain boulders. However, due to unfavorable climatic conditions agriculture has not become the main source of livelihood. It consisted mainly of metallurgy, glassmaking, woodworking and linen, especially in the 16th century. At this time and later years Šumava was famous for its glassmaking, no concentration of glassworks in Europe was like here.

4.3. Economy

4.3.1. Industry

The district is not rich in raw materials, the sources of energy raw materials are absolutely low, some parts of the district are peat deposits. It is possible to mention stone mining in the vicinity of Vimperk and Prachatice. They are an important natural resource extensive forests, especially coniferous and mixed forests.

Industrial production over the last ten years has undergone extensive restructuring and the cancellation of inefficient operations. At present (as of 31 December 2007), there are 58 companies with 20 or more employees in the district. Their share in the industrial production of the region only 3.1%. Construction has also changed its structure. It caused the collapse of large state-owned enterprises to smaller private firms. It participates in the construction of the region 4.0%. The bulk of the activity is directed to new construction, modernization and reconstruction buildings.

Prachatice is considered to be rather an agricultural area, industry is widely distributed in this area. It is represented mainly in larger cities, in Prachatice, in Vimperk and Volare. There are mainly foreign companies, mainly German, which establish businesses in the territory of the district. This reduces unemployment in the Prachatice district, which is low compared to other parts of the country, which is around 3.5%.

In agriculture, cereals and forage crops predominate in crop production. The livestock production is mainly cattle and pig breeding (in Strunkovice nad Blanici), sheep breeding is growing. The livestock breeding in the open-air ranks considerably.

4.3.2. Services

The network of school facilities consists of 36 kindergartens, 29 primary schools, 2 gymnasiums, 4 vocational secondary schools, 5 secondary vocational schools. Higher levels of schools in the district are only one, and the Higher Social School in the SPGŠ in Prachatice.

Medical doctors provide 159 doctors in the district. Private practice is operated by 103 physicians. On the 10,000 inhabitants of the district there are 22.81 physicians in outpatient care and 4.96 physicians in hospitals. There are 323 inhabitants per district doctor. There are also 7 social care facilities in the district where there are 393 places. (31 December 2001).

Cultural facilities are concentrated mainly in cities. There are 6 permanent cinemas, 54 public libraries (including branches), 9 museums, 1 theater with own amateur ensemble ŠOS. There are also 136 sports facilities, including 25 swimming pools and pools with operator, 32 sports fields with operator, 33 gymnasiums including school facilities. The covered swimming pools with year-round operation are in Prachatice and Volare, and there is also an indoor swimming pool in Vimperk. Indoor ice stadium with artificial ice is in Vimperk. (31 December 2001).

As can be seen in the table below, service-oriented entities predominate in the area under consideration. These entities are 932. 690 of them fall into a category employing 1 - 5 employees. There are 366 businesses in the industry, and only 88 are in the agricultural area.

Field	Number	Number of entities by number of employees								
		1-5	6-9	10-19	20-24	25-49	50-99	100-199	200-249	250-499
Agriculture	88	54	8	10	1	8	6	1	0	0
Industry	366	200	45	52	16	33	9	9	2	0
Services	932	690	98	72	21	31	13	4	1	2
Total	1386	944	151	134	38	72	28	14	3	2

Table4.4: Distribution of entities by target and number of employees(to 2008) (www.czso.cz)

4.3.3. Transportation

The road network in the district is relatively dense and all municipalities have connections to the state road network. The most important first class roads pass through the district from the state border (Strážný) in the direction of Vimperk, Strakonice and Prague, about 40 km. The total length of 1st class roads is 66 km, roads II. class 228 km and roads III. class 392 km. At present, the project of extensive reconstruction of the Strunkovice nad Blanicí - Prachatice - Volary - border crossing Strážný is being prepared.

The direct rail link has 17 municipalities, including all 4 cities. The railway line Číčenice - Prachatice - Volary passes through the district, then Strakonice - Vimperk - Volary with a continuation to Kájov - Český Krumlov - České Budějovice. This track has a turn from the Black Cross to Stožec and Nová Údolí. A track of local importance leads from Netolice to Dívčice, connecting to the main line Plzeň - České Budějovice, as well as the two previous tracks. It is also important to mention the highest track in Kubo Huti (995 m above sea level).

4.3.4. Tourism

Interest in recreational stay in the district proves a large number of objects of individual recreation. In addition, there are a number of other recreational facilities - hotels, guesthouses, etc., which make it possible for those interested in recreation in the district. The territory of Šumava is used for recreation not only by citizens of the Czech Republic, but also by visitors from abroad. There are border crossings in Strážný, Nový Údolí and others.

Prachatice region have natural beauties, historical monuments, hiking, winter sports, cyclists and watersports. The landscape of the area is diverse: the South Bohemian ponds in Netolice, the Lhenice fruit-growing area, the deep Boubín forest, as well as the border forests with wooded settlements, the picturesque landscape of the Prachaum and the Šumava National Park. The Vltava from Lenora and the Soumarský Bridge to Nové Pec is interesting for watersports. It is possible to walk through a number of pedestrian walkways (one of the oldest is the Medvědí stezka), ride a great number of cycling routes - all await visitors to this unique landscape.

4.4.1. History of administrative arrangements

Today's Prachatice district was in almost all parts of the so-called Prácheňský region. According to August Sedláček, the creation of the regions was a complicated process due to the existence of three principals - Prachňany with a center on Prachni, Netolice and Božešice with a center on the fortification of Bozeň u Březnice. There was unification, which lasted until the 13th century, while in the second half there were clearly two regions, Prácheňský and Bechyňský.

4.4.2.. Prácheňsko

As already mentioned, Prácheňsko was part of the first administrative system of the Czech state, the castle system. The Prachin Castle was the headquarters for which the region was named. The castle was a part of the feudal administration system and it was not only a defensive function, but also a part of the government, administrative and economic system. Here was the Prince, and later the King's Royal Castlekeeper with his armed squad.

Late 13th century wave of founding county and cities began to change position in the organization. Great emphasis was placed on security and order. As a result, a special civil servant was appointed to the castle - a janitor with extensive judicial and criminal jurisdiction.

The Czech kings built along the Vltava a number of fortified settlements to ensure greater security for the region. At that time, the capital of the region, Pisek, grew too.

After the end of the Hussite wars, Prácheňsko still maintained a great influence between the then twelve Czech regions. The county states were governed by the regional congresses, where the interests of the nobility were. Instead of the executioners, the commanders of the military were now elected, also called the commanders. This change was not welcomed initially, and it was an attempt to reestablish the trustees. However, the resolution of the 16th century has definitely stabilized. The lower nobility has at least recovered the choice of two governors, one from the local estate, the other from the government (Kolektiv 1993).

After the Habsburgs, after 1526, completely withdrew from the election governors. They were now designated, on the basis of the imperial appointment, of the local nobility. Gradually the function of the governors expanded to other areas - economic - coins, rates, scales, social - wage family, supervision of hunting, carrying weapons, etc.

In the 17th and especially in the 18th century the powers of the governors increased. Interest has also been given to things previously neglected, especially education, industrial production, and underage affairs. A fundamental change came in 1751. Only one governor was appointed here. This was Jan Martin Běšín of Běšin. He had a firm office in Písek and was given a salary from the Royal Treasury. He was directly subordinate to the provincial political administration.

4.4.3.Origin of districts

As mentioned in the previous chapter, the Prachatice District has undergone a number of changes during its development. One of the other major factors was the fall of feudalism in the second half of the 19th century and the disappearance of the patrimonial administration, where the lower administrative units - the districts - were organized.

In the proclamation of the provincial governor Mecséry, dated September 1, 1849, the establishment of the political offices of the administrative in the crown country of Czech states: " The grace of the highest decision in Schönbrunn from August 4th to the most advanced preamble of the Minister of Internal Affairs, Dra. Alexandra Bacha, since 31 July graciously deigned to conform to the narrowing of political administrations in the Czech Crown land.

Most surprisingly, this preamble, which contains not only the reasons for the political establishment of the Czech country, but also the guiding principles that the Minister of Internal Affairs has dealt with in the implementation of the basic features.

At the same time, it is recalled that all documents concerning the establishment of political governance should be submitted to the King. the Land Commission to set up a political office that has its headquarters in a government house in Prague.

4.4.4. Establishment of sub-regional authorities

On the basis of the Ministry of the Interior's Decree of August 9, 1849, a sub-state office is established in Vimperk. It commenced its activity on February 1, 1850. Its district consists of 150 municipalities of the district courts of Vimperk and Volyně with a total of 42 035 inhabitants (Starý, 1979).

On 1 February 1850 the Podkrajský Office in Prachatice also emerged. Its circumference was a non-political and prachatical district. The non-territorial court district included 48 cadastral municipalities and 16,100 inhabitants; the Prachatice District Court had 57 cadastral municipalities with a total of 25,037 inhabitants. However, this division is not permanent.

Dominion	Manur
Český Krumlov	České Žleby, Frantoly, Horní Sněžná, Chroboly, Mičovice, Ovesné, Skříněřov, Spůle, Spálenec, Sviňovice, Záhoří, Zbytiny
Prachatice	Ostrov- Staré Prachatice, Prachatice
Vimperk	Albrechtovice, Cudrovice, Dvory, Hlásná Lhota, Horní Záblatí, Husinec, Chlístov, Kahov, Kratušín, Krejčovce, Křišťanovice, Lažiště, Milešice, Mlynářovice, Oseky, Perlovce, Petroviče, Řepešín, Saladín, Stádla, Švihov, Volovice, Záblatí, Zábrdí, Zvěřetice
Vlachovo Březí	Budkov, Dachov, Dolní Kožlí, Horní Kožlí, Horouty, Chlumany, Chocholatá Lhota, Lipovice, Pěčnov, Uhřice, Vlachovo Březí, Žárovná
Volary	Běleč, Libínské Sedlo, Rohanov, Těšovice, Zdenice
Volyně	Mojkov

Table 4.5. Administration of Prachatice, according to its former domination District Court (Prachatice 1850 - 1897, Inverter, ONV Prachatice 1994)

After the reorganization of the state administration, the mixed district office for the Vimperk district court was active in Vimperk on 26 May 1855. It consists of 69 cadastral municipalities with 22,828 inhabitants (John, 1979).

The new district office is also established in Netolice, whose territorial area consisted of 48 cadastral municipalities with a population of 16,100 inhabitants.

For the time being, the so-called united district offices were established, in which the administration and the judiciary were joined in the state apparatus. In 1863, the judiciary was separated from the administration and the district councils were established with district courts and, on the other hand, the administrative districts with district governments. Court districts were smaller and connected in part to former larger estates.

In 1866, another reorganization is under discussion. In spite of the great protest, according to the Act on Administrative Division of Bohemia of 19 May 1868 on 31 August, the district authorities in Netolice and Vimperk are abolished. Their district extends the territorial scope of the district government in Prachatice. Prachatice district thus becomes the third largest Czech district. It comprises 174 cadastral municipalities with an area of 18.7 square miles, with 69,811 inhabitants ((Starý, 1979).

Circumstances of individual district courts underwent some minor modifications concerning the connection or separation of municipalities or settlements, but this did not have much influence.

In 1874, the Volary County Court was established, becoming the smallest district in the past.

During the District Courts, several territorial changes took place in their district. When the district court in Volare was established, the district villages of Prachatice, České Žleby, Horní Sněžná and Volary were connected to the district by the Vimperk District Court. The following villages belonged to Volary: Hliniště, Horní Casov, Houžná, Radvanovice, Řasnice and Vlčí Jámy. In 1876, the District Court of Vimperk was extended by municipalities from the Volyně District Court: Branisov, Jaroskov, Putkov, Račov, Zdíkovec, Žírec (John, 1979) and the Prachatice District Court in 1875 about the villages of Jelemek, Kralovice, Lažiště and Nebahov from the district of the district court in Netolice.

District Court	Municipalities	Population
Netolice	38	15079
Prachatice	35	22230
Vimperk	24	28365
Volary	5	7631
Total	102	73305

Table 4.6. Administrative Districts in 1989 (Stary, 1979)

Other major territorial changes did not record the Prachatice District until 1 October 1938.

4.4.5. Administrative development in 1918 – 1938

The declaration of the independent Czechoslovak Republic on 28 September 1918 did not bring any major changes in the political administration. The government was the executive. Ministers composed of the appointment of the Constitution prescribed oath before the President of the Republic. The government ruled on draft laws, negotiating government orders. It was also subject to administrative authorities at country level, political districts, mayors of towns and municipalities. By law of 2 November 1918, 16 ministries were established in Czechoslovak Republic (Toms, 1979).

4.4.6. Administrative development in 1938 – 1945

Other major territorial changes did not take place until 1938. At the beginning of October 1938 the Munich Agreement was signed and a considerable part of the border was occupied by the German troops.

The so-called uncontested territories were occupied on October 1-7, 8th - 10th October occupied the so-called 5th zone, which was to become the basis of the final boundary, and in exceptional cases allowed derogations from the strictly ethnographic determination of zones (Radvanovský, 1998).

On 1 October 1938 the units of the Šumava border crossed the roads between Reitenschlag - Přední Výtoň - Frymburk and Bučina - Kvilda and reached the Vltava line from Frymburk to the Bohemian Forest.

On October 2, the German troops crossed the Vltava river, the left wing proceeded from Zwiesel to Prášily and the right wing through Horní Dvořiště to Rožmberk.

Achieved lines:

Susice: Prášily - Seckenberg - Srní - Horská Kvilda.

Prachatice: Staré Hutě - Nové Hutě - Nový Svět - Kubova Huť – Zátoň - Schreiner Berg

- Stöger Berg - Volary – Bretenberg.

Český Krumlov – Ondřejov – Vitěšovice – Hořičky – Kladné – Větřní – Přídolí – Malčice – Střítěž - Dolní Dvořiště.

On October 2, the units were already in the Aigen - Černá - Hořice area in Šumava

On October 3, the section on the line Prášily - Srní - Nový Svět - Volary - Ondřejov - Větřní - Rožmitál na Šumavě was occupied.

On October 8, the march of troops began to cross the border between Gmünd, Oberhaid and Zelezna Ruda and Furt. The territory was occupied up to the Květoňov - Český Krumlov - Vimperk line - Waldmünchen.

In the afternoon, the Nové Hrady - Kaplice - Český Krumlov - Křišťanov - Vimperk - Kašperské Hory - Nýrsko - Filipova Huť - Folmava (Radvanovsky, 1998).

1,696 km2 and 90,332 inhabitants were connected to Germany. From the then political district of Prachatice, 47 municipalities from 125 political communities were transferred to Germany. Under German domination, the industrial territory and administrative centers of Prachatice, Vimperk, Volary were given. The municipalities were connected to Bayerische Ostmart in the beginning of 1939. The remaining villages were connected to the administration of the political districts of Písek and Strakonice (Starý, 1979).

District	the municipalities of Germany
Netolice	Babice, Horní Chrášťany - obec ober Groschum, Chvalovice
Prachatice	Brenntenberg, Cudrovice, Fefry, Frantoly, Chroboly, Jáma, Kratušín, Křišťanovice, Leptač, Malešice, Oseky, Ovesné, Prachatice, Staré Prachatice, Řepešín, Skříněřov, Sviňovice, Trpín, Volovice, Záblatí, Horní Záblatí, Záhoří, Zbytiny
Vimperk	Brdo, Bučina, Horní Světlé Hory, Hrabice, Korkusova Huť, Nové Hutě, Lesní Chalupy (Zdíkov), Klášterec, Kunžvart, Kvilda, Knížecí Pláně, Pravětín, Silnice, Nový Svět, Vimperk, Horní Vltavice
Volary	Horní Sněžná, Chlum, Pumperle, Volary, České Žleby

Table 4.7. The municipalities of the Prachatice district, underwent in 1939 by Germany (Kolektiv, 1938)

After the liberation in 1945, Prachatice once again became the seat of the state administration. The new establishment consisted of 112 municipalities in 1946.

Thus, the district districts had a similar composition as in 1921, there were only slight changes in the arrangement. Netolice District Court joined the village of Vodice, the Prachatice District Court lost the villages of Brenntenberg, Křišťanovice, Leptáč, Milesice, Ovesná, Skříněřov, Volovice, Záhoří. On the contrary, it grew on the villages of Cudrovice, Jama, Kralovice, Zábrdí, Lhota Ratiborov. Under the Vimperk District Court, Horní Světlá Hory, Korkusova Huť, Libotyně and Silnice were no longer included; on the other hand, Klášterec, Masák Lhota and Putkov were included here. The Volary County Court lost its two villages - Horní Sněžná and Chlum (Kolektiv 1955).

4.4.7. Administrative development after 1949

The biggest changes since 1850 affected the district in 1949 and then 1960, when there was a significant reorganization of the territorial administration.

According to the Decree of the Government of 18.1.1949 No. 3/1949 Coll. about the territorial organization of the administration, a district national committee was established in Vimperk. The district of Vimperk consisted of 90 municipalities with 24 961 inhabitants and the Prachatice district of 70 municipalities with 22 091 inhabitants (Starý, 1979).

Vimperk district was formed by the district of the Vimperk District Court, except the Vojslavice settlement from Šumavské Hoštice and settlements Kaplice, Lenora and Zátoň from the village of Horní Vltavice.

Many villages were connected here from the Strakonice district: Benešova Hora, Čábuze, Češtice, Dobrš, Drážďany, Dřešín, Dřešínek, Horosedly, Hoslovice, Chvalšovice, Kvaskovice, Lochovice, Lhota nad Rohanov, Malenice, Nahořany, Nespice, Nová Ves, Nuzin, Přečín , Radešov, Radhostice, Rohanov, Úbislav, Vacov, Vacovice, Viska,Vlkonice, Vrbice, Zálesí, Zálezly, Žár.

From the Sušice district there were connected the following villages: Filipova Huť, Horská Kvilda, Javorník, Nicov, Stachy. In addition, the villages of Strašice and the settlements of Bolíkovice and Setěchovice from Dolni Nakvasovice were included here.

On the other hand, the extent of the Prachatice District was reduced by Babice, Černěves, Čichtice, Hlavatce, Hvožďany, Chvalovice, Krtely, Lékářova Lhota, Libějovice, Lužice, Mahoš, Malovice, Malovičky, Nestanice, Netolice, Nemcice, Obora, Olšovice, Petrův Dvůr , Podeřiště, Radomilice, Sedlec, Sedlovice, Strpí, Truskovice and Zvěřetice. They were connected to ONV Vodňany.

However, there were connected villages from the Český Krumlov district: Bělá, Hintring (now Záhvozdí), Jaronín, Křišťanov, Křižovice, Ktiš, Nová Pec, Směděč, Stožec, Písek: Blanice, Javornice, Koječín, Strunkovice nad Blanicí, Zichovec,from the Strakonice district: Bohunice, Bušanovice, Dub, Dubská Lhota, Horní Nakvasovice, Jiřetice, Tvrzice, Újezdec, from the Vimperk District Court: Lenora (Kolektiv, 1955).

4.4.8. Cancellation of the Vimperk district

In 1960 the Vimperk District was abolished and its district was divided into three neighboring districts.

The village of Filipov Huť and Horská Kvilda, the district of Strakonice, Češtice, Dobrš, Drážov, Dřešínek, Hoslovice, Chvalšovice, Kvaskovice, Malenice, Nahořany, Nová Ves, Vacovice, Viska and Zálesí. The remaining municipalities and parts of the municipalities were connected to the Prachatice district, which was extended by municipalities from the Sušice district: Maleč, from the district Vodňany: Chvalovice, Lužice, Netolice, Obora, Olšovice, Podeřiště, Mahouš, Němčice, Velký Bor (Starý, 1978).

Municipalities were merged in the 1960s. We know about 65 municipalities in 1960, in 1962, 92 districts were constituted, in 1966 only 69 municipalities (Starý, 1979). If we look at the Prachatice district in 1982, the district has only 44 independent municipalities (Kolektiv, 1982).

In 2003, there are 65 separate municipalities. This state is the same until nowadays. At present, it is the municipality: Babice, Bohumilice, Bohunice, Borova Lada, Bošice, Budkov, Buk, Bušanovice, Čkyně, Drslavice, Dub, Dvory, Horni Vltavice, Hracholusky, Husinec, Chlumany, Krushinov, , Kubova Huť, Kvilda, Lizice, Lovice, Luzice, Luzice, Lipovice, Luzice, Mahos, Malovice, Mickovice, Nebahovy, Nemcice, Netolice, Strážný, Strunkovice nad Blanicí, Svatá Maří, Šumavské Hoštice, Těšovice, Tvrzice, Újezdec, Vacov, Vimperk, Vitějovice, Vlachovo Březí, Volary, Vrbice, Záblatí, Zábrdí, Zálezly, Žárna, Želnava, Žernovice.

4.5. Agricultural settlement

After the end of the war, the so-called 2nd stage of settlement began in 1945. This settlement took place gradually in several waves and unevenly fast. Tempo and quality have been influenced not only by the realities within the country but also by international relations. On the one hand, they depended on legal acts, on the other hand it was the definitive Potsdam confirmation of the displacement of the German minority that helped to strengthen the feeling of security in the new environment.

We can not determine the beginning of the second settlement stage. The beginning of the settlement began after the liberation of Czechoslovakia by the Soviet and American military. The defeat of Hitler's fascism by allied troops, the stay of these troops on Czechoslovakia, all this was a decisive guarantee that the possibility of a new settlement would become real.

Researchers who are still addressing settlements can not agree to determine the end of this stage. The settlement was not only the arrival of new settlers, but also the migration of those who did not fulfill their ideas and returned back to the interior (Slezák, 1978).

J. Koťátko considers the completion of the settlement process in summer 1946, when most agricultural estates are already occupied. Other demographers put an end to settlement by the end of 1952.

it can be concluded that the main arrival of the settlers took place in 1945 and 1946, when this process was roughly completed. At that time, the expulsion of the German population ended.

4.5.1. Stages of agricultural settlement

The agricultural settlement has been diverse and we can divide it from different perspectives into several stages.

In terms of economic opportunities, the settlement should take place in two stages. In the first place, finished self-sufficiency farms should be occupied up to 20 ha, and in the second row, farms with newly built buildings, resulting from the merger of two or more adjacent properties.

From the point of view of the origin of the settlers, the process was also planned in two stages: first of all, it was to cover predominantly domestic Czech and Slovak candidates whose registration ended on September 1, 1945, second stage foreign soldiers and re-emigrants, mainly from the former USSR, Hungary and Romania .

From the point of view of the time sequence, we can divide the occupation of German land in the border regions into three stages:

The first stage is constituted by the National Administration of Confiscated Property, which is generally enacted by Decree No. 5/45 Coll. (April - October 1945).

The second stage is its own settlement process, set out in Decrees No.12 and 28 (October 1945 - Summer 1946).

The third stage is overcoming and achieving the necessary consolidation (summer 1946 - 1947),(Slezák, 1978).

The District Settlement Commissions were divided into three settlements in Prachatice. Each group was in charge of one member and another was responsible for the administration.

Settlement group	Municipalities
1st Group	Prachatice, Babice, Horní Chrášťany, Dolní Chrášťany, Chvalovice, Frantoly, Klenovice, Malonín, Chroboly, Lučenice, Leptač, Lažišťko, Rohanov, Oseky, Kahov, Podolí, Ovesné, Plánská, Skříněřov, Psí Koryto, Mošna, Volovice, Cvrčkov, Kamýk, Křeplice, Sedlmín, Stádla, Třemšín, Záhoří, Příslop
2nd Group	Volary, Cudrovice, Mlynářovice, Plešivec, Fefry, Perlovice, Horní Záblatí, Křišťanovice, Albrechtovice, Hlásná Lhota, Kratušín, Milešice, Krejčovice, Sviňovice, Skříněřov, Volovice, Kamýk, Sedlmín, Cvrčkov, Křeplice, Záblatí, Zbytiny
3rd Group	Vimperk, Řepešín, Saladín, Zvěřetice, Pravětín, Vyšovatka, Skláře, Veselka, Hrabice, Cejsice, Křesánov, Modlenice, Korkusova Huť, Arnoštka, Huťský Dvůr, Huť pod Boubínem, Šerava, Klášterec, Michlova Huť, Solná Lhota, Lipka

Table 4.8. Distribution municipal district Prachatice on settlement groups

(State District Archives in PT, Situation Report of Settlement Min. agriculture in PT, 1.4.1946. National land min. agriculture - OKR. Settlement Papers. Office Pt, 1945- 1950. Carton No. 1. Inv. No 5. sig. 1/3)

4.5.2. 1st Stage

The first candidates for agricultural property were members of the Czech population who survived the occupation in the occupied territories. They created the first seed of state power and became the first national administrators of the best property.

With a slower delay, a second wave of farmers interested in agricultural land emerged behind them. They came mostly without family members and were from nearby municipalities located in the vicinity of the Protectorate Border. These two waves came before the National Administration decree was issued.

The third, most numerous wave of national administrators came three months after the war. It has met here with the settled population and their gained position.

Farmers, small farmers, young and old people, longing for rapid riches were moved here. Many of the arrivals saw the possibility of a new home in the border region, better conditions for their lives. They were looking for a homestead that would suit them all their lives. This gave birth to the institutions of national administrators over confiscated agricultural property.

It would appear that the national administration decree does not contain any direct reference to the settlement itself. But that is not the case. National administrations were a significant beginning of the settlement process. The purpose of setting up national administrators was to secure and save the landed property of displaced Germans, to add to the borderland part of future settlers. It was necessary to ensure that national administrators properly manage and do not leave the border. On the other hand, it should be ensured that the estates are brought into their possession.

In the autumn of 1945, however, the question arises as to whether the quality of national administrators is on the level of whether or not there is a "gold-shop".

It was a gradual examination, which started on October 1, 1945. In the Prachatice district there were a total of 143 administrators, 128 of which were verified (Slezák, 1978).

4.5.3. 2nd Stage

While the first phase was marked by spontaneity, a little planning and shortcomings in the organization of security, the second stage is pronounced their planning and organizational security of the event.

It starts in parallel with the revision of national administrators. This is an organized influx of inhabitants from the inland, to whom applications for the acquisition of an agricultural property were distributed.

After the end of the war, agricultural farms were taken away by Czech farmers, who had started occupying vacant homes in February 1946 in Prachatice. During the years 1946 - 1949, 422 settlements were inhabited in 82 municipalities. Each village produced a list of settlements according to the descriptive numbers with the names of the new settlers, which included the name, surname, year of birth and the number of the inhabited settlement.

To the Prachatice district, after 1945, 6,555 inhabitants moved from the inland, which is 55.89% of the total population in the district. in the district Vimperk since 1945, immigrated 3363 inhabitants, which is 57.99% of the total population.

4.5.4. Last Stage

It had to eliminate the problems of the previous stages. Above all, however, It should continue to settle other farms and decide the fate of buildings over 20 hectares (Slezák 1978).

It was decided that small farms would be allocated to non-agricultural families and the rest of the farms would be made available to the National Land Fund. The large farm was decided as follows: "In the settlement plan, this group, estimated at about 250,000 hectares of agricultural land, includes a land reserve for the claims of national administrators of these buildings, for late applications, for re-emigrants and for public purposes.(J. Koťátko at the First National Settlement Conference on 28 February 1946. AUML ÚV KSČ Praha, fund 23,)

One of the other problems was the departure of settlers. The first stage went mostly prospectors who left richer in the second stage it was unproven national administrators. Those opposed to gold miners, leaving under duress. At the last stage, the reasons were many. The causes were personal, economic, financial and political.

Year	Population of Farmers	%	Total Population
1930	17507	49,4	35454
1946	9030	48,2	18720
1948	12000	50,4	23800

Table 4.9. Population at the time of agricultural settlement in the Prachatice district (1.1.1945) (Slezák, 1978)

5. METHODOLOGY

Horní Záblatí, Sviňovice, and Zdenice are growing and developing due to migration due to various reasons around the Prachatice. This growth has led to the formation of a new center that brings together many business and social spaces that have developed and expanded with the spread of the sites as well as the village centers, which preserves its old structure. The villages are growing towards the old square of this rural settlement, a positive impact concerning the development of the village by the local people while creating at the same time also brings the disadvantages. Horní Záblatí, Sviňovice and Zdenice are studied as an example in this study because of the ever-increasing urbanization and consequently increasing population and settlement is one of the places where the effects on rural areas and natural resources.

In this study, after determining the aims and objectives, literature related to the subject or written related to the topic was searched in the internet environment. General information about the region has been provided by the information obtained from the Internet and public institutions. This data has been collected and evaluated under the name of historical, physical, socio-cultural, economic and planning data.

In the literature search, firstly the concept of the landscape was discussed, and the changes in landscape and the effects on the regions were investigated. Based on the changes, the effects of the change of identity on the rural area and the process of urbanization have been taken up with publications such as theses, researches, journals, and articles which have been made in the scope of this study.

Satellite maps have been used to determine landscape changes which belong to different periods. First, 1/10000 scaled satellite maps downloaded from www.kontaminace.cz. These maps have 1688X734 pixel and 32-bit data. Land use classified by creating polygons on ArcGIS. Detection of land use changes for some years was first carried out at the village level. The distributions of data according to years are shown on tables, graphs, and maps. Later, the resulting tables were compared, estimating the future situation by assessing the past and present situation of the area.

5.1 Vectorization of the Satellite Images

Firstly, all aerial images input the ArcGIS software which belongs to 3 municipalities with the 1950s and 2010s. These inputs filled with vectorized data of land cover. All these data were processed in S-JTSK_Krovak coordinate system.

Land cover types defined according to the visibility of aerial maps. Most common categories are selected when these categorization decision definition.

Agriculture : Area principally occupied by agriculture, irrigated or non-irrigated arable lands

Grasslands: Areas covered by grass and herbaceous vegetation, meadow and pastures sometimes used for agriculture

Forest: Areas covered with dense and continuous woody vegetation

Built-up: Urban areas including gardens and public spaces

Water : Main water courses visible in aerial maps

Roads: Main roads and paths visible in aerial maps

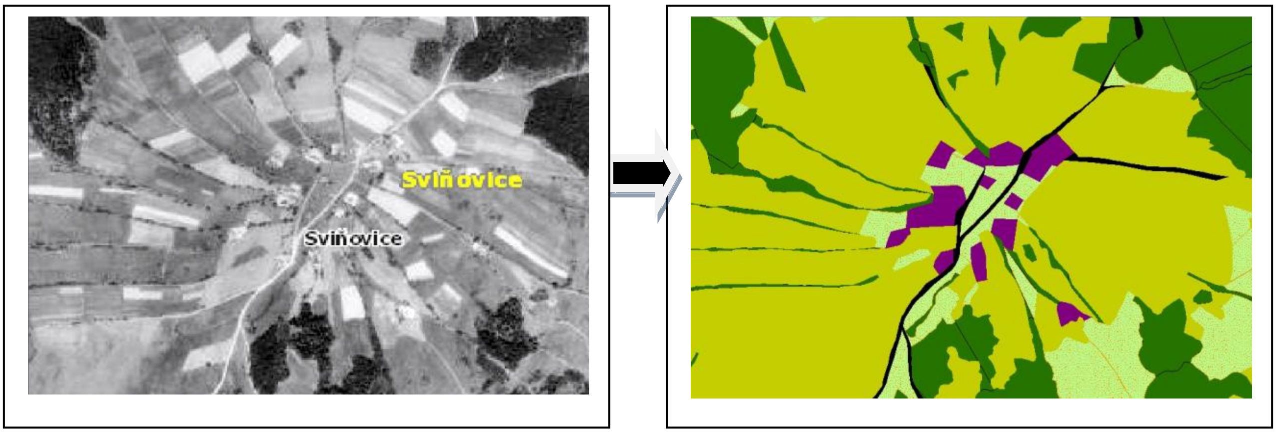


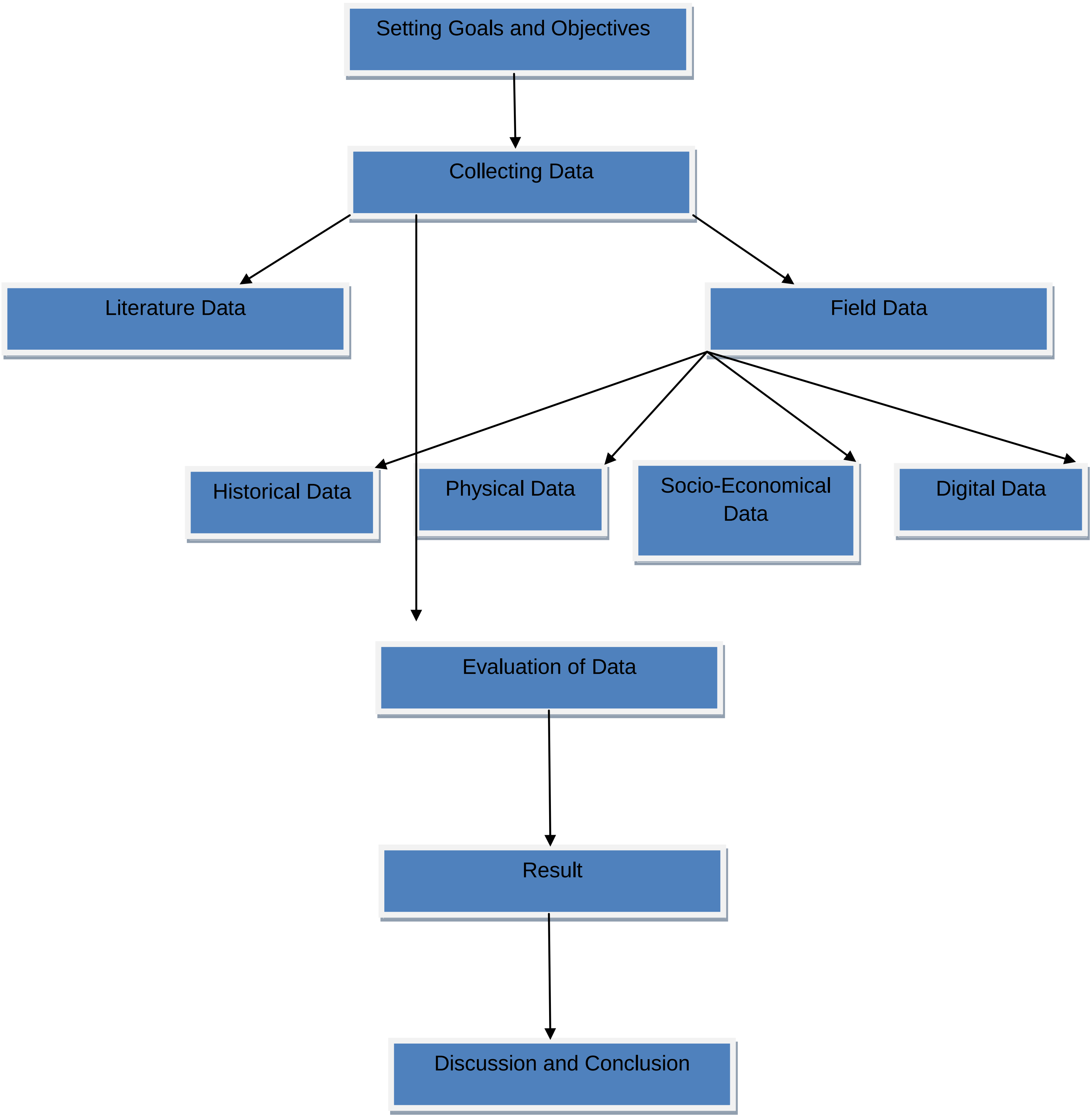
Figure 5.1. Example for Vectorization on Svinovice's 1950's aerial image

5.2. Analysis of Vectorized Satellite Images

Different land cover classes were calculated by using ArcGIS's summarize tables. All summarize tables converted on excel file and calculated according to the map's scale. We created graphics according to these data between years to see land cover changes.

5.3. Field Research

All these three areas inspected by walk to investigate what is different from satellite map on reality and we tried to see unidentified patches on the satellite map. Photos are taken on the areas to keep a record for comparing next time and keep notes about these areas.



Schema 5.1. Work Flow Chart

6. RESULTS

In this section, ArcGIS polygon tool applied to Historical and today's Satellite Map data of kontaminace.cenia.cz are used to determine land cover classes, data converted to tables and charts after ArcGIS land cover classification polygons draw. Following tables and charts show summarized areas of individual land cover categories in the selected areas two periods. These results as an overview of the land cover development.

Horní Záblatí

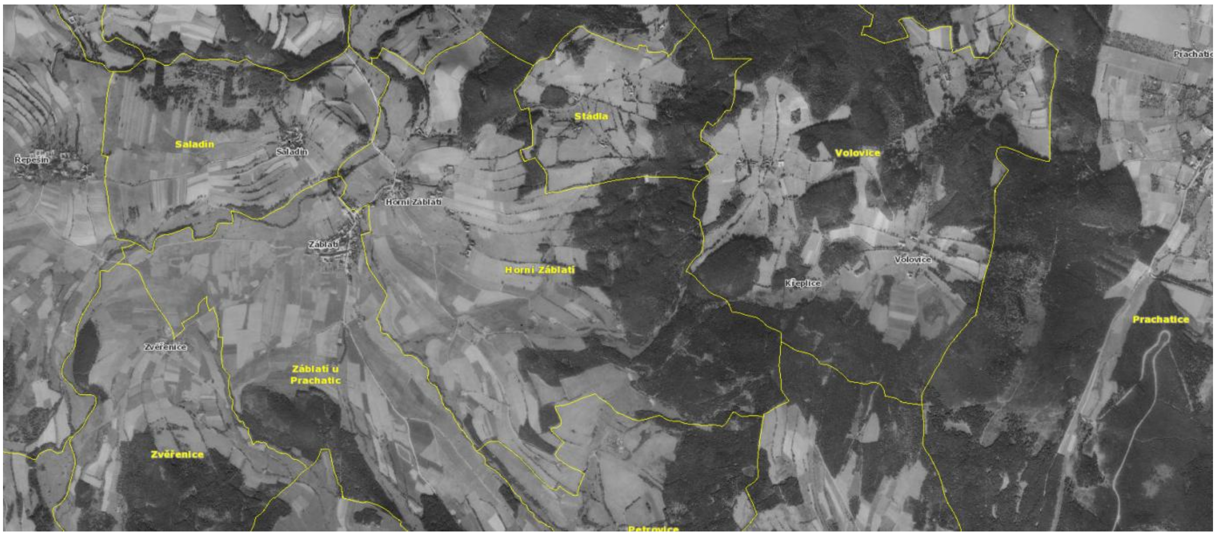


Photo 6.1. Aerial Photo of Horni Zablati 1951 (kontaminace.cenia.cz)

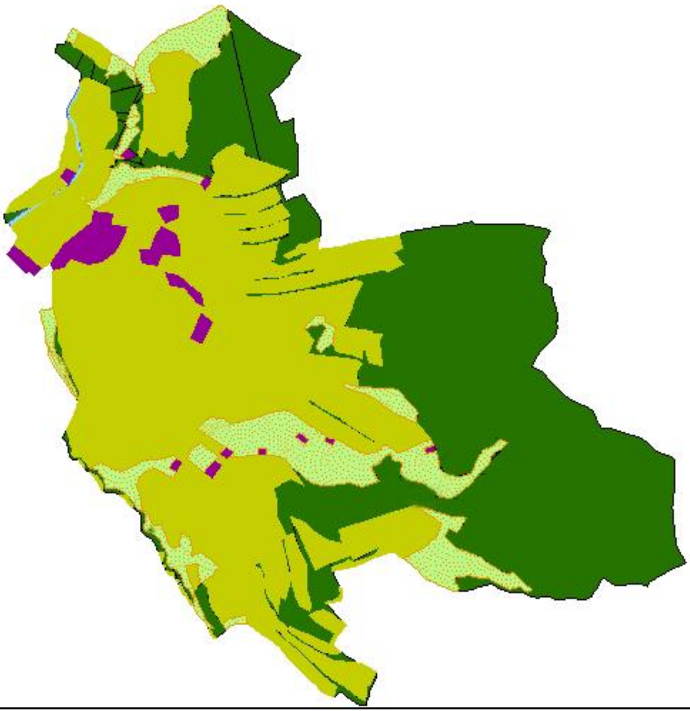


Figure 6.1. Vectorized Land Cover/Land Use Map of Horni Zablati

	Horni Zablati 1951					
	Grassland	Agriculture	Build-up	Forest	Road	Water
Area (km^2)	0,330681	1,471119	0,082884	1,37651	0,000349	0,008457

Table 6.1 Land Cover Categories in Horni Zablati in 1951

Photo 6.2. Satellite Photo of Horni Zablati 2011(kontaminace.cenia.cz)

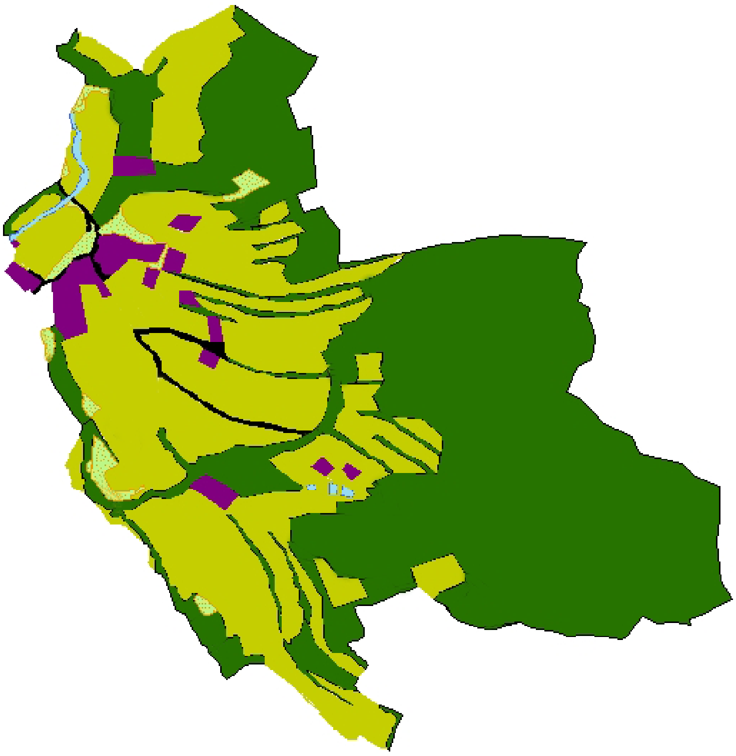


Figure 6.2. Vectorized Land Cover/Land Use Map of Horni Zablati 2011

Horni Zablati 2011					
Grassland	Agriculture	Build-up	Forest	Road	Water
0,054659	1,23289	0,103526	1,842925	0,021927	0,014073
Area (km^2)	Area (km^2)	Area (km^2)	Area (km^2)	Area (km^2)	Area (km^2)

Table 6.2 Land Cover Categories in Horni Zablati in 1951

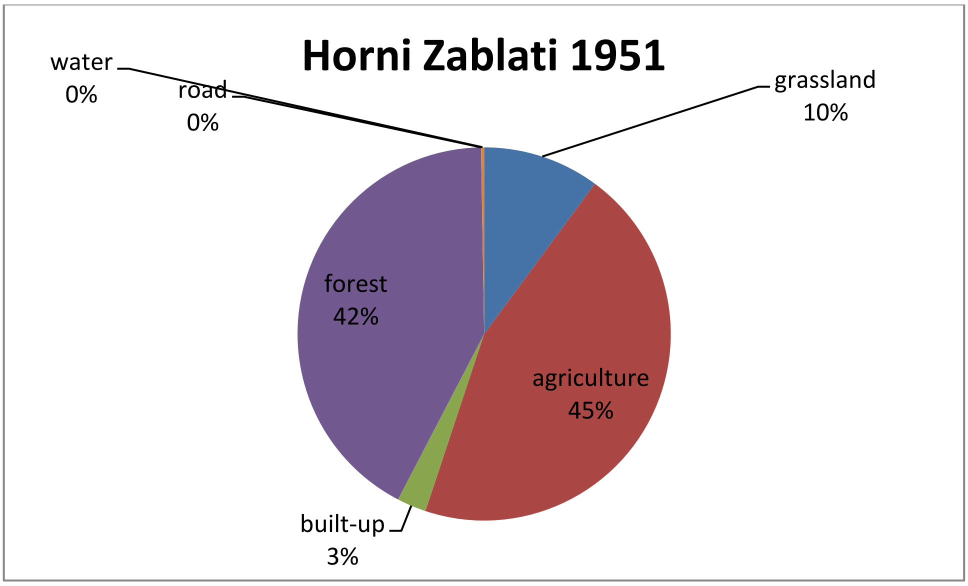


Figure 6.3 Graphical Distribution of Land cover/land use of Horni Zablati1951

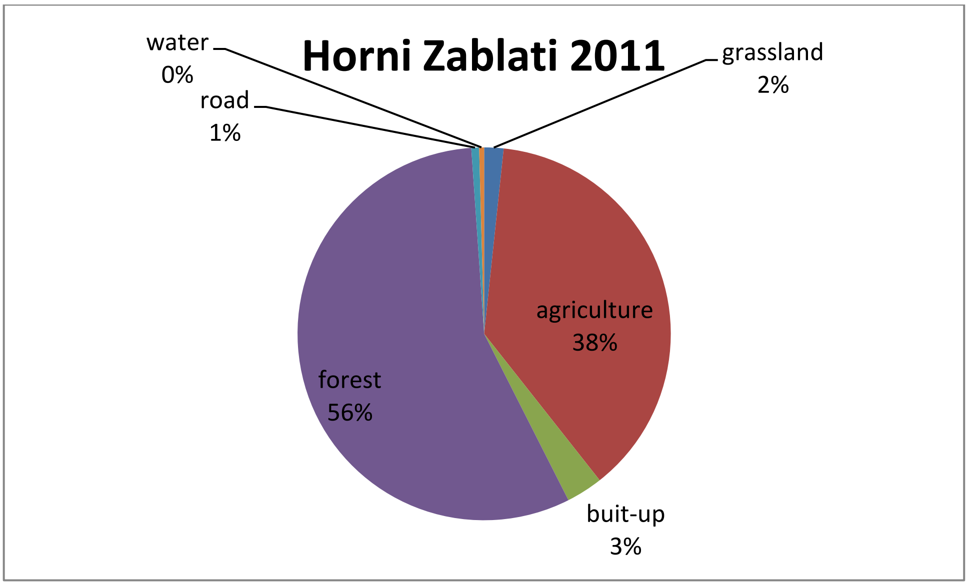


Figure 6.4 Graphical Distribution of Land cover of Horni Zablati in 2011

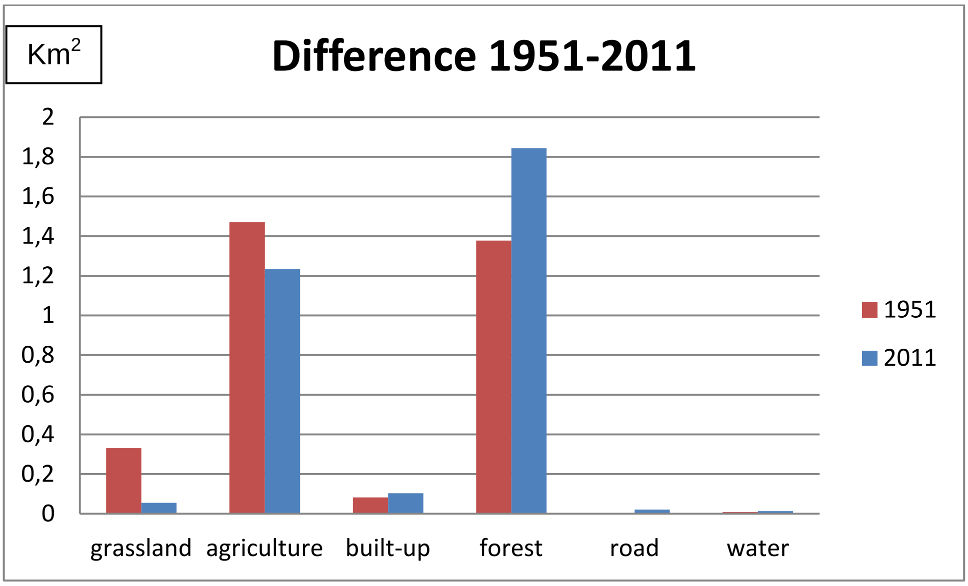


Figure 6.5 Land cover difference between 1951-2011 of Horni Zablati

According to processed data shows that over 87% of the area is covered by forest and agriculture, but it has increased by 7% in 60 years. Rest of the area is other selected land cover classes. Forest areas increased significantly over the 60 years, but grassland and agricultural areas decreased. Built-up, grassland and water areas do not have significant changes.

Photo 6.3 Aerial Photo of Zdenice 1952 (kontaminace.cenia.cz)

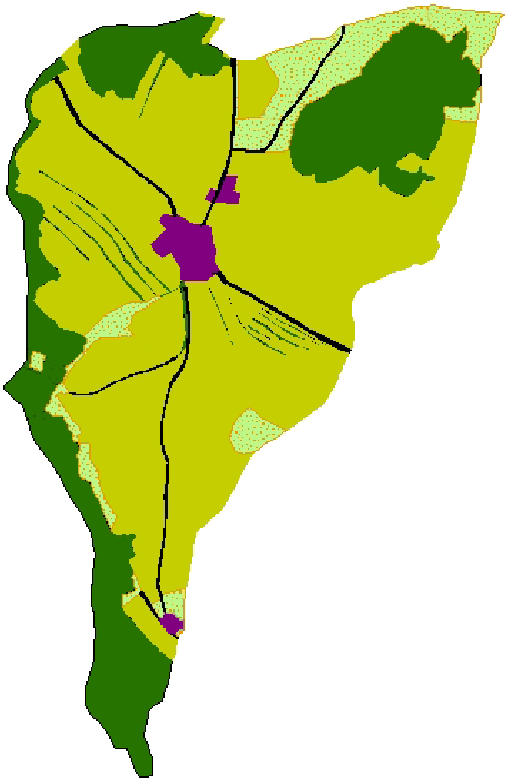


Figure 6.6. Vectorized Land Cover/Land Use Map of Zdenice 1952

	Forest	Agriculture	Grassland	Built-up	Road
Area km^2	0,629201532	1,382504832	0,210248613	0,040263421	0,027782

Table 6.3 Land Cover Categories of Zdenice in 1952

Photo 6.4 Satellite Photo of Zdenice 2011 (kontaminace.cenia.cz)

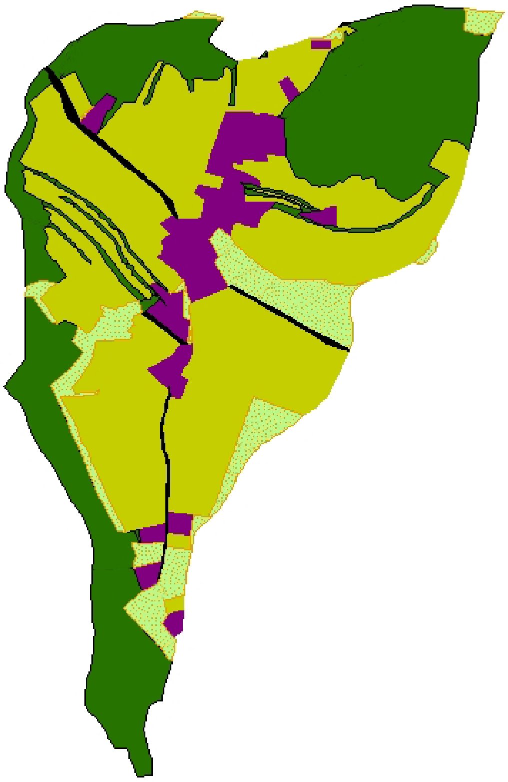


Figure 6.7. Vectorized Land Cover/Land Use Map of   Zdenice 2011

	Forest	Agriculture	Grassland	Urban	Road
Area km2	0,781099467	1,079869894	0,21895818	0,184498143	0,025574

Table 6.4 Land Cover Categories of Zdenice in 2011

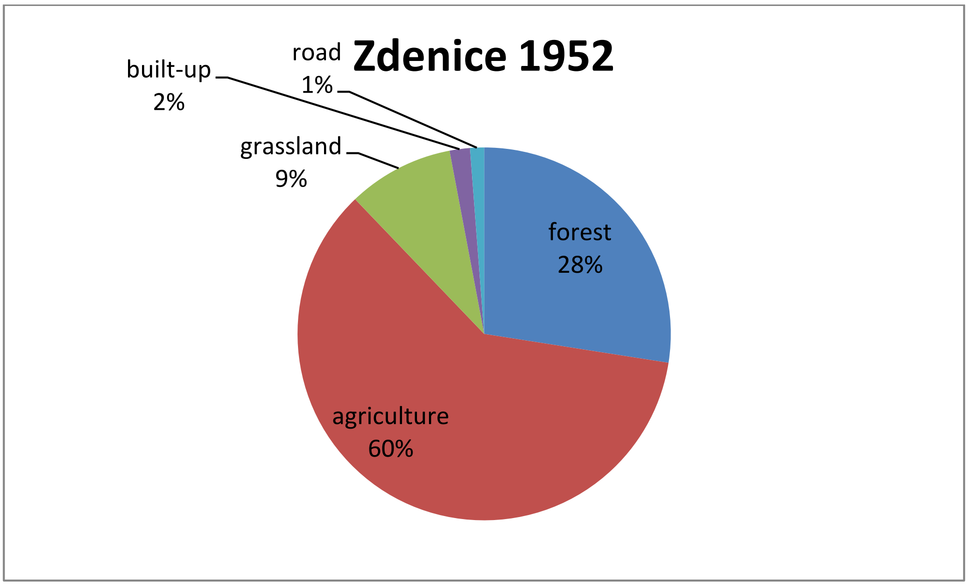


Figure 6.8 Graphical Distribution of Land cover/land use of Zdenice in1951

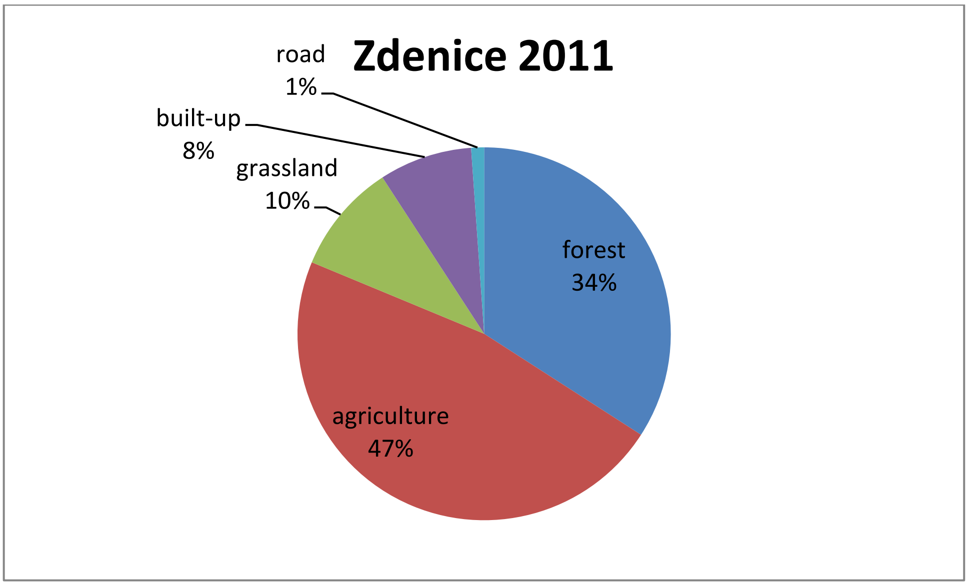


Figure 6.9 Graphical Distribution of Land cover/land use of Zdenice in 2011

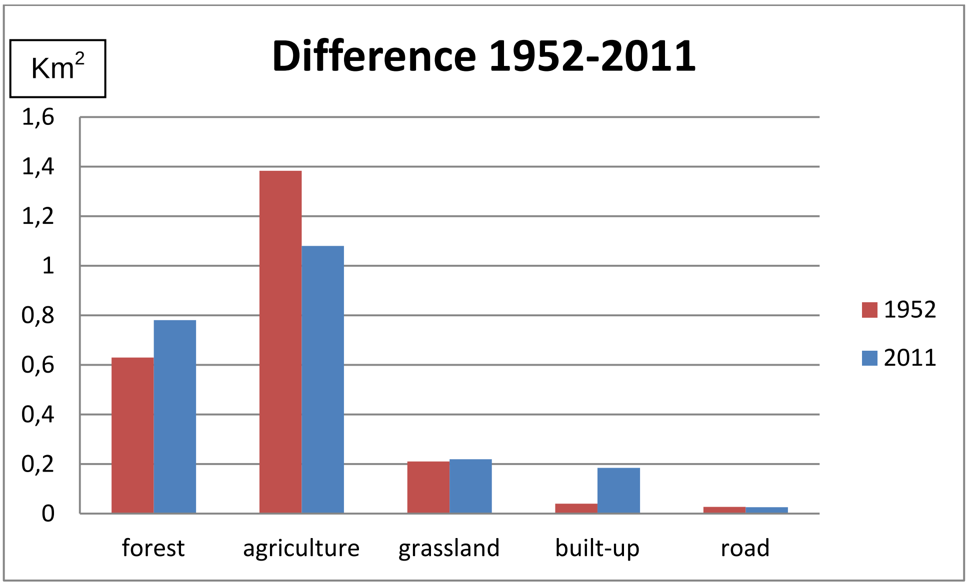


Figure 6.10 Land cover difference between 1951-2011 of Zdenice

Zdenice is more agricultural area according to other studied areas. It had 60% of the agricultural area in, and it reduced to 50% these days. The topography of the Zdenice is the reason why it has more agricultural land cover. Because it is flatter than other study areas. Forest cover and built-up areas increased over the years when agricultural areas reduced — highest full area change rate in this study area. The main reason for this result is, Zdenice is the closest village according to another study area. It is obvious how Prachatice grows up over the years next to Zdenice. This development affected Zdenice on built-up area change rate. Grassland cover did not change significantly, but when maps are compared, grassland areas changed places. Most of the grassland was on the north border of the Zdenice in, but it moved to on the middle and the east border of the Zdenice now. The reason for this may be to find difficulty in finding the difference between aerial view the fields and the pastures. The other reason for this may be these grasslands can be used as agricultural purposes in different years, and fallow can be used as grassland.

Sviňovice

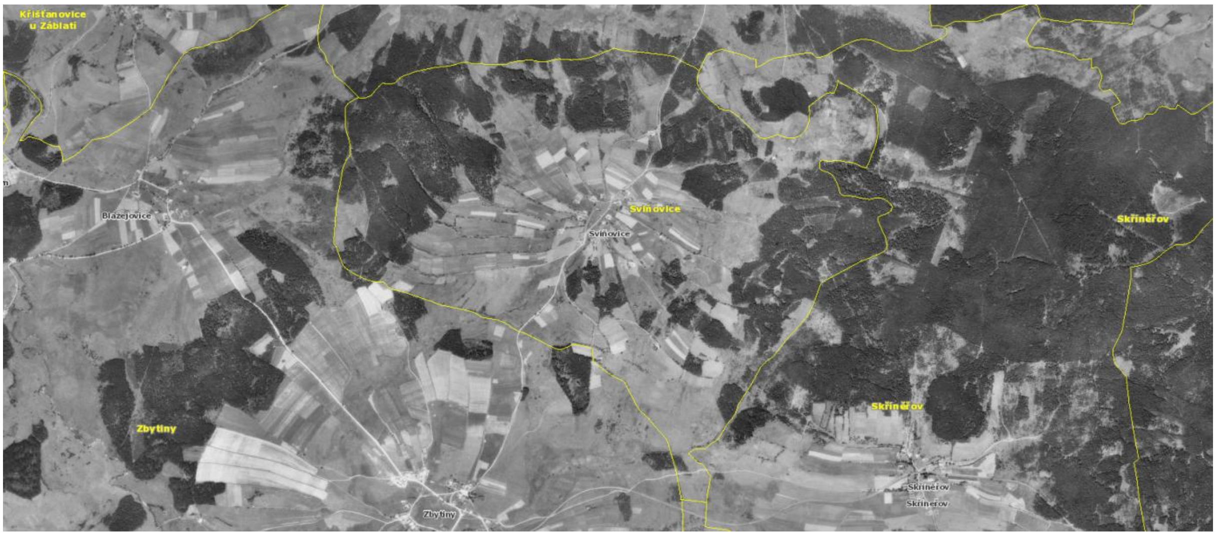


Photo 6.5 Aerial Photo of Svinovice 1952 (kontaminace.cenia.cz)

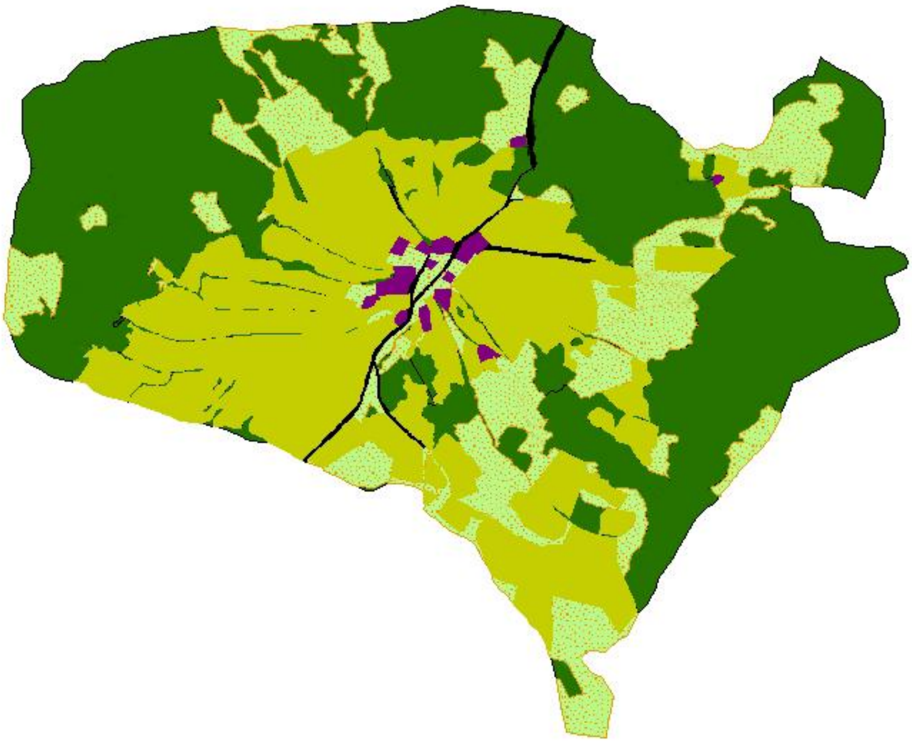


Figure 6.11. Vectorized Land Cover/Land Use Map of Svinovice 1952

	Forest	Agriculture	Built-up	Grassland	Road
Area km^2	2,134691	1,329347	0,037649	0,802704	0,025608

Table 6.5. Land Cover Categories of Svinovice in 1952

Photo 6.6. Satellite Photo of Svinovice 2011(kontaminace.cenia.cz)

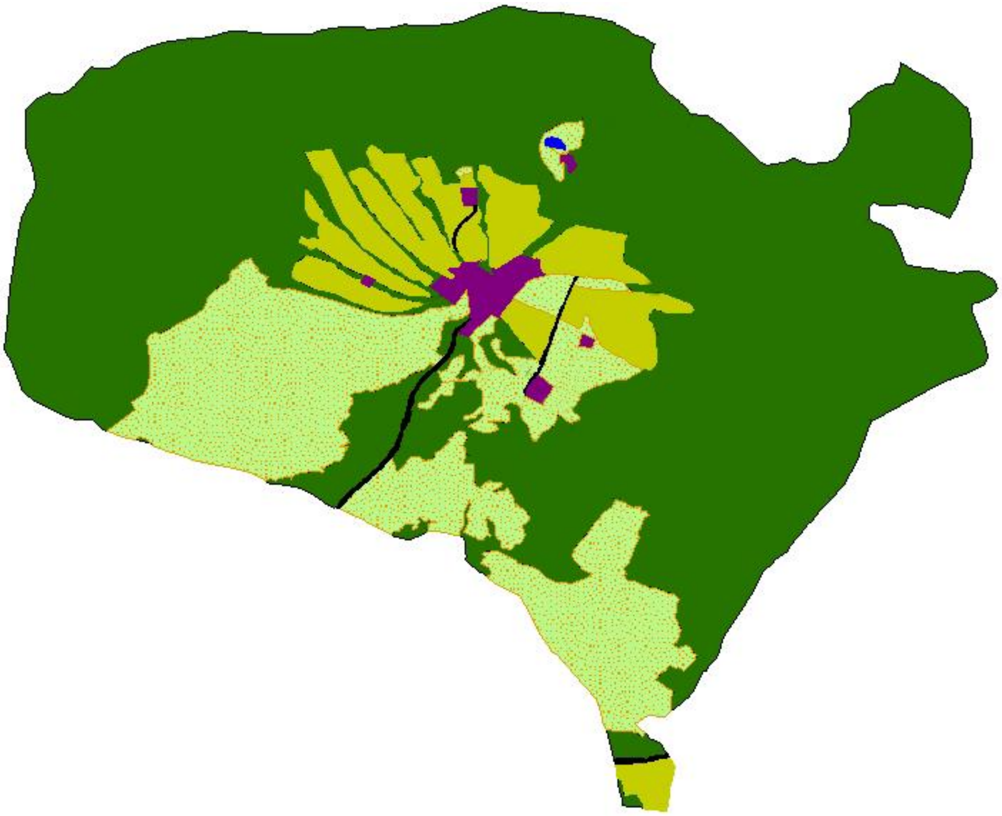


Figure 6.12. Vectorized Land Cover/Land Use Map of Svinovice in 2011

	forest	arable	build-up	grassland	road	
Area km^2	3,057553	0,346788	0,051263	0,857883	0,014968	

Table 6.6. Land Cover Categories of Svinovice in 2011

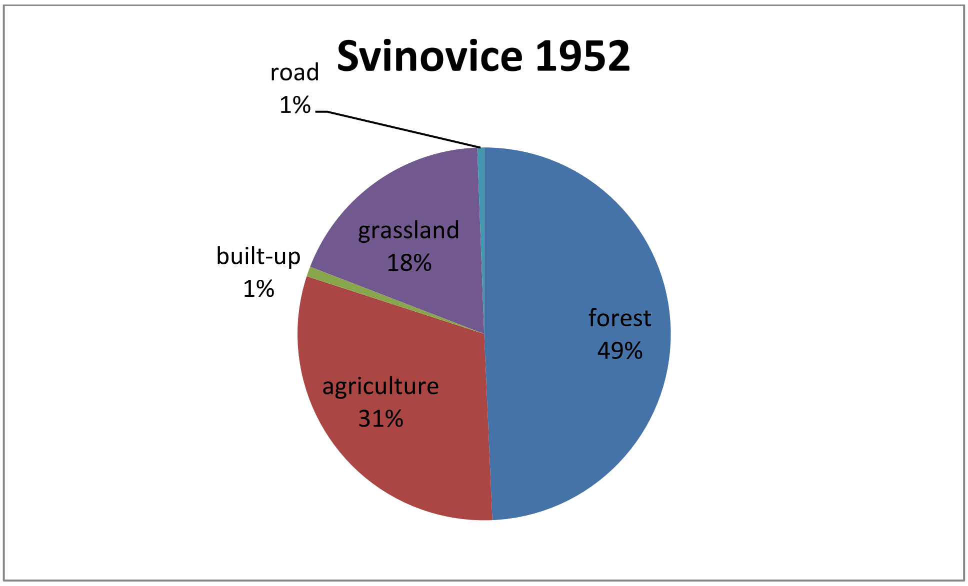


Figure 6.13. Graphical Distribution of Land cover/land use of Svinovice in1952

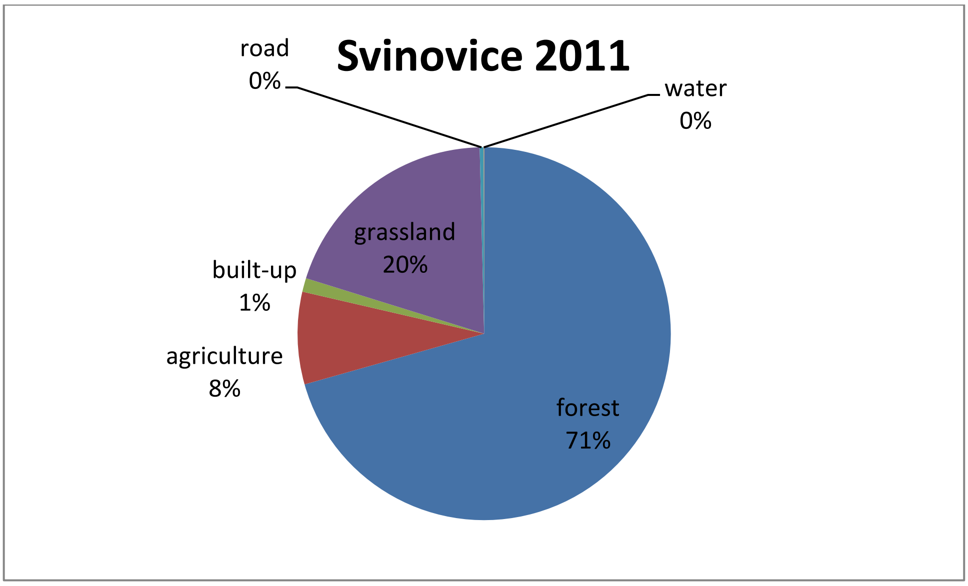


Figure 6.14. Graphical Distribution of Land cover/land use of Svinovice in 2011

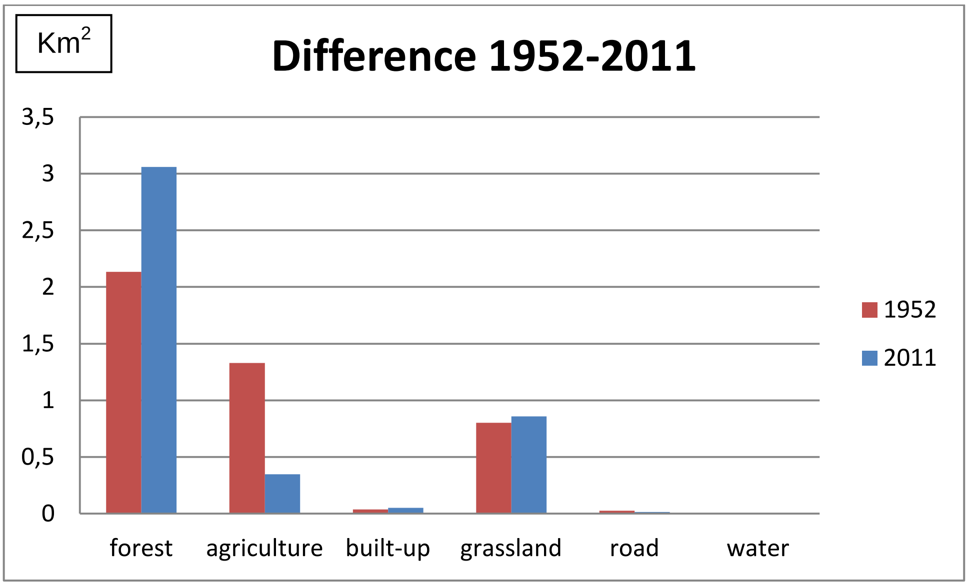
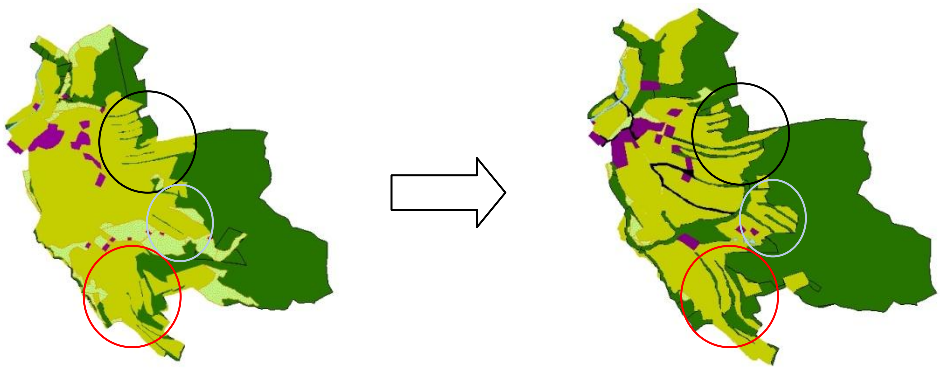


Figure 6.15 Land cover difference between 1952-2011 of Svinovice

Svinovice has the biggest forest cover rate according to other studied area. It was almost 50% in the 50's and increased by 71% over the years till now. Agricultural land cover reduced when forest cover was increasing. Grasslands not changed significantly in this period but shifted the place. Grasslands were between forest cover in 50's. While the forest areas were expanding and the grasslands were shifted towards the southern border of the region. Topography is important in Svinovice to understand the land cover changes. The large cow farm in Svinovice's southern neighbor Zybitiny was also effective in the displacement of the grasslands to the south.

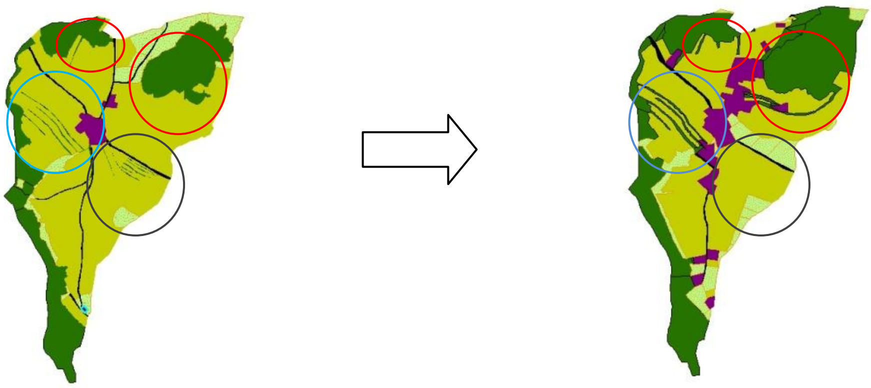
With the end of the vector works, it was observed that hedgerow structure in the region were still preserved and a further study was carried out. It was determined that hedgerow extensions in the study areas showed improvements with aspect ratio. The hedgerow changes observed in the study area are described in the following vector study.



Horni Zablati 1951 Horni Zablati 2011

Figure 6.16. Vectorized Land Cover/Land Use Map of Horni Zablati

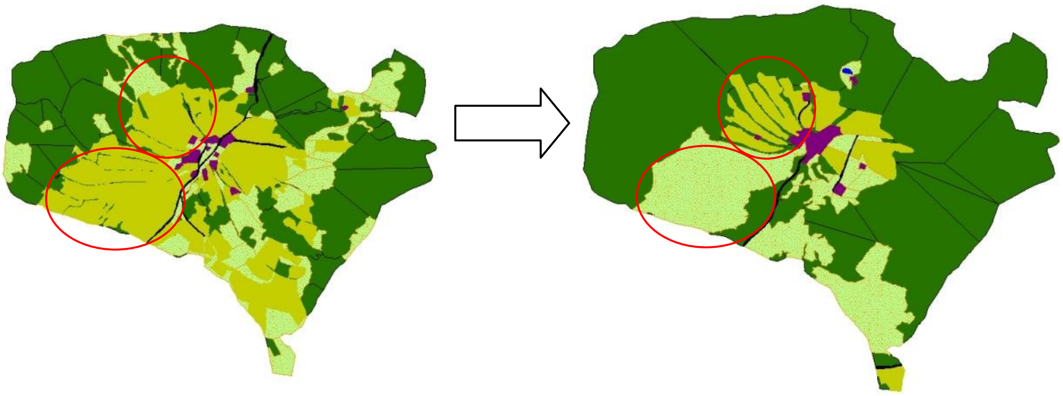
In the Horni Zablati region, it is observed that Hedgerow dimensions are developed more and more are added in time. The reason for this may be considered as a measure against erosion due to the slope of the region. In addition, it can be said that the wooded corridor around the river extending in the north-south axis to the west of the region shows great improvement.



Zdenice 1951 Zdenice 2011

Figure 6.17. Vectorized Land Cover/Land Use Map of Zdenice

In the Zdenice region, it can be said that hedgerow structures in the west and north west of the region are preserved and developed, but the hedgerow structure on the east side is estroyed in the south of the road, but a new one is formed on the north side of the road.



Svinovice 1952 Svinovice 2011

Figure 6.17. Vectorized Land Cover/Land Use Map of Svinovice

We determine that in the Svinovice region, the hedgerow structures in the southwest of the region were completely disappeared , but the hedgerow structures in the north of this area were added and developed further.

It can be said that small size parcels have disappeared and the area can be used for both grassland and agriculture at different times for the disappearance of hedgerow structures in the south west.

In addition, the tree community on the road that connects Svinovice with Zbinit has expanded over time.

7. DISCUSSION and CONCLUION

In order to understand the landscape, it is necessary to understand the landscape structure formed by landscape elements (patch, corridor, and matrix) and their function in the landscape because the landscape is continuously changing due to anthropogenic factors and natural events. Humans consume their environment and natural resources continuously In order to meet their needs like food, shelter, energy, fuel, transportation, etc. For this reason, every change in the landscape affects the landscape elements; it causes changes in shape, size, and connection between the elements.

When the changes in the landscape are examined, it is seen that the first change starts with the formation of patches in the area. If the area is not interfered, the area is fragmented, and each part formed in the later stages disappears. As the number of lost natural spots increases, the area will be deficient concerning ecological wealth. Even if natural spots are not lost, fragmentation will damage the area concerning integrity. Each patch contains unique species. The rupture of the connection between the patches showing the same characteristics will change the living environment of living things and will negatively affect biodiversity.

Studies to determine the landscape change are gaining speed. These studies consist of the stages of supply, processing, and interpretation of data. Each of these stages is quite important. The answers will be given to the questions such as which image will be used, whether the image will fit the working scale and the method by which these images will be processed. The data source to be used must be appropriate to the working scale and the image that best represents the area needs to be selected. In the data such as satellite images or Orthophotos used in landscape change studies, there may be problems such as lack of data related to the area at desired time intervals, lack of images due to lack of image in the area due to certain restrictions, or the fact that data sources belonging to previous years are not kept in a digital environment. As a result, determining the resources that can be reached before starting the landscape change studies is the necessary step for the reasonable conduct of the work to be done.

This study aimed to determine the composition of landscape changes and landscape structure in the villages of Zdenice, Horny Zablati and Slavovice in the province of Prachatice. The selected study areas were considered in 3 different directions of the Prachatice city border. (Zdenice-east, Svinovice-south, Horni Zablati-west) The changes in the landscape negatively affect the landscape structure and its floristic compositions. When the studies conducted in order to determine the landscape change, it is observed that GIS is used. However, in order to improve the accuracy and reliability of the analysis, the landscape metrics are integrated into these analyzes.

In this thesis, landscape metrics are used in order to determine the landscape change, and the landscape structure is expressed numerically, and thus the landscape is easier to understand. In the 1950s and 2011 years, the images classified according to the land use/land cover of the study area were analyzed in the ArcGIS program per the identified metrics. Thus, the landscape structure of the study area has been revealed numerically. When the landscape changes of the study areas are analyzed as a result of the analyze, it is seen that the forest areas have grown and the agricultural areas decreased between 1950 and 2011.

The rate of grassland area rate is preserved in Svinovice and Zdenice, but it is seen that Horni Zablati has caused a considerable decrease in this rate. The reason for this is that small agricultural farms are being built on larger areas, and Horni zablati has a more sloped land than others. Forests have replaced the fields on the sloping terrain, and farmland areas have expanded in the plains where there are grassland areas. The river passing through this plain area (which is not visible in the satellite analysis) affected the expansion of the fields in this area. It is thought that cows and sheep breeding contribute to the protection of meadow areas. The milk produced in the region is sold to factories in Germany and Austria which is close to the region.

The rate of increase in settlement areas is considered, the most significant change is seen in Zdenice. This is since Zdenice is the closest to Prachatice city center than other selected areas. When looking out of the analysis area, the growth of Prachatice city center was on the Zdenice border. If the forest area between Prachatice and Zdenice had not formed a barrier, perhaps Prachatice would eventually grow to Zdenice and Zdenice could become a neighborhood of Prachatice. According to the results of the analysis, no changes were observed in terms of wetlands and roads. The ratio of road and wetlands to the general area in the studied areas is so low that almost there is no ratio.

Suggestions for landscape change studies and the field of study related to the results of this study are as follows:

-Landscape metrics should be used to increase the accuracy of the data obtained in landscape modification studies and to interpret the landscape structure more comprehensively. The metrics to be used should be chosen so as to show how the landscape changes in terms of shape, edge and core area as well as spatial evaluation.

-The satellite image or the aerial photographs used should be determined taking into account the area to be studied. This is because the scale is an important element. If working in small areas, a low resolution image or aerial photo will not provide enough information to classify the study area.

- It is difficult to distinguish between grassland and agricultural areas in the use of aerial photographs or satellite photographs, while making landscape changes researches. In addition, the detection of wetlands in the forest does not seem possible from the aerial photographs. It is difficult to detect areas shaded by tree branches. These are sprins, river, road and small structures.

-In addition to evaluating the landscape change depending on the structure, the vegetation structure related to that area should be evaluated. Because the slightest change in the landscape will affect the habitats of the area. In order to determine the change depending on the vegetation, the necessary data for the past years should be provided. For future studies, floristic studies should be done for each area, plant societies / vegetation types should be determined and biotope maps should be made to create a basis for landscape planners.

-Regarding the field of study; future changes in this area should be carried out in studies. In line with these studies, ecological based landscaping plans should be established. It is known that the anthropogenous factors in the areas where the transportation is provided come as fast. This will cause the field to change rapidly.

- The research area is adjacent to the Shumava National Park and area is home to many animal and plant species. On the main road line, natural corridors should be built in the region to prevent wild life from being trapped in certain regions.

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APPENDICES

Photo 1 from Nebahovy to Zdenice ©(Photo by Zafer Karakaya, July 2018)

Photo 2 A creek on the Zdenice border on the way of Nebahovy ©(Photo by Zafer Karakaya, July 2018)

Photo 3 Development in Zdenice ©(Photo by Zafer Karakaya, July 2018)

Photo 4 Wild Life in Zdenice (on the road of Prachatice) ©(Photo by Zafer Karakaya, July 2018)

Photo 5   Sheep Farm on the road of Horni Zablati ©(Photo by Zafer Karakaya, July 2018)

Photo 6 Free Chicken farm on Horni Zablati ©(Photo by Zafer Karakaya, July 2018)

Photo 7 Horni Zablati from South ©(Photo by Zafer Karakaya, July 2018)

Photo 8 Deer Farm in Horni Zablati ©(Photo by Zafer Karakaya, July 2018)

Photo 9 Cow Farm in Svinovice ©(Photo by Zafer Karakaya, July 2018)

Photo 10 Multi purposed grassland in Svinovice ©(Photo by Zafer Karakaya, July 2018)

Photo 11 Svinovice from Zbytiny Road. ©(Photo by Zafer Karakaya, July 2018)