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KAZALO - CONTENTS

INTERDISCIPLINARY METHODOLOGICAL APPROACH TO THE PROCESS OF BROWNFIELD REVITALISATION OF TRADITIONAL INDUSTRIAL AREAS

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Abstract

Interdisciplinary methodological approach to the process of brownfield revitalisation of traditional industrial areas

Traditional industrial regions in the South-East Europe (SEE) represent an underexplored economic value. Revitalisation is delayed and hindered because of legal, financial, environmental and image problems. This weakens competitive investment position for cities and for SEE as a European region.

This paper aims at presenting interdisciplinary methodological approach used in a brownfield revitalisation research project. The research work methodology applies the endogenous approach ("bottom up") on a basis of newly defined land use category of brownfields by the local community. Geography science enjoys an advantage of complexity of understanding spatial issues. This enables geographers to coordinate and harmonize interests between the owners, stakeholders, legislation and human resources. In addition to geographical areas (economic, traffic, demographic, environmental and regional geography) directly involved in the project applicative research, this also includes collaboration of architects, lawyers and economists.

The form of applicative research work presented is being developed within the international Revitalisation of Traditional Industrial Areas in South-East Europe (ReTInA) project. The project is funded in the context of the SEE European Transnational Cooperation Programme 2009/12, involving ten partners from seven countries. The main result of the project will be the new methodology and tools to boost brownfield revitalisation in the municipalities and in old industrial areas of SEE region.

Key words

Applied geography, interdisciplinary methodological approach, endogenous approach, practice tools, brownfield revitalisation

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1. Introduction

The process of industrial change has resulted in the creation of so-called "brownfield" across Europe. Brownfields can be understood as sites that: "have been affected by the former uses of the sites and surrounding lands; are derelict and underused; may have real or perceived contamination problems; are mainly in developed urban area; and require intervention to bring them back to beneficial use" (NET 1).

In almost all European countries recognize that the presence of brownfields is a complex problem that goes far beyond single economic, environmental or urban and social concerns and that need some political and methodological solution. These sites present particular challenges to national and regional policymakers, including the remediation of hazards to human beings, groundwater and ecosystems. But there is also a need to facilitate the reintegration of rehabilitated sites into the property market and to ensure that they can be brought back into new economic uses.

Many problems facing industrialized cities and regions are interlinked and exacerbate one another. The decline of industrial value-added, loss of image and self-esteem, the exodus of qualified and young strata of population, the financial overtaxing of the public purse for the maintenance of huge infrastructural legacies and the implementation of decontamination measures, and, finally, increasing social disintegration and a lack of economic perspectives combine to form a complex set of problems that are not amenable to simple solutions and traditional remedies. Specific, historically grounded factors to which many of the CEE States are subject make finding solutions even more difficult, with the upshot that a direct transplantation of strategies is out of the question in most cases (NET 2).

Over the past decades the "brownfield" issue was a particular topic of discussion in the traditional industrial regions of Europe. Countries such as the UK, France, Germany and Belgium are particularly affected by derelict land and also most European cities as well as in peripheral locations. De-industrialization processes in Western Europe and the shock of transformation in Central and East European (CEE) countries have savaged many industrial places on the continent. Communities of former economic heartlands have often become notorious for bankrupt companies, massive unemployment, derelict factories and decrepit infrastructure (Domanski 2000). This wide range of different circumstances and conditions means that different strategies and programmes will be needed to support redevelopment.

In the Central-East European area revitalization is delayed and hindered because of legal, financial, organizational and image problems. It weakens competitive investment position for the cities and for CEE as a whole. Built and expanded around the requirements of a command economy, CEE cities now have to respond to market economy challenges. Dormitory town have to make place for entertainment and retail venues amongst the population with higher incomes and a higher appetite for spending. Polluting industries in inner cities have to make place for cleaner office buildings in an economy that is rapidly shifting from industrial production to services. The pressures of suburban development have to be countered with effective reuse of derelict and underused sites in inner cities, while minimizing greenfield development and reducing sprawl for more environmental sustainable cities (Ionescu-Heroiu 2010). Suburbanization has its morphological, functional and

socio-demographic dimensions and belongs to the complex transformation processes and to the most visible changes on the face of cities (Ptáček, Szczyrba 2007).

Brownfield sites present particular challenges to national and regional policy makers in terms how to improve European global competitiveness in sustainable way in CEE region. In this respect successful brownfield redevelopment policies and strategies need quality research recommendations in setting and meeting public policy objectives and improving practice.

Geographers at the University of Maribor participate in Transnational Cooperation Programme in the project *Revitalization of Traditional Industrial Areas in South-East Europe* (ReTinA). Expanding the scientific knowledge base and developing a clear understanding of the socio-economical, legislative, environmental and spatial dimension that impact on brownfield revitalization are important aspects of our future research programme. The added value of multi-stakeholder and multidisciplinary approaches in research programmes is already demonstrated in other regional projects.

Maribor (Slovenia) is one of tenth partners on the ReTInA project. The partners cities are located in or near urban areas and are subjects to revitalization schemes. Regional case studies include industrial areas in Athens (Greece), Komotini (Greece), Ferrara (Italy) and Iaşi (Romania), contaminated sites in Galaţi (Romania), Fidenza (Italy), Csepel, municipality of Budapest, 21st District (Hungary), brownfields in traditional heavy industrial centers in Pernik (Bulgaria) and Košice (Slovakia). Also city of Maribor is an old industrial city with three old industrial zones, which we would like to help to revive. Brownfields are often of great social and economic importance to a city or region because of its strategic location and economic value. The massive decline in industrial jobs in metallic and textile industries at the ending of the 1980s and especially in the period of transition, created a need for wider structural change in industry. In this regions economic disadvantage, making government intervention indispensable, as it could not be expected that the property market itself would solve the underlying environmental, social and economic problems.

2. Objectives of the project Revitalization of Traditional Industrial Areas in South-East Europe (ReTinA)

Regarding the redevelopment and revitalisation of traditional industrial areas, the spatial strategy at the EU-level, as well as the spatial legislation system at national level provide the basis for strategic and planning documents at regional and local level. On the contrary, to the EU- environmental policies, there is no EU-legal framework for physical planning. In the framework of the enforcement of sustainable development, diverse strategic documents promote the need for analysing and redeveloping abandoned industrial sites. At EU-level, the main strategic document is the European Spatial Development Perspectives - ESDP (1999), aiming at the provision of general guidelines and objectives to be integrated in national documents, where promoting, recycling and restructuring of underused, abandoned or derelict urban sites represent the most explored issues. Parallel, several specific documents, such as the Territorial Agenda (2007) and the Leipzig Charter on Sustainable Cities (2007), shall be integrated in national, regional, and

local urban development policies. Additionally, diverse EC-programmes and initiatives explore the aspects of new territorial action planning to be promoted and co-financed in practice. On the other hand, the EU has overtaken an emerging role in environmental issues, focusing on traditional elements, and less on Brownfield's' redevelopment. However, several EU-networks have incorporated the remediation and redevelopment of brownfield sites as the main issue of redevelopment programmes and actions (UM a, 2010).

The review of national approaches for the redevelopment of brownfields in Europe made quite clear that the problem is clearly identified in many countries and action has been taken. However, such action may not always be based on a national strategy but rather relates to single or regional efforts to cope with the problem. Taking a broad view across Europe, there is a general need for development of effective support systems for programme management for urban brownfield regeneration. It is however unlikely that a single model for the European Union would be sufficient.

In this context, ReTInA project define the main objective how to ensure growth, competitiveness and quality employment in the areas by preparing a series of concrete revitalization and investments plans to catalyze revitalization while contributing to a quality urban environment.

A specific objective for the ReTinA project is to develop an innovative Brownfield Revitalization Method (BRM). The jointly developed approach in ReTinA relates directly to the project and programmes (a.o. INTERREG and URBAN). It focuses on two crucial aspects of successful sustainable brownfield revitalization: integrated master planning and stakeholder engagement. Via development of ten regional case studies on revitalization in the partners' areas of SEE Europe, the common BRM which focuses on integrated master planning and stakeholder engagement will be shaped, tested and finalized.

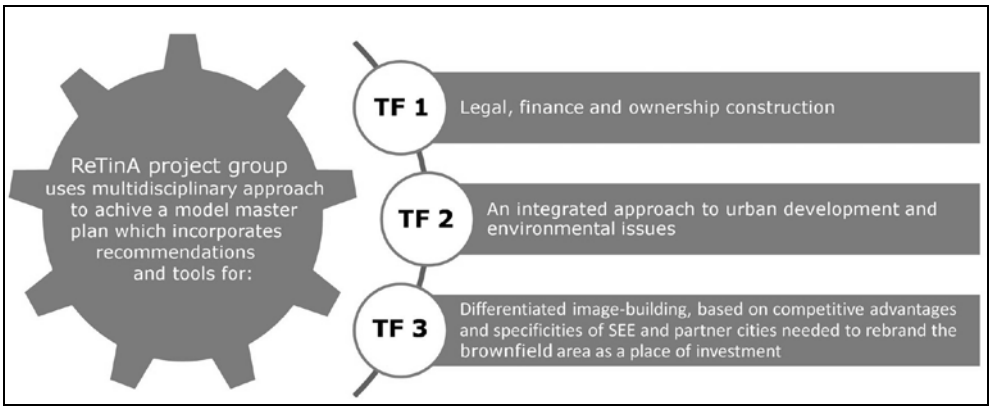

Fig. 1: Multidisciplinary approach to achieve a model master plan (UM a, 2010).

The process of brownfield re-development as an essential component of sustainable urban regeneration is an exceeding complex matter. It issues related to the overall context of urban development and planning with socio-economic implications and finally to the project' implications onto sustainability (NET 3). Research work has a main role in setting and meeting public policy objectives and improving practice

(NET 4). Expanding the scientific knowledge base and developing a clear understanding of the economic or societal dimensions that impact on brownfield regeneration are important aspects of any future research agenda.

The process of brownfield regeneration involves numerous stakeholders at various stages of the process. The process of regeneration is affected by local, national and European drivers and barriers. We would like jointly develop a method for multi stakeholder engagement. The method will lead to a process management tool for stakeholder engagement (TSE). It defines and tests a methodology for stakeholder engagement. Engage stake- and shareholders from »offers and demand« side as early as the brownfield-analysis phase to get necessary support for a consensus-based, business-focused but not business-controlled long term development. The method will lead to the TSE and ten regional brownfield revitalization plans and investment programmes.

The exchange of national problem solving experience can also inform EU policy initiatives on the urban environment. This helps to create instruments that empower European cities working in a global market while still maintaining the important aspects of subsidiarity.

3. Methodological Approach

Retina methodology follows the same cross-sectorial approach that is reflected in the programme and in the Commission Communication on 'Cohesion Policy and Cities'.

The principal methodological approach of ReTInA is to analyze and evaluate current practice in brownfield re-development via a practical regional case studies (UM a 2009). Regional case study (RCS) (UM b 2009) provide a lot of information concerning the specific needs, weaknesses and existing tools that are used in brownfield regeneration activities. A confrontation of the result of these RCS's allows the project to identify a common approach to be discussed in three thematic taskforces which results in a Brownfield Revitalization Method. Each Task Force (TF) covers one field of interest for the project:

TF 1 - Legal Framework
TF 2 - Urban planning and environment
TF 3 - Imaging and branding

Within each Taskforce a Transnational Case Studies (TCS) will be carried out focused on an intensified development and transfer of know how. Within the taskforces a system of peer reviews and benchmarks was established, too.

Task Force TF1: Legal Framework

- Selection of sample of legal entity to serve as public private partnership model
  - → Selection of a body for coordination of the revitalisation process in each area.
- Selection of sample of method of financing the above legal entity's activities.
  - → Selection of sources for revitalisation process.
- Projection of both to the less developed Brownfield and testing of feasibility.

→ Conduction of revitalisation process.

- Testing of feasibility of model to the Brownfield.
  → Measurement of results for verification of effectiveness of chosen activity.
- Correction of eventual deviations.
  → Action plan.

TF1 – 1 Legal:

a) overview of legal framework on entities of public law and private law (competences of authorities regarding public-private partnerships),
b) setting up of horizontal cooperation between local public stakeholders (harmonization of local policies regarding Brownfields),
c) setting up of vertical cooperation between state and regional and local level (harmonization of state policy with local policies regarding Brownfields),
d) decision on establishment of a legal body of public law/private law to steer activities (proposals for legal forms of public-public partnership bodies (combination of horizontal and vertical cooperation of public stakeholders)),
e) presentation of model to case studies,
f) decision on best model of public-public partnership for investment in conditions for public-private partnerships,
g) invitation of private stakeholders (establishment of interest in partnership with public bodies),
h) proposal of legal entity of public-private partnership at each location (concession/private company with public management/private company with private management and public supervision/private company with private management and supervision),
i) decision on best model of public-private partnership for projects of revitalisation of Brownfields.

TF1 – 2 Finance:

a) setting up of an overview of optional sources of finances for investment in infrastructure for set up legal entity (depending on existing programmes on European, national, regional and local level),
b) establishment of eligibility criteria regarding optional sources of finances,
c) proposal of sources of finances and support in decision making on them,
d) support for legal entity to apply for funding (established public private partnership entity).

TF1 – 3 Ownership:

a) analysis of ownership structure within Brownfield,
b) setting up a structure of public ownership (traffic, communal infrastructure, space for rent) and private ownership (offices, factories) and decision on ratio of both,
c) regulation of open questions regarding ownership (if needed) by established public-private partnership entity.

Task Force TF2: Urban planning and environment

- Selection of sample of urban spatial planning for Brownfield.
- Selection of sample of environmental protection programme.

- Projection of selected model to Brownfield to be developed.
- Testing of feasibility of chosen model.
- Correction of deviations.

TF2 - 1 Urban planning:

a) site characterization,
b) definition of limits between Brownfield area and surrounding land,
c) analysis of needs for connections (train, street, air) of Brownfield to next economic area – needs analysis regarding infrastructure,
d) overview of existing programmes for urbanisation of each case study brownfield – as starting point for setting up of urbanisation goals,
f) sustainable economic and land use planning,
g) urban green space development,
h) restoration, land revitalization and reuse projects,
i) establishment of feasibility study of urbanisation in dependence of programmes (foreseen sources),
j) action plan for funding of urbanisation goals.

TF2 - 2 Environment:

a) analysis of existing environmental threats:
- information on the general types of contaminants likely to be present at brownfields sites,
- an understanding of common industrial processes formerly used at brownfields sites and the general relationship between such processes and potential releases of contaminants to the
environment,
b) overview of methods and technologies of protection of the environment depending on the type and extent of pollution, we can choose innovative or established technologies, (proposal: eco-remediation),
c) independent evaluation of the cost and performance associated with innovative hazardous waste treatment, monitoring, and measurement technologies,
d) technology efficacy evaluation (bench, pilot, and full-scale),
e) setting up a proposal for eco-remediation in Brownfield (when deciding between innovative and established technologies or between treatment and containment technologies, or other options, brownfields stakeholders should consider the specific needs of the individual site and stakeholders. It is also important that brownfield decision makers consider both the current effects of the selected technology approach and its future effects on potential development of the site),
f) promotion of this proposal to stakeholders,
g) action plan for achievement of co-natural Brownfield.

Task Force TF3: Imaging and branding

- Selection of sample trademark/marketing strategy of developed Brownfield.
- Projection of sample trademark to Brownfield to be developed.
- Testing of feasibility of selected sample.
- Correction of deviations.

TF3 - 1 Branding:

a) outline and explanation of all social concerns involved during the planning and development process, including community planning, land reuse issues, and community revitalization groups,
b) analysis of existing brand/trademarks in developed Brownfield/case study,
c) overview of method of development of this brand,
d) setting up a proposal for establishment of brand,
e) promotion of this proposal within less developed Brownfield,
d) action plan for achievement of brand/trademark.

TF3 - 2 Imaging:

a) redevelopment vision,
b) the purpose of revitalization is to improve neighborhood environments, and enhance the overall quality of life,
c) promote individual self-sufficiency through the creation of new, full-time, permanent jobs.

The results of all three Task Forces shall compose the Revitalisation Method of Brownfields. After sorting out all deviations, the remaining will be the most appropriate or the most successful method of Revitalisation of Brownfields (UM a 2010).

4. Regional Case Study

At national level the Ministry of Environment and Spatial Planning (MESP) is the responsible authority for the preparation of spatial and urban plans at all the levels, while the Ministry of Economics is responsible for the preparation of strategic development plans and programmes. The guidelines on renewal and redevelopment represent the substantial part of the sustainability paradigm in all the legislative and strategic documents: Spatial Planning Act (2003, 2007), Spatial Management Policy (2001), and Spatial Development Strategy of Slovenia (2004). The Spatial Planning Act (2007), determining the responsibilities of the state and the municipalities, indicates the rehabilitation of brownfield sites as the objective of spatial planning.

At national level, no thematic strategy on brownfield redevelopment in detail has been adopted yet. As a consequence, there is no legal basis for actions or financial incentives.

At local level, the Municipality Spatial Plan (MSP) is the basic urban planning document, competent for the land use and planning of local importance, while the Urban Plan represents the strategic and operational part of the municipality spatial plan, dealing with areas of comprehensive renewal, among others. In spatial planning system, the state is competent for supervision of the legality of physical planning in municipalities' plans.

Starting in 1995 the new Urban Development Plan for the City Municipality of Maribor was developed in response to the dynamics of economic and social changes in the city. The planned activities focused on the old city core renewal on one side and, on the redevelopment and regeneration of the abandoned areas on the other,

with special regard to the protection of the green belt of the city. As a main instrument, some innovative cooperation and participation methods regarding active incorporating of citizens' participation in planning processes were introduced (Sitar 2008).

In recent years, the Environmental Protection Law (2006) introduced the comprehensive environmental impact assessment in order to integrate the sustainable development principles, at the very beginning of the process of preparing plans, programmes, etc.

Revitalisation of brownfield sites is mentioned in the Development Strategy of Slovenia (UMAR 2005) with an aim of industrial and residential sites development. The task is assigned to so-called »development regions under regional development programmes (at NUTS 3 level), and included in the Operational Programme on Strengthening Regional Development Potentials (OP RR) (Vlada RS 2006).

Accordingly, tenders for structural funds published under this OP RR included »revitalisation of brownfield sites« as one of potential objectives to be attained by eligible investment. However, eligible applicants were municipalities, which mean that Municipality of Maribor should have established construction of the BIZ Tezno as its development priority.

Slow developments at local level urged ZPPCT to look for support at national level. This is why all possible efforts were made in 2009 to include the development (construction) of BIZ Tezno into the Resolution on National Development Projects (hereinafter referred to as the Resolution). The government earmarked some budgetary funds for the period of 2010-2013. A public call to submit applications for the period of 2010-2013 is expected to be released in 2010, for all identified business centres in Slovenia (UM a 2010).

5. Business and Industry Zone Tezno

Economic, technological and social changes are the cause of all functional and structural changes in the area. The deindustrialization process triggered the downfall of traditional industrial branches and employment centres that did not manage to adapt to the structural changes in economy and market globalization.

In industrially degraded areas we witnessed the downfall of classic industry, the closing-down of plants with production activities, and the emergence of high unemployment rate, all of these resulting in depressed and economically stagnant area.

Structural changes of Maribor economy, especially in the processing sectors, during the transition period and during the period of switching to market economy are conveyed in the development of industrial zones. The downfall of large industrial companies of production activities caused the stagnation of industrial zones or a change in their function.

Old industrial zones were defined as the lowest form of industrial zones. At first, they represented merely a location of industrial companies and production plants of individual industries with no internal technological or logistical connections that would enable better and more rational business operations. They were located in the

vicinity of housing settlements and had no protective greenbelts. Small housing areas have formed inside them where residence quality was inadequate. Environmental standards and principles of humane ecological design were not observed. The actual location of these zones was limiting the spatial expansion of companies and the construction of a linked infrastructural network (Lorber, 2006a).

The industrial zone Tezno was formed in 1941 for the purposes of German military industry. The site selection was determined by the following factors: ideal traffic location, industrial and trade tradition, and the proximity of Fala power plant. In the period from 1941 to 1944, the production in the aircraft parts plant was constantly increasing. The total number of employees was estimated to around 7000.

After World War II, TAM Maribor was established which was the first motor vehicle plant in FLRJ (Federative People's Republic of Yugoslavia) that was manufacturing vehicles following the Czech license named »pionir«. In 1961, the plant was renamed to »Tovarna avtomobilov in motorjev Maribor« and started manufacturing trucks with air cooling engines, following the licence of the Klockner – Humboldt Deutz Company.

In post-war period and until 1985, the vehicle production volume in TAM Maribor was in constant increase. The greatest increase in production happened in the period from 1971 to 1975. From 1981 to 1985, the production was steady and amounted in 9.000 vehicles per year. After 1988, as a reflection of political and economic circumstances, the production volume started to decrease rapidly. In 1990, only 4058 vehicles were manufactured and in 1994 merely 431.

Business and Industry Zone Tezno (BIZ Tezno) was created in 1996 when TAM went bankrupt and thus ended its several years' long agony. After the bankruptcy and in the context of Maribor restructuring programme (MRP), the Development Fund (the predecessor of Slovene Development Corporation – SDC) joined sound cores of the bankrupt company and established fourteen new companies. Since these companies were capitally very weak, they were eager to find new strategic partners and thus ensure their long-term perspective. This was a necessity, for the TAM production programme was technologically obsolete.

SDC and Maribor Municipality then established a consortium which was responsible for the redemption of all TAM assets; the latter took place in 1999. The infrastructure was redeemed as well. The administering was transferred to the BIZ Tezno Institute, which is a non-profit organisation.

Many factors influenced by the location trends have always been important, but the concept of the strategic features is getting more and more critical (Frej 2001). From this point of view, the recognized characteristics of BIZ Tezno will be briefly summarised, among others, as follows (Sitar, Lorber, Šubic-Kovač 2011):

Strengths

- Good geographical location at the crossroad of the main EU transport corridors
- Sufficient building land available, spatial and urban planning documents adopted
- Several successful companies potentially attracted
- Site management in place: provision of energy, assistance to potential investors, promotion.

Weaknesses
- Slow construction of the infrastructure facilities in Site B
- High prices of land; internationally uncompetitive conditions
- The strategic municipality priorities are not focused on economic and urban land management
- Lack of common strategy on attracting investors.

Opportunities
- Public investments in infrastructure (Site B) aiming at international competitiveness
- Scientific and innovation potential at University of Maribor

Threats
- Future national priorities concerning structural funds may not include development of the business sites
- Internationally uncompetitive general business climate in Slovenia performs an obstacle in attracting foreign investments.

Fig. 2: Urban use and the surrounding areas of BIZ Tezno.

Before the global financial and economic crisis occurred in the middle of 2008, the BIZ Tezno management was frequently contacted by potential investors seeking location in the Zone. Actually, during the period of seven years, starting in 2001, the Zone attracted over 150 companies to settle in the area. However, in line with escalation of global negative trends, the demand for land and/or premises in the Zone decreased almost to zero.

We are positive that once the economy stabilises and begins to grow again, the Zone will be sought by potential investors again; particularly so, if the construction

of public infrastructure was supported by EU funds and, consequently, initial cost related to purchase of land and construction of premises would be reduced.

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INTERDISCIPLINARY METHODOLOGICAL APPROACH TO THE PROCESS OF BROWNFIELD REVITALISATION OF TRADITIONAL INDUSTRIAL AREAS

Summary

The regeneration of European brownfield sites is an essential part of improving European global competitiveness in a sustainable way. A 'brownfield land dimension' is critical to the pursuit and attainment of many aspects of the EU's structural change. Brownfield revitalization is of transnational relevance to South-East Europe. The quality and attractiveness of the urban environment is one of the decisive factors for foreign investment. If SEE wants to position itself at a global investment scale, it must concentrate on solving the brownfield development problem which is more dominant in SEE compared to other EU regions (Auer, Reuveny 2001).

Brownfield sites present particular challenges to local, national and regional policy makers in terms of bringing the land back into beneficial use. In this respect successful brownfield redevelopment policies and strategies need a complete multidisciplinary approach.

Continuity and change are fundamental, intriguing elements of economic and social processes. One of the salient problems concerning local development is the extent to which economic success is an enduring phenomenon and how it is sustained or reproduced in the same places. The development of towns results from the interaction of various external forces, usually operating on a larger geographical scale, and numerous local factors. Thus the vital question is what local conditions facilitate the reproduction of prosperity of communities in the increasingly competitive national and global economy (Domanski 2000).

ReTInA clearly contributes to the community cohesion policy as well as the Lisbon Agenda providing improved growth potential and higher employment to the cities/regions involved while contributing to the Goteborg Agenda (solutions for pollution). Transnational Cooperation Programme in the project *Revitalization of Traditional Industrial Areas in South-East Europe* is coherent with the global objectives of the SEE programme which aims for improvement of territorial, economic and social integration, stability and competitiveness.

The main goal of ReTInA project is create the ReTInA development methodology, which will be focus on legal/finance issues, bottom up multi stakeholder involvement and integrated master planning. With the ReTInA development methodology, we would like to ensure growth, competitiveness and quality employment in the revitalized areas by preparing series of concrete revitalisation and investments plans to catalyse revitalisation while contributing to a quality urban environment. A special task for the project is to commonly figure out an innovative Brownfield Revitalisation Method (BRM) that prove to be transnationally applicable and flexible enough to suit the requirements and peculiarities of different environments and different phase. In order to develop such methodology, information sharing among partners is crucial. A common understanding and use of tools is indispensable, as much as developing a common know-how to be used throughout the implementation phases. Efficient brownfield revitalisation requires a cross sectorial approaches in which innovative strategies lead to awareness of stakeholders. This in turn leads to putting the theme on the agenda of concerned authorities. This will facilitate a more efficient development of new instruments, to tackle the problem in an integrated approach. ReTInA uses these assumptions to develop sustainable solutions for urban renewals

and revitalisation contributing to enhance the management of the brownfield sites, along with the development of sustainable solutions for the future (Lorber 2010).

Brownfield revitalisation is an excellent example where experiences can be transferred between EU regions, notably between western regions where brownfield revitalisation started in the 80's when urban sprawl resulted in inefficient land use and CEE countries that in most cases start with transition.

TRENDI TEMPERATUR, VIŠINE PADAVIN IN VODNE BILANCE V MARIBORU V OBDOBJU 1876-2010

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Izvleček

Trendi temperatur, višine padavin in vodne bilance v Mariboru v obdobju 1876-2010

V članku so prikazani trendi temperatur, padavin, evapotranspiracije in vodne bilance za meteorološko postajo Maribor v obdobju 1876-2010. Analizirane so spremembe mesečnih, sezonskih in letnih povprečij v opazovalnih nizih. Obravnavana je tudi dinamika sprememb trendov v opazovalnem obdobju. Prikazane so povezave med trendi temperatur in Sončevo aktivnostjo.

Ključne besede

Trendi temperatur, trendi višine padavin, trendi vodne bilance, podnebne spremembe, Maribor

Abstract

Temperature, precipitations and water balance trends in Maribor in the period 1876 – 2010

In this article are presented trends of temperature, precipitation, evapotranspiration and water balance for the meteorological station Maribor in the period 1876 – 2010. Analysed are the changes of monthly, seasonal and annual averages in observational sequences. Treated is also dynamics of trend changes in the observational period. Presented are connections between temperature trends and activity of the sun.

Key words

Temperature trends, precipitation trends, water balance trends, climate changes, Maribor

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1. Uvod

Spremembe podnebja na lokalni in globalni ravni so splošno priznano dejstvo. Vzroki za podnebne spremembe so različni. Lahko bi jih razdelili v tri večje skupine:
- astronomski vzroki: Osnovni astronomski vzrok za spreminjanje podnebja na Zemlji izvira iz treh Milankovićevih ciklusov: spreminjanja sploščenosti Zemljine orbite (perioda reda velikosti 100 000 let), precesije pomladišča (perioda reda velikosti 22 000 let) in spreminjanja nagnjenosti Zemljine osi (perioda reda velikosti (42 000 let) (Houghton 2009, 86). Med astronomske vzroke sodi tudi spreminjanje aktivnosti Sonca (praviloma z 11 letnim ciklom). Manj redni vzroki izvirajo predvsem iz padcev večjih teles na Zemljo, ki vplivajo na prosojnost Zemljine atmosfere, s tem pa tudi na spremenjeno energijsko bilanco našega planeta.
- atmosferski vzroki: Sestava Zemljine atmosfere se ves čas spreminja. V preteklosti so bili vzroki za spremembe naravni (spremenjeni biogeokemični krogi na Zemlji, nihanja vulkanske aktivnosti). Posledice so spremenjena kemijska zgradba atmosfere, ki vpliva na koeficiente absorbtivnosti in transmitivnosti in s tem na spreminjanje energijske bilance.
- terestrični vzroki: med te sodijo spreminjanje razmerja med kopnim in morjem, spremembe v rabi tal, spremembe v albedu, spremembe morskih tokov in orogeneza.

V zadnjem času govorimo o čedalje intenzivnejšem posegu človeka v biogeokemične kroge na Zemlji, predvsem v kroženje CO_2 (Plut, 2010, 178). Kot posledica povečanih vnosov toplogrednih plinov v ozračje, se njihove koncentracije višajo, kar modificira energijsko bilanco našega planeta. Zaradi povečane absorbcije dolgovalovnega sevanja v atmosferi je namreč komponenta dolgovalovnega protisevanja čedalje večja, kar vpliva na zmanjševanje energijskih izgub atmosfere, posledično pa vodi k segrevanju. Naravnim vzrokom se torej pridružujejo umetni, antropogeni (Houghton 2009).

2. Metodologija

O spremembah posameznih podnebnih parametrov lahko najbolj zanesljivo govorimo v t.i. instrumentalnem obdobju, to je v času, ko meteorološke elemente merimo. V Sloveniji potekajo meritve v okviru meteorološke službe od sredine 19. stoletja naprej. Najstarejša meteorološka postaja je bila locirana v Ljubljani, kjer meritve potekajo od leta 1853 naprej (Povše 1984).

Sorazmerno dolgo merilno obdobje ima tudi meteorološka postaja Maribor, kjer so začeli z meritvami že leta 1864 (Povše 1984), vendar zgodnji podatki žal niso dostopni. Urejeni niz podatkov za meteorološko postajo Maribor obstaja od leta 1876 naprej. Meteorološki podatki za Maribor zaradi spreminjanja lokacij žal niso povsem homogeni (Tabela 1).

Od začetka meritev do časa po 2. svetovni vojni je bila meteorološka postaja Maribor locirana na levem bregu Drave, ob vznožju Mariborskih goric na lokaciji Zavoda za pospeševanje sadjarstva, od leta 1948 do leta 1961 pa je delovala na območju nekdanjega športnega letališča na obrobju mesta ob današnji južni vpadnici v mesto. Leta 1961 so meteorološko postajo preselili za okoli 500 m proti severozahodu. Z rekonstrukcijo značilnosti rabe tal s pomočjo starejših zemljevidov in vojaških aerofotoposnetkov lahko z gotovostjo sklepamo, da se do konca 60. in začetka 70. let 20. stoletja oblika rabe tal ni bistveno spreminjala. Na vseh

obravnavanih lokacijah so se v okolici nahajali travniki, vrtovi in njive. Šele na koncu 60. let so v okolici sedanje lokacije meteorološke postaje začele rasti prve stavbe (gasilski dom, stanovanjski bloki ob Rapočevi ulici in Jadranski cesti, nakupovalna središča in servisne dejavnosti s pripadajočimi asfaltiranimi parkirišči). Tako se tudi na primeru Maribora v zadnjih 50. letih pri analizi podnebnih sprememb ne moremo izogniti vpliva mestnega toplotnega otoka (Žiberna 1996; Žiberna 2006).

Tabela 1: Lokacije meteorološke postaje Maribor med leti 1876 in 2010.

Lokacija	Nadmorska višina (m)	Obdobje delovanja
Zavod za pospeševanje sadjarstva	269	1.1.1876-31.12.1877
Splošna postaja	297	1.1.1882-31.12.1917
Zavod za pospeševanje sadjarstva	269	1.1.1921-31.12.1947
Maribor-Tezno	275	1.1.1948-31.12.1961
Maribor-Tabor	275	1.1.1962-

Vir: Arhiv Urada za meteorologijo, 2011. Povše, 1984.

Analizirali smo trende naslednjih meteoroloških elementov:
- povprečne temperature zraka
- povprečne višine padavin
- povprečne potencialne evapotranspiracije po Thornthwaitu
- vodna bilanca

Podatke o temperaturah, padavinah, evapotranspiraciji in vodni bilanci smo analizirali na nivoju mesecev, leta in sezon, pri čemer smo upoštevali klasično klimatsko tipizacijo sezon (pomlad od 1. marca do 31. maja, poletje od 1. junija do 31. avgusta itd.).

Zaradi omejenega števila merjenih meteoroloških elementov na obeh postajah predvsem do sredine 20. stoletja, smo se pri računanju potencialne evapotranspiracije bili prisiljeni zateči k preprostemu Thornthwaitovemu modelu, po katerem se potencialna evapotranspiracija za dani mesec računa po naslednjem obrazcu:

$$PET_m = 1{,}6\ x \left(100\ x \frac{T_m}{I} \right)^a$$

Pri čemer pomenijo:
T_m – povprečna mesečna temperatura v °C
I – člen, ki ga izračunamo po obrazcu:

$$I = \sum_{m=1}^{12} \left(\frac{T_m}{5} \right)^{1{,}514}$$

a - člen, ki ga izračunamo kot funkcijo I:

$$a = \left(6{,}75\ x\ 10^{-7}\ x\ I^3\right) - \left(7{,}7\ x\ 10^{-5}\ x\ I^2\right) + \left(1{,}79\ x\ 10^{-2}\ x\ I\right) + 0{,}49$$

(Linacre 1992).

Vodno bilanco smo privzeli kot razliko med višino padavin in potencialno evapotranspiracijo.

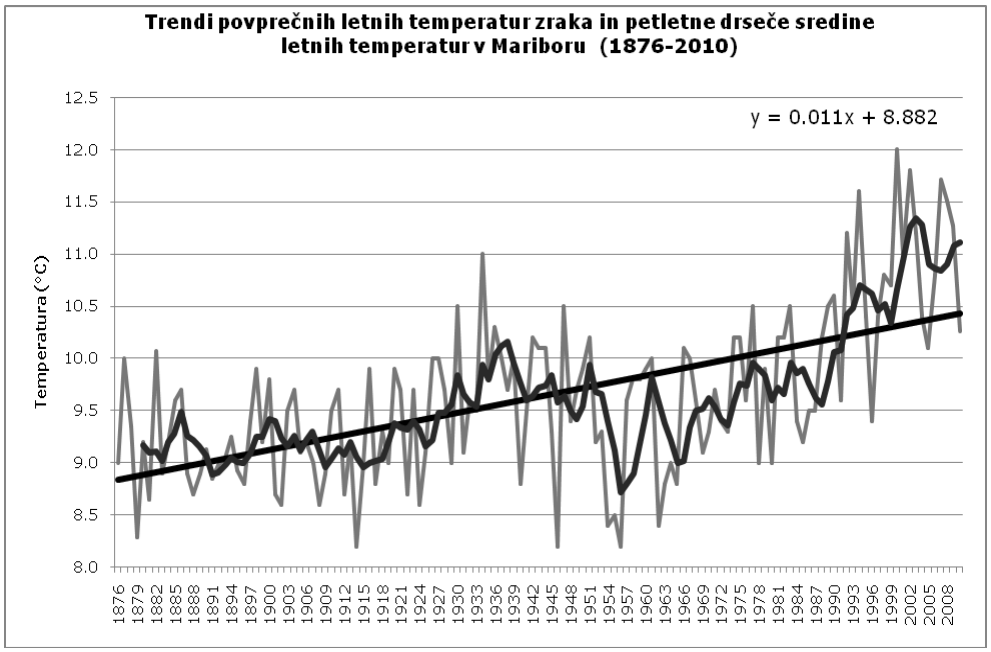
Trende klimatskih parametrov smo prikazali tudi s petletnimi drsečimi sredinami. Zveze med temperaturnimi trendi in aktivnostjo Sonca smo analizirali z uporabo povprečnih mesečnih vrednosti Wolfovega števila. Slednje je merilo aktivnosti Sonca s pomočjo števila peg in števila skupin peg na Soncu. Verificirani podatki o povprečnem mesečnem Wolfovem številu se nahajajo na spletni strani NASE in sicer za obdobje od leta 1749 naprej (http://solarscience.msfc.nasa.gov/SunspotCycle.shtml).

3. Trendi temperatur zraka

Začetek merjenja temperatur zraka v Sloveniji sovpada s koncem »male ledene dobe«, obdobja s podpovprečnimi temperaturami zraka, ki se je začelo sredi 16. stoletja (Borroughs 2007, 256).

V Mariboru v obravnavanem obdobju 1876-2010 lahko govorimo o naraščanju povprečnih letnih temperatur in sicer s stopnjo 1,19°C/100 let. Med sezonami so se najintenzivneje segrevali zima (1,37°C/100 let) in pomlad (1,31°C/100 let), sledili pa so poletje (1,11°C/100 let) in jesen (0,94°C/100 let). Med meseci so se najintenzivneje segrevali februar (1,69°C/100 let) in januar (1,68°C/100 let), za tem pa še maj (1,46°C/100 let), november (1,30°C/100 let) in april (1,27°C/100 let). Tudi v Mariboru lahko zaznamo, da se trendi v zadnjih desetletjih stopnjujejo. Če smo za zadnjih 135 let ugotovili intenzivnost segrevanja povprečnih letnih temperatur s stopnjo 1,19°C/100 let, pa so ti trendi za obdobje 1911-2010 (100 let) 1,56°C/100 let, za obdobje 1941-2010 (70 let) 2,61°C/100 let, za obdobje 1961-2010 (50 let) 4,29°C/100 let in za obdobje 1981-2010 (30 let) celo 4,91°C/100 let. Zanimivo je, da so se v zadnjih 30 letih najbolj segreli poletje (trend 6,66°C/100 let), pomlad (trend 5,94°C/100 let) in šele nato zima (trend 5,26°C/100 let). Jesen se je segrela s stopnjo 2,55°C/100 let.

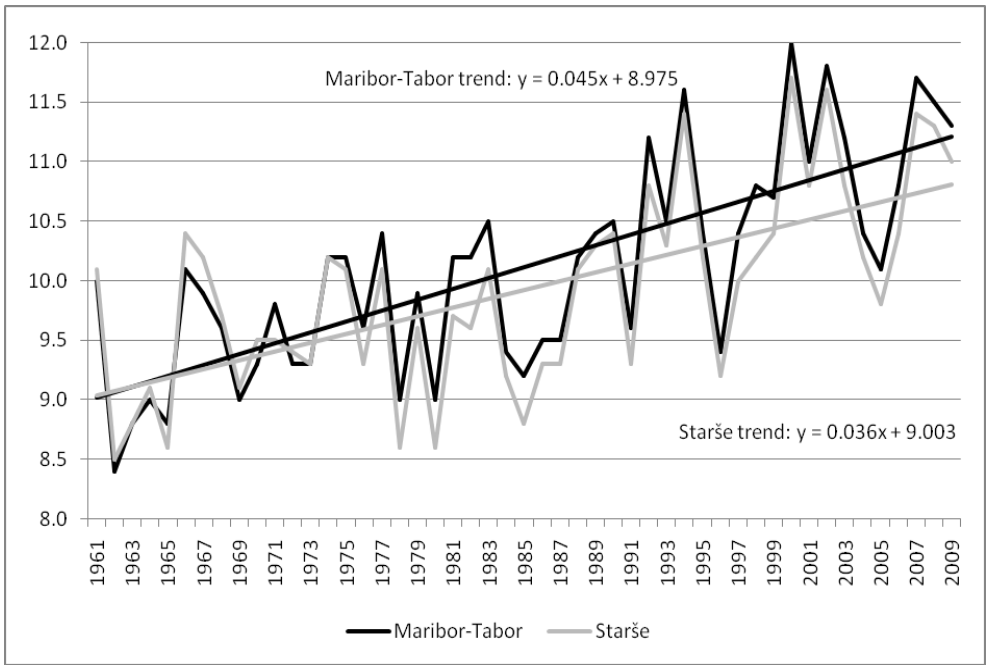
Oscilacije petletnih drsečih povprečnih letnih temperatur zraka je mogoče zaznati tudi v Mariboru. Viški so se pojavljali v letih 1882, 1896, 1903, 1910, 1916, 1926, 1934, 1941, 1947, 1957, 1969, 1973, 1980, 1990 in 1999. Intervali med vrhunci oscilacij so v Mariboru tako znašali 14 let, 5 let, 7 let, 6 let, 10 let, 8 let, 7 let, 6 let, 10 let, 12 let, 4 leta, 7 let, 10 let in 9 let. V povprečju se torej dolžina oscilacij giblje med 4 in 14 let. V nekaterih epizodah bi lahko govorili tudi o ujemanju med ciklom Sončeve aktivnosti in nihanjem povprečnih temperatur zraka, v večini primerov pa so temperaturna nihanja očitno oblikovali drugi dejavniki. Pearsonov korelacijski koeficient med Petletnimi drsečimi povprečnimi letnimi temperaturami v Mariboru in Wolfovim številom je le 0,2173. V Mariboru je mogoče zaznati razkorak med trendi aktivnosti Sonca in povprečnimi letnimi temperaturami. Delno si to lahko razlagamo s spremenjeno rabo tal v Mariboru, čeprav je intenzivnost širjenja bila največja v času do začetka 80. let 20. stoletja.



Slika 1: Trendi povprečnih letnih temperatur zraka in petletne drseče sredine letnih temperatur v Mariboru (1876-2010).
Vir: Urad za meteorologijo, ARSO, Ljubljana, 2011; Lastni izračuni.

O vplivu mestnega toplotnega otoka na trende temperatur zraka smo že govorili. V Mariboru lahko izvedemo primerjavo med urbano meteorološko postajo Maribor-Tabor in meteorološko postajo Starše, ki je locirana na Dravskem polju, 12 km jugovzhodno od Maribora in je začela delovati leta 1961. Za slednjo pa je potrebno omeniti, da se je zaradi suburbanizacije predvsem od sredine 90. let 20. stoletja vendarle kažejo tudi precej omiljeni antropogeni vplivi (Žiberna 2006), vendar ti v obravnavanem obdobju še niso moteči. Starše tako v naši analizi predstavljajo neke vrste »ozadje« v kateri se »šum«, ki nastane zaradi součinkovanja vpliva globalnih temperaturnih trendov in vplivov mestnega toplotnega otoka dajo razločiti.

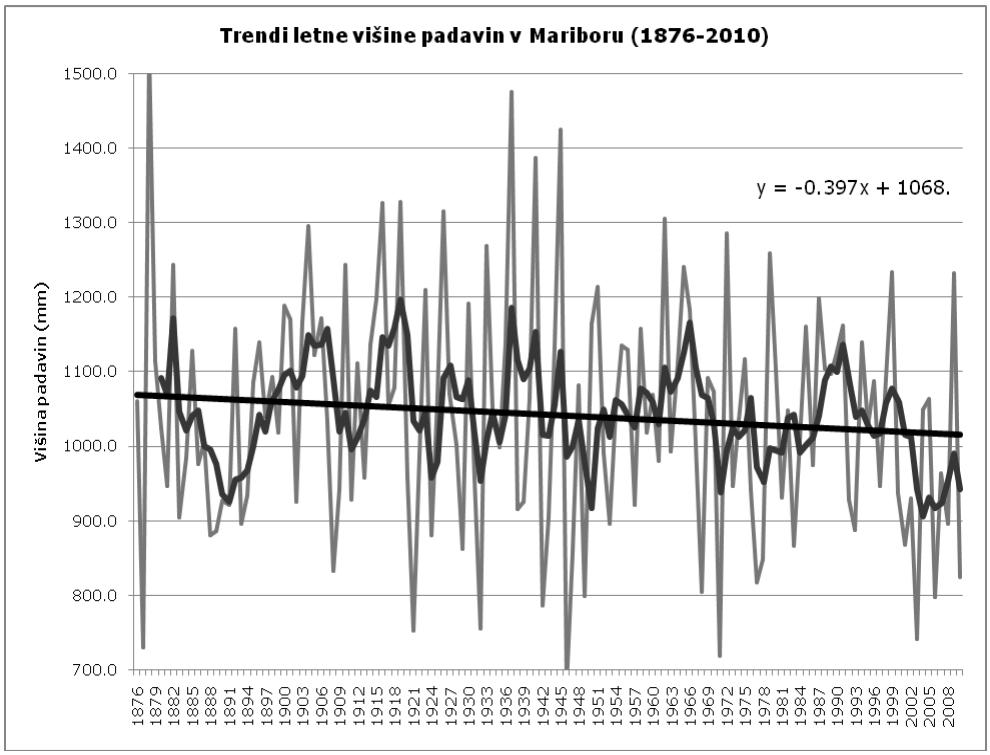
Primerjava trendov povprečnih letnih temperatur zraka kaže, da so te seveda hitreje naraščale v Mariboru in sicer s stopnjo 0,45°C/10 let, v Staršah pa je ta trend znašal 0,36°C/10 let. Groba ocena torej kaže, da je v zadnje pol stoletja prispevek mestnega toplotnega otoka na trend reda velikosti 0,09°C/10 let (Slika 2).



Slika 2: Povprečne letne temperature zraka na meteoroloških postajah Maribor-Tabor in Starše (1961-2009).
Vir: Žiberna, 2006.

4. Trendi višine padavin, evapotranspiracije in vodne bilance

Trendi višine padavin so manj signifikantni od temperaturnih trendov. V Mariboru zaradi lege na robu subpanonskega podnebnega tipa pade letno manj padavin kot v osrednji in zahodni Sloveniji. Povprečna letna višina padavin v obdobju 1876-2010 je znašala 1041,9 mm. Najbolj namočeni so poletni meseci (junij 121,6 mm), ko so padavine konvektivnega nastanka. Sekundarni maksimum padavin se pojavlja v oktobru (95,5 mm) in novembru (84,2 mm), ko je izvor padavin povezan z intenzivnejšo ciklogenezo v Genovskem zalivu. Tudi v Mariboru v obravnavanem obdobju beležimo trend upadanja povprečne letne višine padavin in sicer s stopnjo 39,8 mm/100 let. Trendi niso signifikantni, saj znaša standardni odklon povprečne letne višine padavin v obravnavanem obdobju 160,2 mm. Tudi trendi višine padavin po sezonah niso signifikantni in so vsi nižji od standardnega odklona. V zimskih mesecih višina padavin celo rahlo narašča (1,35 mm/100 let), v ostalih sezonah pa pada: spomladi s stopnjo 34,23 mm/100 let, poleti s stopnjo 3,54 mm/100 let in jeseni s stopnjo 15,72 mm/100 let. Potencialna evapotranspiracija na letni ravni znaša 772,4 mm, najvišja pa je seveda poleti (385,1 mm), sledita jesen (185,6 mm) in pomlad (185,1 mm), najnižja pa je pozimi (16,5 mm). Zaradi višanja temperatur se potencialna evapotranspiracija viša in sicer na letni ravni s stopnjo 200,7 mm/100 let. Med sezonami je trend potencialne evapotranspiracije najvišji poleti (95,43 mm/100 let), sledijo pa pomlad (53,53 mm/100 let), jesen (42,51 mm/100 let) ter zima (9,55 mm/100 let).

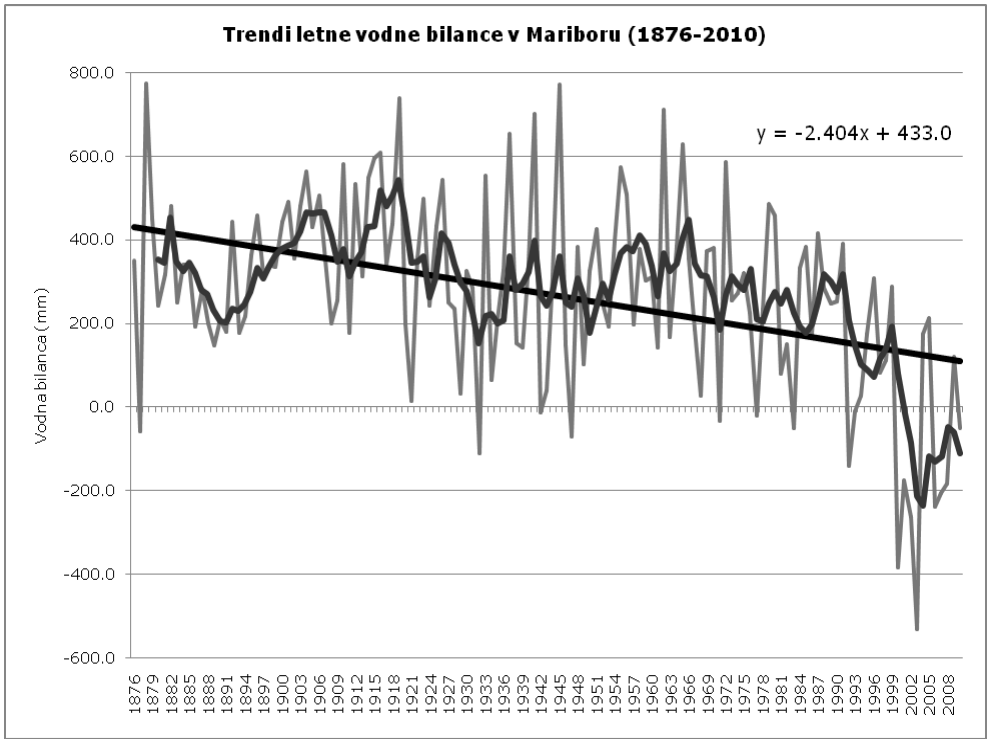


Slika 3: Trendi letne višine padavin v Mariboru (1876-2010).
Vir: Urad za meteorologijo, ARSO, Ljubljana, 2011; Lastni izračuni.

Razlika med višino padavin in potencialno evapotranspiracijo je v Mariboru zaradi subpanonskih podnebnih značilnosti večja kot v osrednji Sloveniji. Če je Ljubljana v obravnavanem obdobju beležila presežek padavin nad evapotranspiracijo v višini 609,5 mm, je ta presežek na letnem nivoju v Mariboru le še 269,5 mm. V Ljubljani so vse sezone in vsi meseci razen julija beležili presežek padavin nad evapotranspiracijo. V Mariboru je situacija precej drugačna. Vse sezone razen zime v obravnavanem obdobju beležijo primanjkljaj vlage. Najvišji primanjkljaj se pojavlja poleti (-258,5 mm), nato spomladi (-100,0 mm) in jeseni (-86,0 mm). V zimi je zaznati presežek vlage v višini 38,9 mm. Stanje je z vidika kulturnih rastlin izrazito neugodno, saj se deficiti vlage pojavljajo ravno v fenofazah rasti, ko rastline potrebujejo največ vlage. Tudi trendi vodne bilance so izrazito neugodni. V obdobju 1876-2010 se je ta nižala s stopnjo -240,45 mm/100 let. To pomeni, da se je enem stoletju povprečna letna višina padavin znižala za okoli 25 %, oziroma, da smo »izgubili« dva najbolj namočena meseca, kar je z vidika oskrbe z vodo in potreb za kulturne rastline izrazito neugodno. Za razliko od nekaterih žitaric (pšenica, ječmen), ki jih požanjemo že na začetku julija, pa se nekatere druge kulturne rastline, predvsem koruza, ki je v osrednji Sloveniji pogosta, ravno v obdobju primanjkljaja vlage nahajajo v fenofazah rasti, torej fazah, ko so njihove potrebe po vlagi največje. Dodatno k neugodnim razmeram botruje dejstvo, da se večina njivskih površin nahaja na plitvih do srednjeglobokih tleh na produ in pesku, kjer meteorna voda zelo hitro odteče v večje globine in kot taka ni več na voljo koreninskemu sistemu rastlin (Kajfež-Bogataj, Bergant 2005, 38-39). Prepolovljeni trendi nastopajo v jesenskih (-67,29 mm/100 let) ter spomladanskih mesecih (-

65,58 mm). Trend vodne bilance v zimskih mesecih je zelo neizrazit (-0,71 mm/100 let).

Trendi vodne bilance so najvišji v poletnih mesecih (-56,41 mm/100 let) in spomladi (-46,60 mm/100 let). Med meseci vsi razen decembra beležijo negativne trende vodne bilance. Ti so najvišji maja (-42,60 mm/100 let), aprila (-34,31 mm/100 let), julija (-31,53 mm/100 let) in junija (-30,37 mm/100 let). Klimatska suša v severovzhodni Sloveniji postaja torej že neke vrste »normalno« stanje. Sušna leta so se pojavljala že v preteklih obdobjih: leta 1877 je bila vodna bilanca -57,9 mm, leta 1932 -110,8 mm, 1942 -13,9 mm, 1947 -69,7 mm, 1971 -33,3 mm, 1977 -20,8 mm in leta 1983 -50,2 mm. Leta 1992 je bila vodna bilanca -141,0 mm, po letu 1999 pa klimatska suša v Mariboru ni pojavila le leta 2004 in 2010, v ostalih letih pa je vodna bilanca znašala vedno pod -200 mm, leta 2000 – 382,9 mm, leta 2003 pa celo -531,1 mm, kar je rekordni deficit zabeležen v času instrumentalnih meritev v Mariboru.



Slika 4: Trendi letne vodne bilance v Mariboru (1876-2010).
Vir: Urad za meteorologijo, ARSO, Ljubljana, 2011; Lastni izračuni.

6. Zaključek

Meritve meteoroloških elementov v Sloveniji potekajo od sredine 19. stoletja naprej. V Mariboru so razpoložljivi podatki od leta 1876 naprej. Lokacije meteoroloških postaj v Mariboru so se v celotnem obravnavanem obdobju spreminjale. Največji vpliv mesta je opaziti predvsem zaradi širjenja pozidanih površin v okolici

opazovalnega prostora, čemur smo na obeh postajah priča v drugi polovici 20. stoletja naprej. V Mariboru so se v obravnavanem obdobju povprečne letne temperature višale s stopnjo 1,195°C/100 let. Trendi pa niso le posledica globalnih podnebnih sprememb, pač pa tudi čedalje intenzivnejšega pojava mestnega toplotnega otoka. Vendar pa ta vpliv predstavlja manjši prispevek k dvigu temperatur, kar je tudi dokazano na primeru primerjave med Mariborom in Staršami. V Mariboru so se v obravnavanem obdobju najbolj ogrele zime in sicer s stopnjo 1,37°C/100 let. Prav tako je mogoče zaznati rahel padec višine padavin, vendar trendi niso signifikantni. V Mariboru so se letne višine padavin zniževale s stopnjo 39,75 mm/100 let. Zaradi višanja temperatur se viša potencialna evapotranspiracija. Posledica tega je, da se razlika med padavinami in potencialno evapotranspiracijo manjša. Vodna bilanca v Mariboru se je nižala z dinamiko 240,45 mm/100 let. Taki trendi so zaskrbljujoči predvsem v severovzhodni Sloveniji, kjer v spomladanskih in poletnih mesecih deficit vlage čedalje pogosteje predstavlja običajno stanje. Deficiti vlage so se v zadnjih desetletjih stopnjevali. V Mariboru (in na območju celotne severovzhodne Slovenije) v zadnjih letih beležimo rekordne izpade padavin, po letu 2000 sta bili le dve leti s suficitom vlage.

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TEMPERATURE, PRECIPITATION AND WATER BALANCE TRENDS IN MARIBOR IN THE PERIOD 1876 – 2010

Summary

Average annual temperatures in Maribor were rising in the above mentioned period with the level of 1,195 degrees Celsius/100 years. Trends are not just the consequence of global climate changes, but also of more and more intensive phenomenon of urban heat island. However, this influence represents smaller contribution to the rise of temperature, what has also been proved on the example of comparison between Maribor and Starše. In the above mentioned period we had to do with the warmest winters with the level of 1, 37 degrees Celsius/100 years in Maribor. There was also possible to perceive a slight fall of precipitation altitude, although these trends are not significant. In Maribor the annual precipitation altitude was falling with the level of 39, 75 mm/100 years. Owing to temperature rising there is also rising of potential evapotranspiration. The consequence of this is that the difference between precipitation and potential evapotransiration is smaller. Water balance in Maribor decreased with the dynamics of 240, 45 mm/100 years. Such trends cause a serious problem primarily in the north – eastern part of Slovenia, in which moisture deficiency in spring and summer months more and more often represents usual situation. Moisture deficiencies have been intensified in the last decades. In Maribor (and also within range of the whole north – eastern part of Slovenia) a record – breaking precipitation deficiency has been registered in the last years and after the year 2000 there have been just two years with moisture sufficiency.

THE SPREAD OF INVASIVE NEOPHYTES IN THE RIPARIAN VEGETATION OF THE TICHÁ ORLICE

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Abstract
The spread of invasive neophytes in the riparian vegetation of the Tichá Orlice
This article summarises the observations and findings gained during the field survey of invasive neophytes in riparian vegetation of the river of Tichá Orlice in the Czech Republic. Seventeen taxa that could significantly load the riparian vegetation of the given area were chosen. A methodology of mapping and surveying which was designed by Matějček (2009) was applied. Using this methodology, neophytes were recorded in segments (500 m long parts of the river channel). The occurrence was expressed by the means of a logarithmic scale. Final data were evaluated with the aid of indexes for individual segments or groups of segments. As more parts of the river channel network of the Czech Republic have been mapped and surveyed this way, it is possible to compare the final data and results.
In the riparian vegetation of the Tichá Orlice following plants were registered most frequently: Himalayan Balsam (*Impatiens glandulifera),* Small Balsam (*Impatiens parviflora)* and Reynoutria *(Reynoutria sp. div.)* The mapped part of the Tichá Orlice is, in comparison to other watercourses, belongs to the watercourses that are loaded with the invasive kinds of plants more than average.

Key words
Invasive plants, neophytes, the river of Tichá Orlice, mapping, riverbank

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1. Introduction

The invasive ecology belongs to the most dynamically developing branches of ecology (Williamson, 1996). Biological invasions of non-native species are obviously connected with human-mediated changes of the environment and the gravest of them burden the economy and change the operation of the ecosystems invaded (Williamson 1996, Mack et al. 2000, Mooney a Hobbs 2000).

Surroundings of the rivercourses belong to the areas that have been touched by invasive species most significantly and, at the same time, to the most diverse dynamic habitat on the mainland (Naiman et al. 1993). Riparian vegetation is found on the fringe between the water habitat and dryland habitat (Gregory et al. 1991, Naiman et al. 1993) and thus is important for spreading species into bordering countryside (*Heracleum mantegazzianum*, *Reynoutria sp., Impatiens glandulifera* in the Czech Republic; Pyšek a Prach 1993). Watercourses serve as corridors for the transfer of dispersions and nutrients (Gregory et al. 1991, Richardson et al. 2007). The range and extend of the invasion touch is influenced by three factors: the amount of propagules invading the environment (propagule pressure), characteristics of the non-native species, and the liability of the environment to the invasions of the new species (invasibility) (Lonsdale 1999). Thus, with the increasing input of propagules, the riparian zones of the watercourses are very invasible to non-native plant species. Due to more favourable conditions, the riparian zones of temperate areas towards the south are invaded more significantly than subartic areas (Naiman and Décamps 1997).

The weakening of the natural functions is supported by human-mediated activities. Logically, any interference with the hydrological regime also changes the composition of the river habitat and can enable the spreading of non-native plants. When building a hydro-engineering plant, the natural water overflows are purposely suppressed and the flow regulation is provided (Décamps et al. 1995; Jansson et al. 2000). Human activities usually increase the input of nutrients and decrease the light passage through the water column and the plant cover that stabilises the bank and prevents erosion (Gregory et al. 1991). All over the world, the expansion of non-native plants increases due to the disturbances and the input of non-native dispersions. All these disturbances of the regime can influence the species diversity and convenience the non-original species (Richardson et al. 2007). The invasion of the non-native plants so called transformers than continue changing the river ecosystem.

The root system often influences the humidity conditions of the soil profile (Burgess et al. 2001), plant invasion along the river decreases the speed of the flowing water and thus local floods eventuate, the plants can influence the composition of the soil (salinity, organic matters, presence of C:N). According to Davis et al. (2000) the theory of the resource fluctuation is one of the serious reasons of the acceleration of the invasion into the disturbed ecosystems. The significant alternations of nutrients, water, and light, or fluctuations in time lower competitiveness and prioritize the growth of non-native invasive plant species.

Serious changes of the original ecosystem are caused by several invasive species that are called transformers (Richardson et al. 2000). Among these we can find e.g. *Accacia mearnsii, Eukalyptus, Tamarix* (LeMaitre et al. 2002; Zavaleta et al. 2001). For instance, bushes *Sesbania punicea* in South America and *Tamarix ramisissima* in

North America recapture sediments, increase roughness and cause the clogging of the watercourse (Hoffmann and Moran 1988, Zavaleta 2000).

In the Czech Republic the river banks are often uncultivated and no management that could reduce the spread of dangerous neophytes is done. These places are more likely to be invaded (Pyšek and Prach 1993, Richardson et al. 2007). The spreading of propagules through the river streem is in the Czech Republic significant especially with the species of *Impatiens glandulifera*, whose occurrence is limited by the humidity conditions, and the species of *Reynoutria*, sp. div. (Pyšek and Prach 1993).

The spread of neophytes in the Czech Republic has been published in many works (Nováková and Rydlo 1980; Slavík 1996; Mihulka 1997; Višňák 1997; Rydlo 1999; Trenčianská 2000; Köppl 2002; Blažková 2003; Vymyslický 2004; Buček 2006, Matějček 2009). The mapping of invasive species in riparian woodland of selected south-Moravian rivers was done by Vymyslický (2004) and Řepka et al. (2007). In a work by Mihulka (1997) a survey of mapping in the surroundings of České Budějovice in South Bohemia is given. Trenčianská (2000) mapped non-native species in the riparian vegetation of the rivers of Labe and Úpa, Buček (2006) mapped the situation around the upper stream of the river of Morava. Višňák (1997) evaluated the occurrence of the invasive neophytes in the northern part of the Czech Republic. Rydlo (1999) maps *Impatiens glandulifera* along the river of Berounka. Pyšek, P. and Pyšek, A. (1995) mapped the spread of the species of *Heracleum mantegazzia*num. In a work by Matějček (2009), the information on 1693 segments of riparian vegetation along watercourses in Bohemia and Moravia (nearly 850 km of riparian vegetation) which were mapped between 2006 and 2008 is given. Similar situation of the occurrence of invasive plant species is dealt with in another work by Matějček (2010).

Non-native species are often mapped in the Czech Republic and detailed information on their spread and on the dynamics of their population is available (Pyšek et al., 2002). The spread of invasive species has been dealt with by e.g. Weber (1997). Chytrý et al. (2009) mapped the neophyte load in a large scale in Europe. The level of invasion was evaluated according to the habitat character and the propagules pressure. Europe is considered to be a more resistant continent than the others. It is given by historical aspects (Drake, 1989). One of the latest common projects focused on the occurrence of non-native plant species in Europe was elaborated by Lambdon et al. (2008).

2. Methods

The terms used in the text follow the terminology suggested by Richardson et al. (2000). Thus the term “invasive species” means non-native species, which has been spread in the new area intentionally or unintentionally due to human-mediated activities. Its population is stable and independent from human interventions and it produces a large numbers of offspring which spread into a considerable distance from the parent plants and have a potential ability of further spreading. Invasive plants according to Moravcová et al., (2010) which spread reproductively have seeds distinctively adapted for spreading by the means of water or wind. Invasive plants usually produce large amounts of light round seeds that are able to sprout in following years.

The term "neophytes" is understood as non-native species that spread in the given area after the discovery of America (approx. 1500 AD). This term says nothing about the fact that the species is invasive, so called transformer, or just non-native species dependent on the human care (Richardson et al. 2000, Pyšek et al. 2002, Pyšek et al. 2004).

For mapping, a method designed for the project VaV SM/2/57/05 "Long-term changes in riparian ecosystems in floodplains along watercourses hit by extreme floods" was exploited. The spread of invasive neophytes belonged to the parameters mapped in the project (Langhammer et al. 2005). After the realization of the project, the method evaluating the presence of invasive species in the riparian vegetation proved good as an entirely independent procedure when mapping species in floodplains along rivers. The advantage of this method is the possibility to compare the neophyte load along all watercourses mapped.

2.1 Characteristic of the area surveyed

The mapping was being done from July to August 2009, which is in the time when a extensive cover of invasive neophytes bloom. For these purposes the middle stream area of the river of Tichá Orlice was chosen (27^{th} – 67.5^{th} river kilometre) situated in eastern Bohemia.

The river springs in the mountains of Jeseníky, flows through folds, where it crosses the lowered spine of the Orlické Mountains. In valleys, it flows through meadows along its partly straightened river channel. In its middle part, the river creates a deep valley where it already looks like a river flowing in protracted bends. The downstream is flanked with fluvial terraces. The river here is rather deep and forms sharp bends with gently flowing water. The part of the Tichá Orlice mapped belongs to temperate area of the foothills character. Local climate is influenced by deeper valley notches of the rivers of Divoká Orlice and Tichá Orlice (Culek 1996).

The potential native vegetation of the northern part of the bioregion is represented by acidophilic oak woods. On the steep marl hills there are isles of calciphile beechwoods or scree woods. Nowadays, the woods are of the secondary species composition predominant spruce fir vegetation and pine monocultures. Oak woods in the valley notches are also typical (Culek 1996). In the lower part of the watercourse surveyed, there is a floodplain forest biotope with periodical flooding (Neuhauslová-Novotná 1998). The part of the river surveyed flows through several towns and smaller villages. Regional roads and international railway network Berlin – Prague – Vienna lead through the river valley. Neighbouring meadows are agriculturally exploited.

2.2 Characteristic of invasive species

From the catalogue of non-native species in the Czech Republic we chose seventeen most significant species that occur in the riparian vegetation of rivers flowing through urban areas as well as through semi-natural areas (Pyšek et al. 2002). Although the chosen species influence their surroundings into a different extent, all of them are classified as invasive. According to Richardson et al., (2000) about 10% of invasive species are so called transformers influencing the biodiversity and the state economy. This term is not applied with any of the chosen species (Pyšek et al. 2002). It is not supposed that all chosen taxa will occur along the chosen

watercourses. Some of them are spread throughout the whole area, some of them are expected only in certain parts of the area.

2.3 Description of the method

The riparian vegetation is understood as a belt of vegetation along the watercourse which is flooded approximately once a year and its width is given by the water surface on one side and by the bank range on the other side (Novák et al. 1986).

The presence of neophytes was recorded in so called segments, which are 500 m sections of the riparian vegetation. The results then were presented in relation to segments or to a series (a set of segments). The number of neophytes was expressed by the means of a algorithmic scale (1-9 species recorded was expressed as 1, 10 – 99 belonged to number 2, 100 – 999 species to number 3, 1000 – 9999 to 4, etc.) A great range of values was chosen intentionally so that the error in the neophyte number estimation would be reduced. For the analysis of the results the median of this algorithmic scale was used (5, 50, 500, …).

Kindred species were – to make the mapping easier - recorded without the interspecific differentiation (*Galinsoga parviflora* and *G. ciliata, Solidago gigantea* and *S. canadensis, Parthenocissus quinquefolia* and *P. inserta, Reynoutria japonica, R. sachalinensis* and *R. bohemica*).

In the case of the species of *Reynoutria* sp., the distinguishing between individual plants is complicated due to its rhizome system. Every footstalk is thus considered to be an individual plant (Matějček 2009).

For each segment several factors were used (number of taxa NT, number of individuals NI, simple index of neophyte load Is and weighted index of the neophyte load Iw). Through these indexes we characterised the neophyte load.

The simple index, Is = log NI + NT, expresses the total neophyte load in the given segment of the riparian vegetation where the number of the present neophyte species as well as the present number of individuals is taken into consideration.

The weighted index, $Iw = \log (\sum NI_x \cdot k_x)$, makes provision for several actuating factors (size of the invasive species, potential dangerousness for natural communities and interests of inhabitants, strategy of growth and reproduction), which are within each species evaluated with taxon coefficient $_x$, k_x (Tab.1). Symbol NI_x means the number of individuals of the taxon $_x$ and k_x is the coefficient of the taxon $_x$.

Tab.1: The coefficients of individual monitored taxa used for the weighted index of the neophyte load determination. Classification of the average size of the plant: 3 = wood species over 5 m, 2 = fully grown herbs (herbaceous plants) usually reaching more than one meter, 1 = small herbs; classification of perenniality (life history): 0 = annuals, 1 = biennials and perennials; classification of the potential dangerousness: 1 = species classified as dangerous invasive species, 2 = species classified usually as the most dangerous, 0 = species without significant infuence.

	Plant size	Danger	Life history	Coefficient (k)
Acer negundo	3	1	1	5
Ailanthus altissima	3	1	1	5
Conyza canadensis	1	1	0	2
Erigeron annuus	1	0	0	1
Galinsoga sp.	1	0	0	1
Helianthus tuberosus	2	1	1	4
Heracleum mantegazzianum	2	2	1	5
Impatiens glandulifera	2	2	0	4
Impatiens parviflora	1	1	0	2
Lupinus polyphyllus	1	1	1	3
Lycium barbarum	2	1	1	4
Parthenocissus sp.	2	0	1	3
Quercus rubra	3	1	1	5
Reynoutria sp.	2	2	1	5
Robinia pseudacacia	3	1	1	5
Rudbeckia laciniata	2	1	1	4
Solidago sp.	2	1	1	4

3. Results

We mapped 162 segments, which makes 81 kilometers along each side of the river channel. Eighteen series were created, each of which contained 9 segments. These followed one another.

Out of seventeen mapped taxa eleven were recorded in the riparian vegetation. As far as the species of *Acer negundo, Ailanthus altissima, Heracleum mantegazzianum, Lupinus polyphyllus, Lyceum barbarum, Rudbeckia laciniata* are concerned, their presence was not proved and recorded.

In average, each segment (loaded as well as without load) contained two invasive neophytes. Within the whole area mapped there were only three segments without the neophyte load. The maximum of taxa recorded in one segment was six. A series (nine neighbouring segments) contained in average five taxa. The most frequently recorded species were *Impatiens glandulifera* and *I. parviflora* (Fig.1). They were

accompanied by the species of *Helianthus tuberosus*, *Reynoutria sp*. and *Solidago sp.*

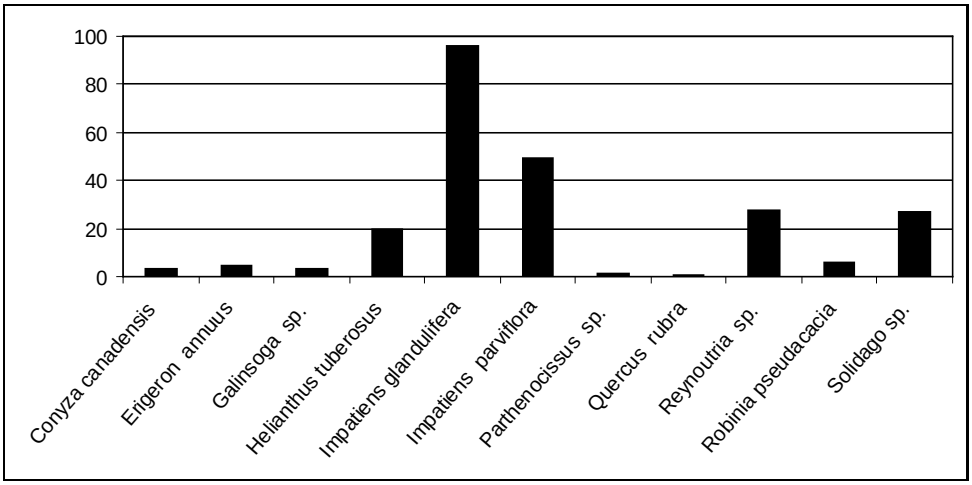

Fig.1: The abundance of invasive species in the riparian vegetation of the river of Tichá Orlice in %.

The most frequent species in the riparian vegetation was *Impatiens glandulifera*, nearly 1700 individuals in each segment of the area mapped (Fig.2). The number of individuals of the species of *Impatiens parviflora, Reynoutria sp.* and *Solidago* sp. was about 100 individuals per segment.

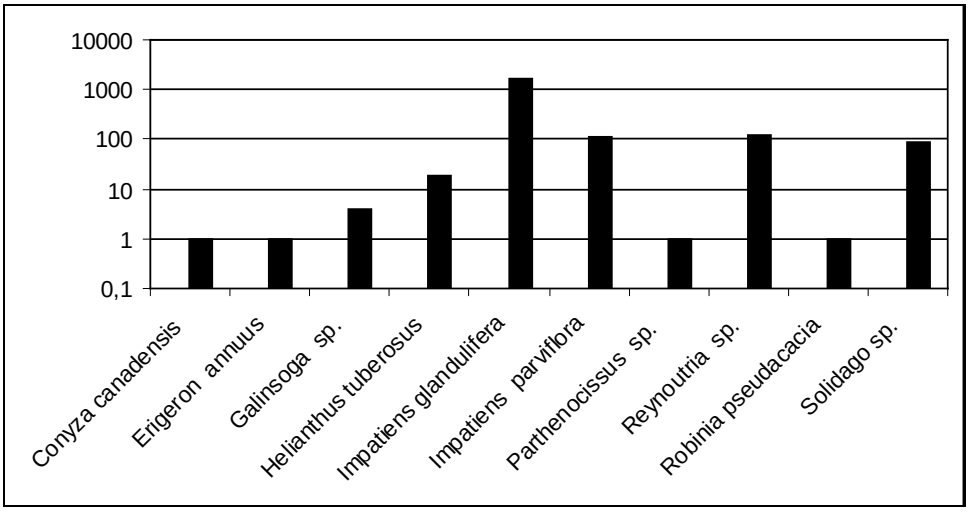

Fig.2: Average amount of individuals in a segment.

The value of the simple index (Is) of the load depends to great extend on the number of taxa in the segment. Thus the greatest load is always recorded where five and six taxa are present in a segment. This also was the greatest number of taxa in one mapped section. In series 5, 6 and 8 on the right side of the riverbank

(Fig.3, 5), in average as many as three invasive plant species were recorded. The average index of load in a segment is 5.

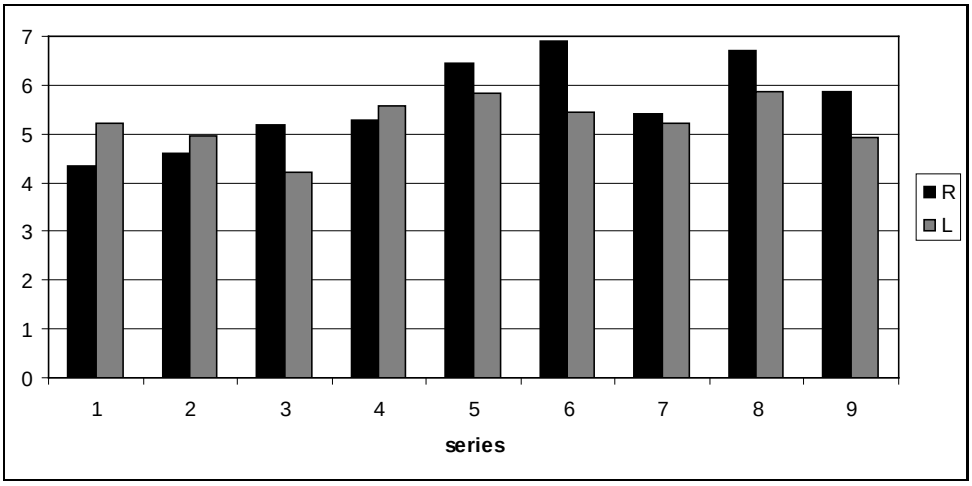

Fig.3: Average simple index of neophyte load in series. R – right riverbank, L – left riverbank.

The average weighted index of the neophyte load (Iw) ranges between 2.87 and 4.16. This marker more concisely expresses the neophyte load of the given segment (Fig.4, 6). The coefficient k_x expresses the size, persistence and dangerousness of each taxon. Chosen invasive species are evaluated within a scale from 1 to 5, where 1 means that the species influences its surroundings very little, and 5 means that the species is aggressive towards its surroundings. According to the table (Tab.1) above, the following taxa reached the highest values - *Helianthus tuberosus, Impatiens glandulifera, Quercus rubra, Reynoutria sp.* and *Solidago sp*. Their enhanced occurrence thus meant a higher neophyte load of the given segment. We don´t evaluate tree *Quercus rubra* as dangerous invasive plant. The coeficient increased thank its size.

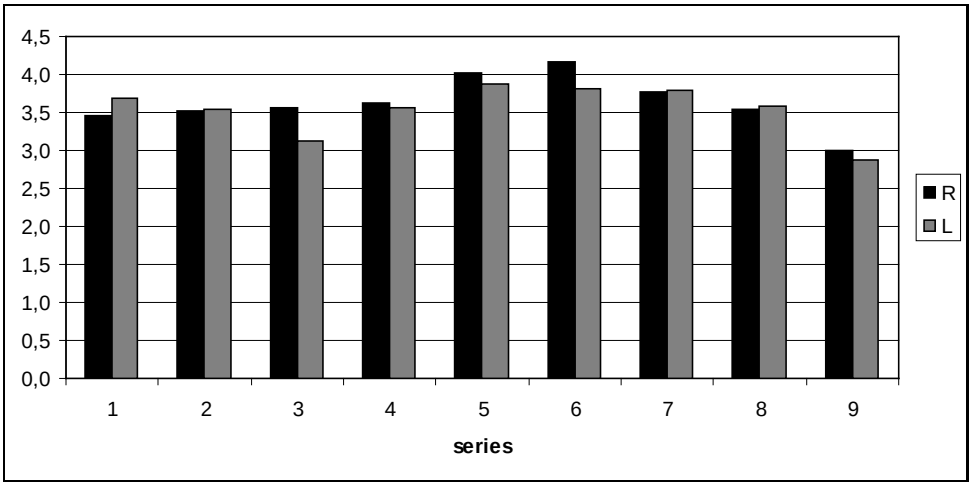

Fig. 4: Average weighted index of the neophyte load Iv in series, R – right riverbank, L – left riverbank.

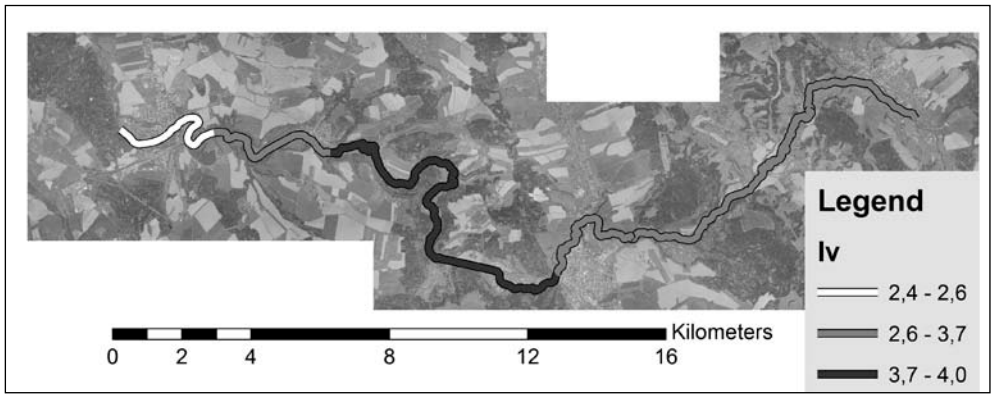

Fig. 5: Average simple index (Is, Ip) of neophyte load in series

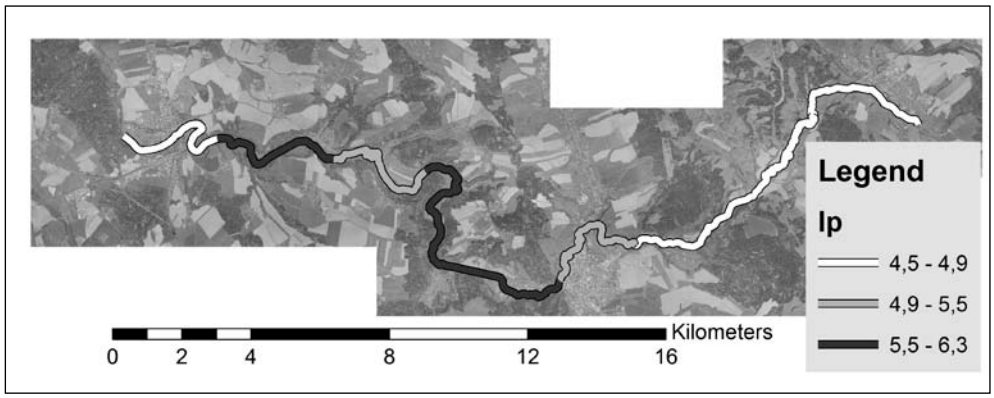

Fig. 6: Average weighted index (Iw, Iv) of the neophyte load i series

4. Discussion

Himalayan Balsam (*Impatiens glandulifera)* was the most numerous invasive species present in the area mapped. The species of Reynoutrias (*Reynoutria sp.*), Goldenrod (*Solidago sp.*), Jerusalem Artichoke (*Helianthus tuberosus*) and Small Balsam (*Impatiens parviflora*) were also often present. The river banks are an ideal background for the spreading of these invasive neophytes. Thus it is possible to expect the increase in their numbers in the future. *Reynoutria sp.* together with s *Heracleum mantegazzianum* are in the Czech Republic considered to be the species that can change the conditions in the area invaded to the greatest extent, as they are able to cover the affected area with their biomass (Hejda et al. 2009).

Impatiens glandulifera not only intensively covers the surroundings of the watercourse, but also uses it for the seed transport (Pyšek and Prach 1993). Most often it was recorded outside rocky hillsides and forest scrubs in any riparian vegetation. Its spreading into the surroundings was only restricted by the

management of the mowing of the nearby meadows. In urban areas its presence was restricted by mowing up to the range of the river channel. The species of *Reynoutria* sp., *Helianthus tuberosus* and *Solidago* sp. were restricted in the same way. The species of *Impatiens parviflora* most frequently occurred in the herb level of forest scrubs along the water course.

Less frequent occurrence or absence of other neophytes can be influenced by the ecology of a given species (Pyšek et al. 2008). Limited spread can be caused by thermophily of the species (*Ailanthus altissima, Acer negundo*, *Robinia pseudacacia, Lycium barbarum*) or by the fact that the species has not spread in the area yet (*Rudbeckia laciniata, Heracleum mantegazzianum, Conyza canadensis, Lupinus polyphyllus*) or it does not mean any serious danger (*Parthenocissus sp, Quercus rubra, Erigeron annuus, Galinsoga* sp.).

The method of the neophyte mapping was created following the purpose of the easy use in the field. For this reason the number of neophytes is given in estimated numbers in a logarithmic scale. The number of neophytes can be burdened by inaccurate estimation of each mapper. However, the use of the logarithmic scale enables to minimise these errors.

This type of mapping did not take into consideration the type of biotope where the neophytes occurred or, vice versa, where they were absent. The method was not designed this way. However, a certain trend determining the presence or the absence of a species was obvious. The whole area mapped is located in cultural landscape. Therefore, it is possible to presume a greater supply of nutrients which supports the growth of the neophytes. The more frequent occurrence of invasive plants was distinct in ruderal areas and in riparian vegetation without management. Contrariwise, the occurrence of most of the species was significantly lower on rocky hillsides and in forest vegetation sloping towards the river channel.

4.1 Mapping comparison

The most similar watercourses (considering the length, the area of river-basin and the flow) which were also mapped (Tab.2) are: the Cidlina, the Chrudimka, the Malše, the Střela and the Ploučnice (Matějček, 2009). The neophyte load of none of the watercourses was as great as the neophyte load of the part of Tichá Orlice mapped. A very similar situation with the neophyte load was recorded at the downriver of the Tichá Orlice (Matějček, 2009), which borders with the mapped area. As far as the neophyte load is concerned the Tichá Orlice most significantly approaches the values recorded in the riparian vegetation of a much larger river of the Ohře (average PT = 3,18 and average PJ = 1930).

Comparing the results of the watercourses mapped (Matějček 2009) the Tichá Orlice belongs to the watercourses with the above-average neophyte load. The average number of taxa (NT= 2) and the average number of individuals in segments (NI= 2040) belongs to above-average values in comparison with the other watercourses. The average weighted index Iw= 3,59 can also be evaluated as above-average. The number of neophytes in the riparian vegetation can be caused by a great supply of dispersions, as the river also flows through urban areas and roads and railways go through the valley (Chytrý et al. 2009). The cultural landscape is also to a different extent used for farming. Anyway, it is difficult to decide if the high share of invasive plants in anthropogenic surroundings is caused by the increased number of

propagules, frequent disturbances, fragmentation of landscape or the increased supply of nutrients (Chytrý et al. 2005). It is probable that these factors will interact to a different extent synergistically.

Tab.2: Mapping comparison.

River	NI	NT	Is	Iw	Dominant neophyte
Cidlina	6	0,2	0,39	0,32	-
Chrudimka	173	3,2	5,03	2,38	-
Malše	794	2,7	5,17	3,12	Reynoutria sp., I. parviflora, Robinia pseudacacia
Ploučnice	372	2,4	4,63	2,82	I. glandulifera, I. parviflora
Střela	191	0,9	1,30	1,22	I. parviflora
Tichá Orlice	2040	2,0	5,35	3,53	I. glandulifera
downriver of the Tichá Orlice	1443	2,0	4,58	3,18	Reynoutria sp., I. glandulifera

5. Conclusion

The Tichá Orlice belongs to the watercourses with the above-average neophyty load. The most frequently recorded species were *Impatiens glandulifera* and *I. parviflora*. They were accompanied by the species of *Helianthus tuberosus*, *Reynoutria sp*. and *Solidago sp*. The part of the river surveyed flows through a cultural landscape and the river banks are with no management that could reduce the spread of neophytes.

Invasive plants were recorded in any riparian vegetation, in surroundings of meadows, in ruderal areas and in urban areas. Human activities support the presence of invasive plants in a large scale. So we suppose the most extensive invasive plants will spread in future.

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Summary

THE SPREAD OF INVASIVE NEOPHYTES IN THE RIPARIAN VEGETATION OF THE TICHÁ ORLICE

This article is hinting about one of the problems the furutre landscape. Non-native plants occurred in Czech Republic last 150 years and some of them become invasive. They are able compete with protected species or farm crops, speed up erosion or complicated overflooding.

With using methodic of complex mapping stream and alluvium it was mapped a chosen part of riverbank Tichá Orlice. There were located chosen neophytes where we supposed they will be occured in riverbank vegetation. The methodic afford information about presence and abundance chosen neophytes.

Most offten were occured this plants – *Impatiens glandulifera, Reynoutria sp., Helianthus tuberosus* and *Solidago sp*. They are herbaceous plants usually reaching more than one meter. The high density these plants prevents full access to the place of occurrence. In comparison with other similar rivers (similar through flow, river-basin and longitude of river), the river Tichá Orlice belongs to on above-average burden watercourse.

Mapping of riverbanks demonstrated that invasive plants are part of vegetation. Invasive plants are regular destroyed only in protected areas. Except these areas plants can spread without some restriction. That is why plants can expand unlimited.

IZBRANE NARAVNOGEOGRAFSKE ZNAČILNOSTI OBČINE RADLJE OB DRAVI

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Izvleček

Izbrane naravnogeografske značilnosti občine Radlje ob Dravi

Članek obravnava zveze med rabo tal in izbranimi naravnogeografskimi značilnostmi na območju občine Radlje ob Dravi. Predstavljena metodologija pridobivanja podatkov in iskanja statističnih povezav med opisnimi spremenljivkami. Analizirana je tudi razporeditev posameznih oblik rabe tal glede na izbrane naravnogeografske značilnosti s pomočjo geografskih informacijskih sistemov.

Ključne besede

fizična geografija, geografski informacijski sistemi, raba tal, Kozjak, Pohorje, Radlje ob Dravi

Abstract

Selected Physical Geographical characteristics of Radlje ob Dravi Municipality

The article treats relations between land use and selected physical geographical charactersitics of Radlje ob Dravi municipality. Methodology of gathering data and statistical analysis is presented. Within geographical information system methodology the frequency of land use categories and their connection with physical geographical characteristics are analysed.

Key words

Physical geography, geographical information system, land use, kozjak, Pohorje, Radlje ob Dravi

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1. UVOD

Občina Radlje ob Dravi leži na območju treh naravno geografskih enot. Severni del občine leži na območju Kozjaka, osrednji del občine v vzporedniški smeri preseka Dravska dolina, ki se proti zahodu razširi v Radeljsko kotlino, medtem ko južni del občine leži na območju Pohorja. V razvoju reliefa, hidrografskega omrežja in današnjih komunikacij sta se na območju občine Radlje ob Dravi razvili dve osi: primarna, ki poteka vzdolž Dravske doline v smeri vzhod – zahod in povezuje subpanonske pokrajine (Dravsko polje) na eni strani in subalpske pokrajine (Koroška) na drugi strani. Sekundarna os poteka v poldnevniški strani in predstavlja povezavo med višjimi deli občine (Kozjak, Pohorje) in Dravsko dolino, kjer se nahaja tudi občinsko središče. V tem smislu se na območju občine kaže dvojnost med hribovitim in dolinskim delom, ki se kaže ne le v naravnogeografskih značilnostih (podnebje, tipi prsti, litološka zgradba, morfometrijske značilnosti reliefa), pač pa tudi v družbenogeografskem in historičnem smislu (gostota prebivalstva, prometni tokovi, demogeografska, ekonomska in izobrazbena struktura prebivalstva, raba tal, intenzivnost prometnih tokov).

V članku smo želeli prikazati povezave med izbranimi naravnogeografskimi kazalci in rabo tal na območju občine Radlje ob Dravi. Analizo smo opravili na nivoju celotne občine in s pomočjo orodij, ki jih nudijo geografski informacijski sistemi (GIS).

2. METODOLOGIJA

Pri analizi zvez med izbranimi naravnimi kazalci in rabo tal na območju občine Radlje ob Dravi smo uporabili možnosti, ki nam jih nudijo geografski informacijski sistemi. Analize smo opravili z rastrskimi podatki, pri čemer je bila velikost celice 25 m x 25 m. Iz izkušenj na osnovi podobnih raziskav menimo, da ta resolucija daje dovolj zanesljive predstave o povezavah med pokrajinotvornimi dejavniki.

Za območje celotne občine smo izdelali več slojev tematskih kart, ki prikazujejo temeljne fizičnogeografske pokrajinotvorne elemente:
- nadmorske višine
- nakloni pobočij
- ekspozicije pobočij
- litološka zgradba
- tipi tal (pedokartografske enote)
- globalno sončno obsevanje
- raba tal.

Vsakega od izbranih naravnogeografskih slojev smo primerjali z rabo tal. Izdelali smo kontingenčne tabele, ki prikazujejo frekvenco kombinacij med dvema spremenljivkama in izračunali Cramerjev korelacijski koeficient. Cramerjev korelacijski koeficient smo izračunali po naslednjih obrazcih:

$$V = \sqrt{\frac{\chi^2}{n(m-1)}}$$

pri čemer pomenijo
χ^2 – hi kvadrat vrednost, ki jo izračunamo na osnovi realnih in teoretičnih frekvenc:

$$\chi^2 = \sum \frac{(F_R - F_T)^2}{F_T}$$

n – numerus (vsota vseh primerov)
m – število kolon ali vrstic, ki ima manjšo vrednost

F_R - realna frekvenca pojava v kontingenčni tabeli
F_T - teoretična frekvenca pojava v kontingenčni tabeli.

Za prikaz podatkov o nadmorskih višinah smo uporabili državo bazo digitalnega modela višin (GURS 2008). Na osnovi teh podatkov smo s pomočjo programa ArcGIS 9.3 in Idrisi Andes izračunali naklone pobočij in ekspozicije pobočij. Podatke o tipih prsti oziroma pedokartografskih enotah smo pridobili s strani Ministrstva za kmetijstvo, gozdarstvo in prehrano (Internet 1), podatke o litoloških enotah pa na Geološkem zavodu RS.

Globalno sončno obsevanje smo izračunali kot vsoto direktnega in difuznega obsevanja, pri čemer smo seveda upoštevali naklon in ekspozicijo pobočij in spreminjanje višine Sonca med dnevom in med letom, ter povprečni koeficient ekstinkcije za zmerne geografske površine in neurbana območja. Podatki so izraženi v kWh/m^2.

$$Q_{gl} = Q_{dir} + Q_{dif}$$

Direktno sončno obsevanje smo računali po naslednjem obrazcu:

$$Q^*_{dir} = Q_{dir} \cdot \cos i$$

Q_{dir}^* - direktno sončno obsevanje pobočja s poljubnim naklonom in azimutom
Q_{dir} - direktno sončno obsevanje ravnine pravokotno na smer sončnih žarkov
i - kot med pravokotnico na pobočje in smerjo sončnih žarkov

$$Q_{dir} = I \cdot q^m$$

I - solarna konstanta (1367 W/m^2)
q - transmisijski koeficient (0.78)
m - relativna zračna masa (m= p_1/(1013 sin h))

$$p_1 = p_0 \, e^{\frac{g\,(nv_1 - nv_0)}{R\,T}}$$

p_1 - zračni pritisk na dani višini
p_0 - zračni pritisk na nivoju morske gladine
g – zemeljski pospešek (9,8 m/s^2)
nv_1 – nadmorska višina na mestu, kjer računamo zračni pritisk
nv_0 – nadmorska višina morskega nivoja
T – temperatura zraka na višini, kjer računamo zračni pritisk
R – plinska konstanta za zrak 287,05 J kg^{-1} K^{-1}
(Oke 1992).

Difuzno sončno obsevanje na poljubno ploskev smo izračunali po naslednjem obrazcu:

$$Q^{*}_{dif} = 0{,}5\rho^{2}\, I \cos^{2}\left(\frac{n}{2}\right) q_a^m \,(1 - q_s^m)\cos^{4/3} z\,(D + (1 - D)C)$$

ρ – relativna oddaljenost Zemlje od Sonca
n - naklon površja
m - optična zračna masa, odvisna od zenitnega kota Sonca
p - kot med smerjo sončnega žarka in površjem
q_a - transmisijski koeficient glede na absorbcijo
q_s - transmisijski koeficient glede na razpršitev
C - faktor, odvisen od rodu oblakov in zenitnega kota. Za poletni čas (od aprila do septembra) smo kot tipičen oblak vzeli altokumulus (Ac), za zimski čas pa stratus (St). Faktor je izračunan po naslednjih formulah:

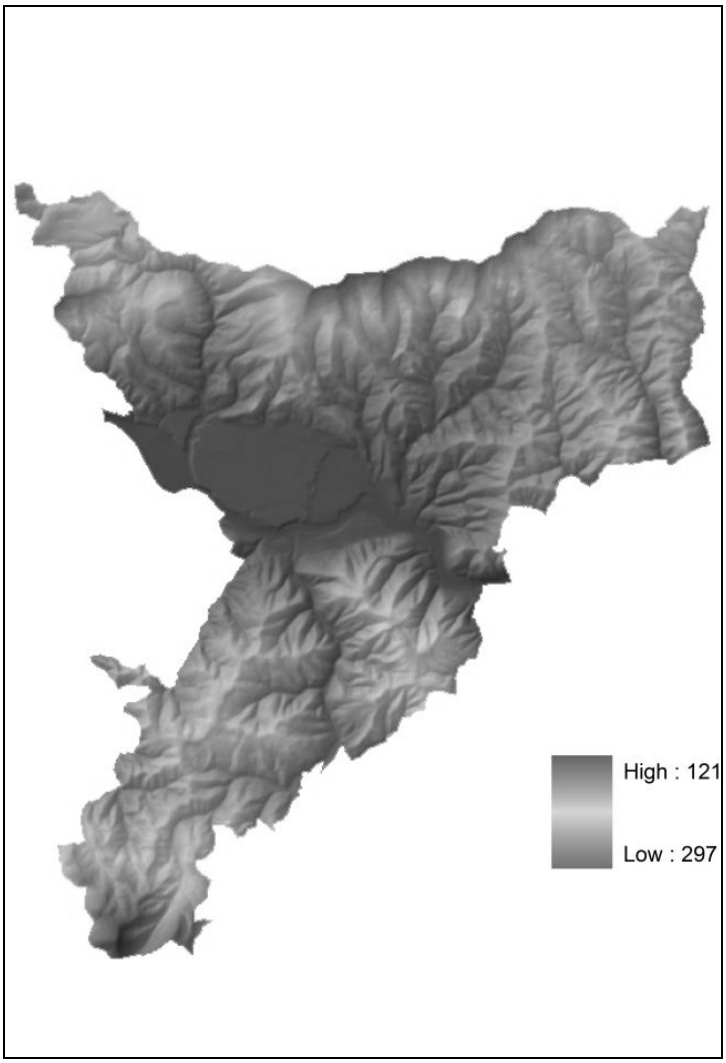
C(Ac) = 1,35 + 5,42z - 3,38z2
C(St) = 0,35 + 4,49z - 2,54z2

z – zenitni kot Sonca
D - relativno trajanje sončnega obsevanja
(Gabrovec 1996).

Stanje rabe tal za območje občine Radlje ob Dravi smo povzeli s spletne strani Ministrstva za kmetijstvo, gozdarstvo in prehrano in sicer za obdobje september 2010 (Internet 2).

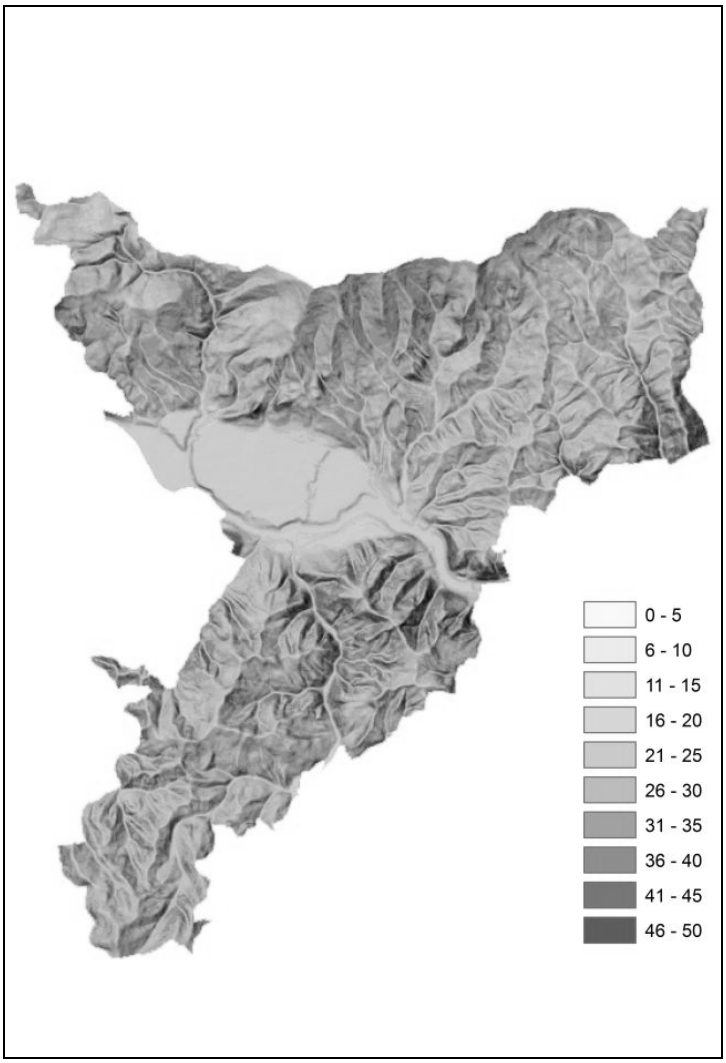
3. REZULTATI IN DISKUSIJA

Območje občine Radlje ob Dravi sodi v subalpsko severovzhodno Slovenijo. Nadmorske višine na območju občine segajo od okoli 318 m (korito Drave ob HE Vuhred), do 1051 m (Kapunar v severnem obmejnem območju občine). Kar četrtina površja sodi v pas nadmorskih višin med 600 in 700 m. K taki razporeditvi prispevajo predvsem uravnane police z manjšimi strminami v tem višinskem pasu, ki so ga v času notranje kolonizacije med 13. in 15. stoletjem poselili in deloma tudi izkrčili. Tako ne preseneča, da se delež travnikov kot pozidanih površin v tem pasu poveča: gozdovi s 75,7% površja v tem pasu še vedno predstavljajo prevladujočo obliko rabe tal, sledijo jim travniki, ki v pasu med 600 in 700 m pokrivajo 19,2% površja, medtem ko so tretja najpogostejša kategorija prav pozidane površine z 2,1% površja. Manjši nakloni v tem višinskem pasu so v zgodovini omogočali celo razvoj strnjenih naselij (Remšnik 685 m). 21,6% površja leži v višinskem pasu med 500 in 600 m, tretji najpogostejši višinski razred pa leži med 300 in 400 m in obsega 15,4% površja občine. Slednji se pojavlja predvsem na račun razširjenega dela Dravske doline na območju radeljske kotline. Tu je gozd še vedno prevladujoča oblika rabe tal, saj pokriva 23,7% površja, vendar takoj za njim sledijo njive, ki v tem pasu pokrivajo 22,3% površja. Po obliki rabe tal so v tem pasu pogosti še travniki (18,5%) in pozidane površine (15,5%). Zanimivo je,da je med njivskimi površinami kar 90,6% vseh površin skoncentriranih prav v najnižjem pasu, kjer so nakloni tudi najnižji, po drugi strani pa tukaj srečamo za poljedelstvo najprimernejše tipe prsti.



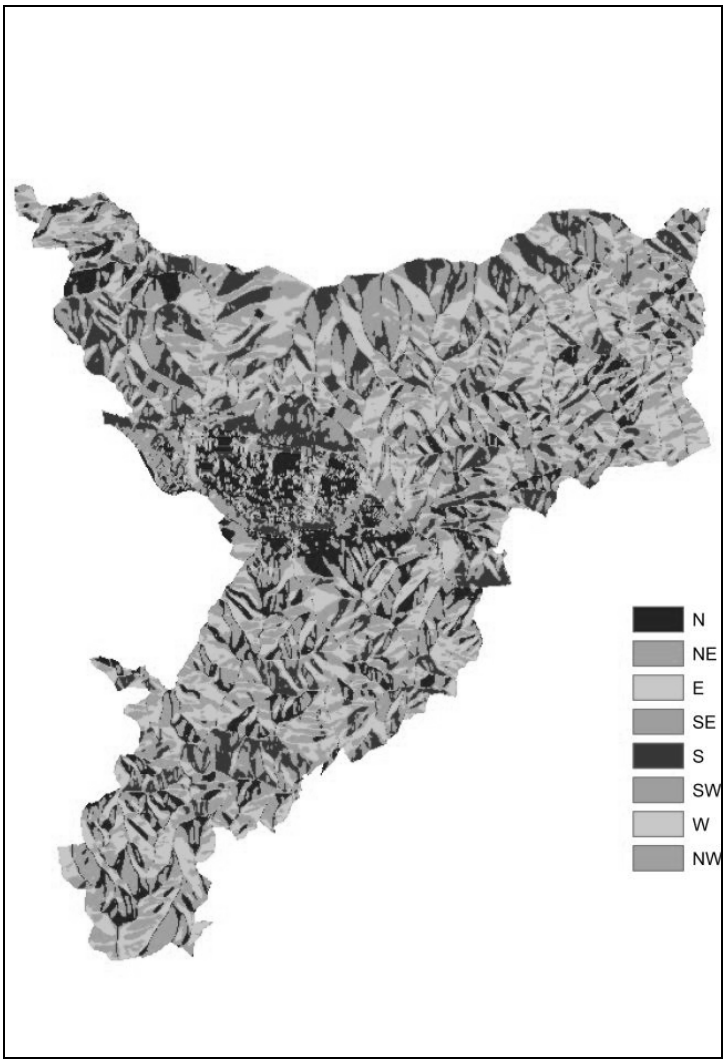
Slika 1: Nadmorske višine na območju občine Radlje ob Dravi.

Območje občine Radlje ob Dravi leži na nekaterih površinah, ki po naklonih pobočij sodijo med najstrmejša v severovzhodni Sloveniji. Med nje sodijo predvsem pobočja nad Javniškim in Kelnerjevom grabnom, ter dolino Remšniškega potoka v zahodnem delu občine (tu so ponekod nakloni pobočij nad 46°), pobočja nad zgornjo dolino Radeljskega potoka v severozahodnem delu občine ter pobočja nad dolino Vuhreščice in Drave. Dobra desetina površja občine leži v naklonskem razredu nad 30°, 16,6% v naklonskem razredu med 25° in 30°, ter 22,6% v naklonskem razredu med 20°in 25°. Dobra polovica Občine Radlje ob Dravi torej leži na strminah, ki so večje od 20°, kar kljub veliki gozdnatosti negativno vpliva na geomehanske lastnosti zemljine, predvsem pa predstavlja veliko potencialno nevarnost za pojav zemeljskih plazov.



Slika 2: Nakloni pobočij na območju občine Radlje ob Dravi.

Ekspozicije pobočij so na reliefno razgibanem območju pomemben pokrajinotvorni element (Oke 1992). Usmerjenost pobočij vpliva na prejeto energijo direktnega Sončnega sevanja in s tem na mikroklimatske razlike v pokrajini, posredno pa na rabo tal in poselitev. Na območju občine Radlje ob Dravi prevladujejo predvsem južne (15,3 % površja) in jugozahodne ekspozicije (14,0 %). K temu prispeva predvsem dejstvo, da se severni del občine nahaja na območju Kozjaka, kjer je prevladujoča slemenitev v smeri vzhod-zahod, pri čemer občinska meja poteka prav po razvodnem slemenu, kjer občina pokriva predvsem prisojni del Kozjaka, južno od razvodnice. K visokim deležem prisojnih pobočij prispeva tudi del Pohorja med Ribniško-Lovrenškim podoljem in Dravsko dolino. Relativno visoki deleži površja pripadajo še vzhodnim (13,1 %), zahodnim (12,7 %) in jugovzhodnim ekspozicijam (12,4 %). Najmanj površja leži na severnih (9,7 %) in severozahodnih ekspozicijah (9,8 %).



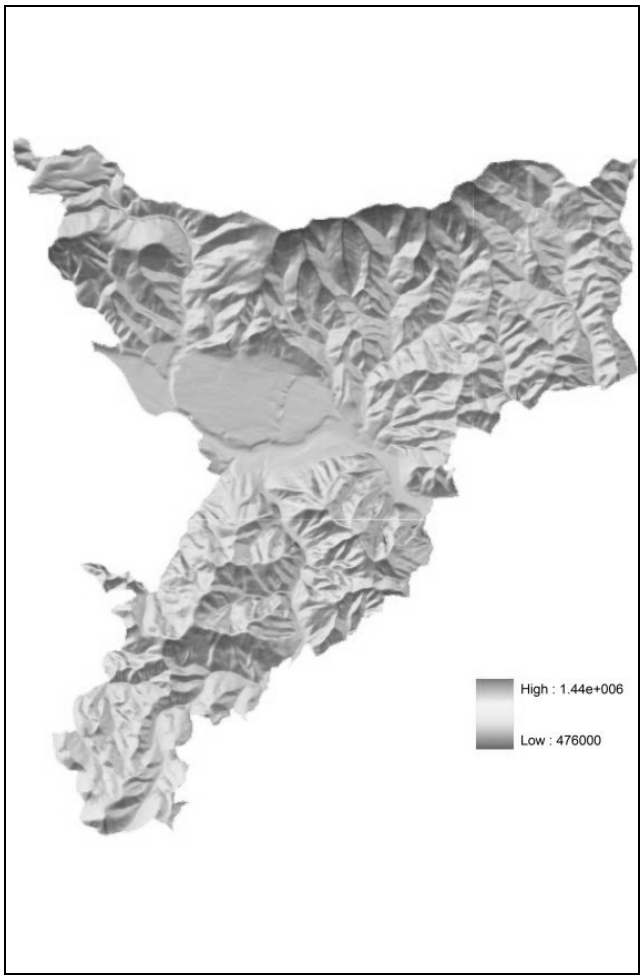
Slika 3: Ekspozicije pobočij na območju občine Radlje ob Dravi.

Čeprav temeljne naravnogeografske značilnosti v razgibani pokrajini določajo relief z litološko zgradbo in topoklimatske značilnosti (Gams 1986), pa je tip tal prav tako eden od pomembnih pokrajinotvornih elementov. Njegov pomen še bolj naraste na ravnini, kjer je glavni vzrok za razlike v rabi tal. Vzporedno s pestro litološko zgradbo je tudi raznolikost tipov tal na območju občine Radlje ob Dravi velika, saj se tu pojavlja kar 29 različnih pedokartografskih enot (PKE). Najpogosteje se na območju občine pojavljajo oglejena evtrična rjava tla na aluvialnih nanosih, ki jih najdemo na rečnih terasah Dravske doline in pokrivajo 13,7 % površja občine. pogosta so še plitva distrična rjava tla na miocenskih peščenjakih in konglomeratih (13,4 %). Ta se pojavljajo pretežno v južnem delu občine na območju, kjer se nahaja podaljšek Ribniško-lovrenškega podolja, ki ga gradijo pretežno miocenske kamnine. Distrična rjava tla na gnajsu pokrivajo 10,8 % površja občine in se nahajajo na območju Spodnje Orlice.

Tudi po pestrosti litoloških enot sodi občina Radlje ob Dravi med naše geološko najbolj pestre občine. Tu najdemo kar 27 litoloških enot (Geološka karta list Slovenj Gradec), med katerimi prevladujejo konglomerat, peščenjak in lapor, ki pokrivajo 16 % površja občine in se nahajajo v južnem delu občine, kjer se odrastek miocenskega Ribniško-lovrenškega podolja od vzhoda nadaljuje vse do Sv. Antona na Pohorju. Drugi večji pas terciarnih konglomeratov, peščenjakov in laporja se nahaja na severnem delu občine, kjer se podaljšek Graškega zatoka sega čez Kapunar vse do Šent Janža pri Radljah. Zelenkast do vijoličen filitoiden skrilavec, ki pokriva 12,8 % površja, se nahaja v severovzhodnem delu občine, kjer proti Radeljski kotlini prehaja v temen filitoiden skrilavec. Obe litološki enoti skupaj pokrivata skoraj četrtino občine. Nad dolino Radeljskega potoka se nahaja slabo vezan konglomerat, na območju Spodnje Orlice pa biotitno-muskovitni blestnik s prehodi v gnajs.

Slika 4: Na območju Kozjaka so prečni profili dolin konveksni: pobočja sprva položno, nato pa čedalje bolj strmo prehajajo v dna dolin. Na fotografiji je viden tipičen konveksni profil doline Remšniškega potoka (Foto: I.Žiberna, 2010).

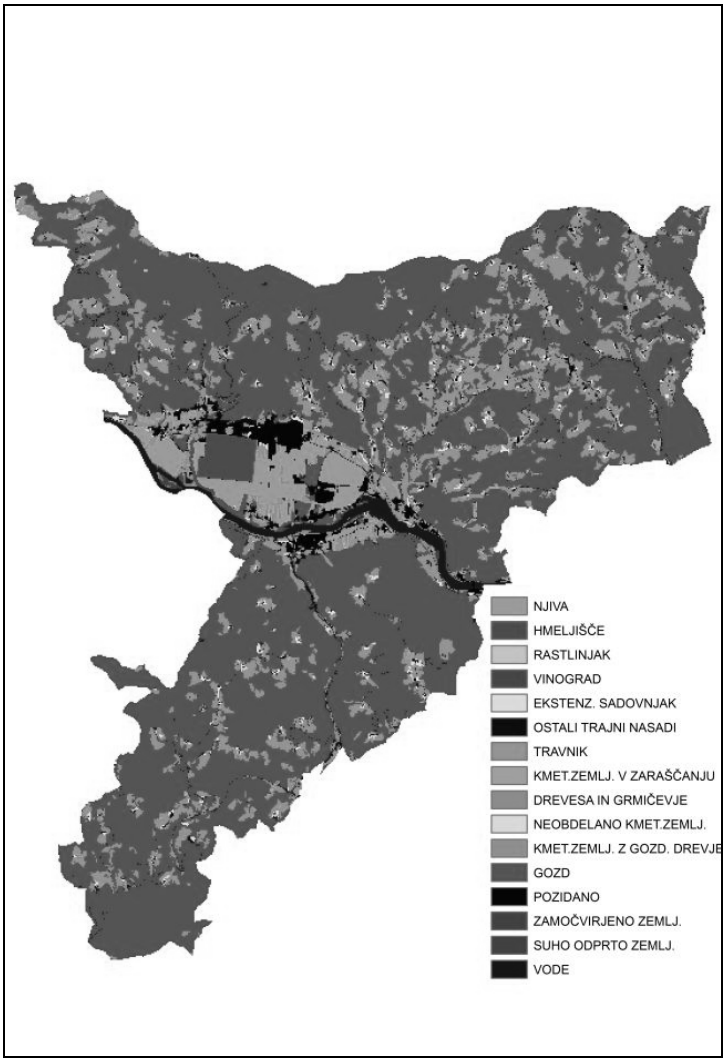
Omenili smo, da na območju občine Radlje ob Dravi prevladujejo prisojne lege. To se odraža tudi v sorazmerno velikih vrednostih globalnega sončnega obsevanja. To je še večje zaradi dejstva, da kar 70 % površja leži nad mejo pojavljanja radiacijske inverzije, ki je pogosta predvsem v Dravski dolini oziroma Radeljski kotlini. Zato ne preseneča dejstvo, da z globalnim sončnim obsevanjem okoli 70 % površja občine letno prejme nad 1100 kWh/m^2 energije, 28,4 % površja pa nad 1200 kWh/m^2. Med najbolj obsevana sodijo južna pobočja Kapunarja in Pongraca, južna pobočja Svetih Treh kraljev in južna pobočja Sv. Antona nad dolino Antonskega potoka.



Slika 5: Globalno sončno obsevanje (Wh/m^2) na območju občine Radlje ob Dravi.

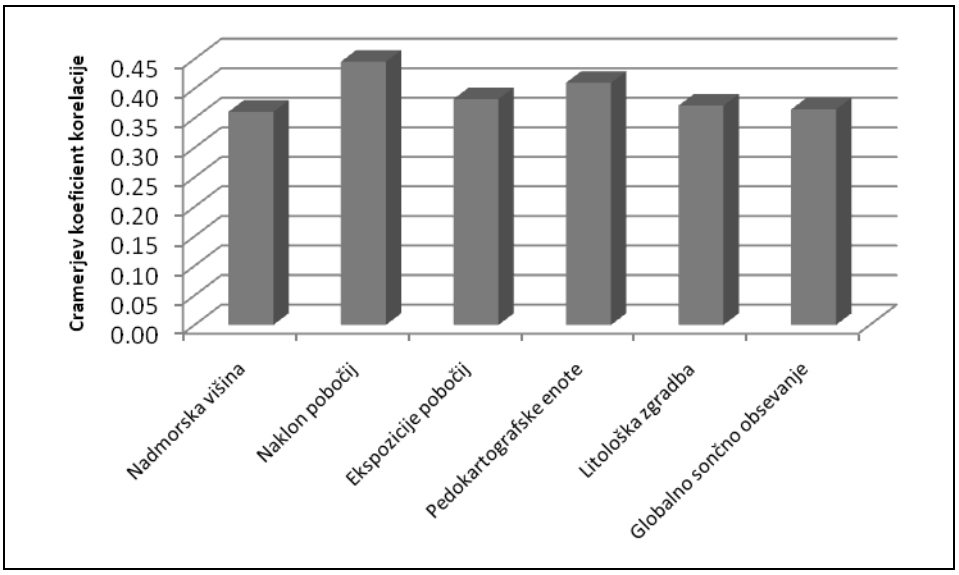
Med oblikami rabe tal kar 69,3 % občine pokrivajo gozdovi. Tak odstotek je zelo podoben slovenskemu povprečju. Med ostalimi kategorijami prevladujejo travniki (17,9 %), pozidane površine (4,1 %), njive (3,8 %) in ekstenzivni sadovnjaki (1,2 %). Posebnost so hmeljišča, ki se nahajajo na dnu Radeljske kotline in pokrivajo skoraj odstotek celotnega površja občine. Travniki se v hribovitem svetu občine nahajajo predvsem na območju samotnih kmetij in jih zlahka prepoznamo, saj na celkih, nastalih v času višinske kolonizacije predstavljajo prevladujočo obliko rabe tal. Nekaj travniških površin se nahaja tudi na dnu Radeljske kotline, kjer se pojavljajo v zaplatah ob robu njivskih površin. Slednje najbolj prevladujejo na dnu Radeljske kotline, v višjih legah pa se v nekoliko večjih sklenjenih kompleksih nahajajo predvsem tam, kjer še uspeva ozimno žito in kjer naklon površja omogoča obdelavo: v vzhodnem delu na območju Remšnika in južno od tod, na območju Breznega vrha in v skrajnem severozahodnem delu občine, kjer so na območju Zgornjega Kozliča in Šujkov nakloni pobočij manjši. Največ pozidanih površin se nahaja seveda na območju naselij Radlje ob Dravi,Vuhred, Spodnja Vižinga, Vas,

Zgornja Vižinga, v višjih legah pa predvsem na območju gručastih naselij, ki pa so zelo redka (Remšnik, Brezni Vrh).



Slika 6: Raba tal na območju občine Radlje ob Dravi.

Vse omenjene naravnogeografske dejavnike (nadmorska višina, nakloni pobočij, ekspozicije pobočij, tipi tal, litološke enote) smo primerjali z rabo tal s pomočjo kontingenčnih tabel in Cramerjevim korelacijskim koeficientom (Slika 7).



Slika 7: Cramerjevi koeficienti korelacije med rabo tal in izbranimi naravnogeografskimi kazalci.

V naši analizi smo izpostavili predvsem analize zvez s pogostejšimi oblikami rabe tal. Omenili smo že, da skoraj 70% površja občine pokrivajo gozdovi. Ti so v vseh višinskih pasovih prevladujoča kategorija, vendar imajo relativno najnižji delež (le 23,7%) v višinskem pasu med 300 in 400 m. Zanimivo je, da njihov delež v pasu nad 400 m sprva naglo narašča (v pasu med 500 in 600 m gozdovi pokrivajo kar 80 % površja), v pasu med 600 in 900 m pa se zniža na v povprečju okoli 75 %. To si lahko razlagamo s pojavljanjem višinskih samotnih kmetij, ki so s krčevinami sredi gozda na manj strmih legah ustvarili njivske in predvsem travniške površine. Delež slednjih prav v pasu med 600 in 900 m dosega vrhunec, saj na teh višinah travniki pokrivajo v povprečju petino celotnega površja. Njivske površine se pojavljajo vse do 1000 m, višje pa je njihov delež zanemarljiv. Zgornjo mejo agrarne poselitve je namreč najpogosteje – poleg ostalih naravnih razlogov – določala zgornja meja uspevanja ozimnega žita (Gams 1959).

Slika 8: Sklenjene pozidane površine v hribovitem svetu se pojavljajo na območjih uravnanega sveta in polic. Eno od redkih gručastih naseljih v hribovitem svetu je Remšnik (Foto: I.Žiberna, 2010).

Nižje se pričakovano najvišji deleži njivskih površin pojavljajo na Radeljskem polju, v pasu med 300 in 400 m, kjer je pokrivajo 22,3% površja in so takoj za gozdnimi površinami druga najpogostejša kategorija rabe tal. Pozidane površine se v največji meri pojavljajo na območju Radeljske kotline, v pasu med 300 in 400 m, kjer pokrivajo 15,5 % površja. Z višanjem nadmorske višine se njihov delež sprva zniža na 1,6 % v pasu med 500 in 600 m, zatem pa zaradi pojavljanja samotnih kmetij in redkih gručastih naselij zopet dvigne na okoli 2 %. Nakloni pobočij kažejo še močnejši vpliv na rabo tal. Pričakovano je, da njivske površine na ravninah predstavljajo pomembno obliko rabe tal, saj tam pokrivajo kar 51,8 % površja. Njihov delež se v naklonskem razredu med 1° in 5° zniža na 27,2 %, v naklonskih razredih nad 5° pa predstavljajo zanemarljiv delež površja. Njihovo mesto na naklonskih razredih zamenjata kategorija travniki (ti na naklonih od 5°do 15° pokrivajo skoraj tretjino celotnega površja) in gozd, katerega delež v naklonskih razredih nad 10° že predstavlja nad 50 %, na naklonih nad 25° pa že nad 90 % vsega površja. Gozdovi imajo na strmih legah izjemno pomembno funkcijo, saj tam s koreninskim sistemom varujejo pobočja pred erozijskimi procesi. Ekspozicije pobočij ne izkazujejo tako tesne povezanosti z rabo tal, kljub temu pa lahko zaznamo, da se na prisojnih pobočjih pojavljajo intenzivnejše oblike rabe tal, medtem ko na osojnih pobočjih prevladujejo gozdne površine. Na severnih pobočjih gozdne površine pokrivajo 79,4 % površja, na južnih pa le 58,1 % površja. Druga najpogostejša kategorija na južnih pobočjih so travniki (24,9 %), sledijo pa pozidane površine (6,8 %) in njive (4,3 %). K intenzivnejšim oblikam rabe tal na prisojah posredno vpliva tudi naklon pobočij. Strmine južnih pobočij so zaradi denudacijskih procesov namreč manjše od osojnih. Vpliv ekspozicij in naklonov na rabo tal se posredno kaže tudi preko vpliva globalnega sončnega obsevanja: na

površinah, ki letno prejmejo manj kot 900 kWh/m^2 gozdne površine pokrivajo nad 90 % površja, pri bolj obsevanih površinah pa se njihov delež zniža celo na 50 % površja. Delež travnikov v razredu 1201 do 1300 kWh/m^2 naraste na 28,4 %, delež pozidanih površin pa na 7,7 % površja.

4. ZAKLJUČEK

Območje občine Radlje ob Dravi predstavlja območje z zelo pestro naravnogeografskimi značilnostmi, v določenih primerih (litološka zgradba) celo izjemnimi značilnostmi. Kot tako je območje zelo za zanimivo za študij povezav med pokrajinotvornimi elementi. Analiza kaže, da so vplivi naravnogeografskih elementov na rabo tal med seboj prepleteni, med tistim, ki imajo večjo težo pa izstopa predvsem naklon pobočij, deloma pa tudi tipi tal in ekspozicije. Najintenzivnejše oblike rabe tal se pojavljajo na dnu Dravske doline, predvsem na aluvialnih nanosih v Radelsjki kotlini, kjer morfologija (uravnan svet rečnih teras), podnebne značilnosti ter tipi tal nudijo dovolj kakovostne naravne pogoje. V višje ležečih območjih se intenzivnost rabe tal poveča predvsem na slemenskih nivojih med 600 in 900 m nadmorske višine, kjer so nakloni omogočajo strojno obdelavo, po drugi strani pa ta pas še sodi v območje uspevanja nekaterih poljedelskih kultur. To je v času višinske kolonizacije bil tudi pas najintenzivnejšega krčenja gozdnih površin in nastajanja samotnih kmetij.

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Summary

SELECTED PHISICAL GEOGRAPHICAL CHARACTERISTICS OF RADLJE OB DRAVI MUNICIPALITY

The area of the Municipality of Radlje ob Dravi spreads across three natural geographical units. The northern part of the municipality lies in the area of Kozjek, its central part belongs to the Drava Valley as it passes from the basin of Radeljska kotlina into the gorge of Brezenska soteska, while its southern part lies in the Pohorje area. Its great geographic diversity is reflected in the geodiversity of the municipality. We analysed the natural geographic indicators using DTM with 25m x 25m cells, by modelling potential global solar radiation and by means of digital pedological and geological maps.

A quarter of the Radlje ob Dravi Municipality lies at altitudes between 600 and 700 m. This especially includes the southern part of Kozjak and the slopes of Spodnja Orlica and Sveti Anton facing Pohorje. A fifth of the municipality area lies at altitudes between 500 and 600 m, while a weak third of the area has altitudes below 500 m. With the existing climate factors, this hypsometric structure still facilitates a broad enough range of farming crops, though the hilly areas of the municipality have a limiting factor: the steep gradient of the slopes. As much as 22% of the surface has slope gradients between 20 and 25°. Two thirds of the municipality lie on slopes steeper than 15° - gradients above which mechanical cultivation is considered impracticable or very difficult by general standards. The highest gradients occur on the slopes of Kozjak above the village of Vas on entering Brezenska soteska, in the area of Zgornje Kaple, Kapunar and on the slopes above Vuhreščica Valley, specifically above 40°, which classes this area as a landslide area, although it is well-forested. We used the available topographical and astronomical input data to model the potential global solar radiation for the municipality area. The areas shown to receive the maximum radiation were the southern areas of Kapunar and Sveti Anton, where the global solar radiation ranges from 1000 to 1500 kWh/m^2. In the southern expositions in lower positions, particularly those with a prominence below 200 m, global solar radiation is reduced by the fact that there is often fog at the bottom of Drava Valley in the mornings, which may persist for several days in a row in the autumn and winter. The territory of the Radlje ob Dravi Municipality also displays great variety in terms of geology. The area around Remšnik on Kozjak and beneath Velika Kopa in Pohorje used to be best known for its rare ores, even including silver. The oldest rock class in the municipal territory is a metamorphic complex. Phyllite, amphibolite and quartzite account for as much as 22% of the surface of the municipality, particularly on Kozjak. Other common rocks are diabase (14%) and phyllitic schist (12%). The dominant sedimentary rocks are conglomerate, sandstone and marl, appearing largely in the northern border area of Kozjak and in the area of Sveti Anton and Spodnje Orlice (30%). At the bottom of the Drava Valley, alluvial deposits predominate, covering 14% of the territory of the municipality. As regards the soil, the dominant type is dystric cambisol on Miocene rocks, which is found particularly in marl, sandstone and conglomerate areas and covers a weak third of the territory. The dominant types of land use are woods (69%) and meadows (18%).

LIVESTOCK REVOLUTION IN TROPICAL MONSOON COUNTRIES: SOME CHALLENGES AND ISSUES

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Abstract
Livestock revolution in tropical monsoon countries: some challenges and issues
Livestock husbandry is one of the important demand driven sectors of agriculture in the world. It acts as a global resource in the form of food, income, nutrients, employment, insurance, clothing and others purposes. It plays a vital role in socio-economic development of the farmers. Demand of livestock products is increasing on account of increasing population, changing food habits of the middle class population and urbanization in developing Asian countries. This paper seeks to understand the pattern of growth of livestock number as well as their products and to identify the issues and challenges emerged on account of dynamics in livestock husbandry in Monsoon Asian countries. By analyzing the recorded data of FAO **(**Food and Agriculture Organization) in different years paper enables to state that all species of livestock showed positive growth rate with the exception of sheep and pigs. Now the livestock husbandry showing the structural change i.e. in general it is shifting from horizontal expansion to vertical expansion in most of the study region. The livestock improved tremendously and achieved a great success in raising livestock derived products. Various issues and challenges of livestock husbandry are now deserved for academic and scientific discussion as a result of livestock revolution in world in general and tropical monsoon countries in particular.

Key Words
Livestock revolution, structural change, livestock issues

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1. Introduction

Livestock sector is one of the very important sub sectors of agriculture in world. Their rearing is done in different ways following various forms of agricultural practices like traditional mixed farming, commercial dairy farming, and nomadic herding in distinct agronomic and socio economic conditions. Developed countries followed high level of commercialized livestock husbandry system with the objective to produce more and more dairy and meat products for meeting increasing demand in these countries. While the developing countries adopted the traditional form of livestock husbandry system with their multiple functions with a view to help in agriculture and enrich food nutrition at household level. Commercial oriented production was limited confined to some selected social groups and in peri-urban areas.

The dawn of 21st century witnessed an alarming growth in urban population, deregulation of agribusiness across inter-national boundary, increasing consciousness for health care with nutritive food and breaking of social and ethnic control on food habits in developing countries. These remarkable changes multiplied and augmented the demand for livestock derived food products tremendously over the decades. The demand for livestock products is estimated to be doubled by 2020 in developing countries (Conroy 2004, 1). A joint IFPRI/FAO/ILRI study suggested that global production and consumption of meat will continue to raise from 233 million metric tonnes (Mt) in the year 2000 to 300 million metric tonnes (Mt) in 2020, as will that of milk, from 568 to 700 million Mt over the same period. Egg production will also increase further by 30%.

Such trend of change in demand of livestock products in developing countries is described as livestock revolution. The tropical developing countries have good potential to augment livestock sector of economy and could meet world's increasing demand of livestock products like meat, milk and eggs in future. The tropical regions have been neglected mainly due to rather more attention on the food crop production for feeding burgeoning population especially in tropical monsoon Asian nations, African and Latin American countries. Traditional livestock husbandry persisted in tropical dry region as nomadic herding well in the past. So these regions may accelerate the livestock production and productivity by both horizontal and vertical expansion of this sub sector of agriculture. Study reveals as made earlier by scholars that the livestock sector has witnessed a structural change in geographical, sociological and economic aspects of livestock husbandry in world in general and Asian countries particular during last decades (Steinfeld 1998, 1). It shifted from temperate and dry agro climatic zones to tropical sub humid and humid regions, from ruminant domination to mono gastric livestock and from subsistence multi functions to mono function market oriented production system. Scaling up of production scale is also taking place from small livestock as household level to vertically integrated large scale enterprises controlled by capitalists/multi -national companies.

Tropical monsoon Asian countries experience mainly intensive traditional livestock husbandry as livestock cropping integrated system (Devendra 2004, 6-13). The growth of this sector at a commercial level, both ruminant and mono gastric livestock, undoubtedly, will affect the socio economic and ecological aspects in the monsoon region. Employment generation, income improvement, women empowerment, nutritional enrichment as well as poverty alleviation are the

important positive blessing which is expected by scholars from the development of livestock sectors. Simultaneously, there is another view concerning water, soil, air pollution, as well as social tension which may emerge after commercial intensification of the livestock sector in crop intensified agronomic dominant region of tropical world.

2. Purpose of the study

The present research work is aimed to

1. understand the pattern of growth of livestock number as well as their products in Monsoon Asia,
2. identify the issues and challenges emerged on account of dynamics in livestock husbandry.

3. Research methodology and data collection

The present work is mainly based on secondary sources of data. The earlier published literature is also used for understanding and developing the ideas regarding various aspects of livestock husbandry in tropical monsoon countries. The collected data are processed with simple statistical technique.

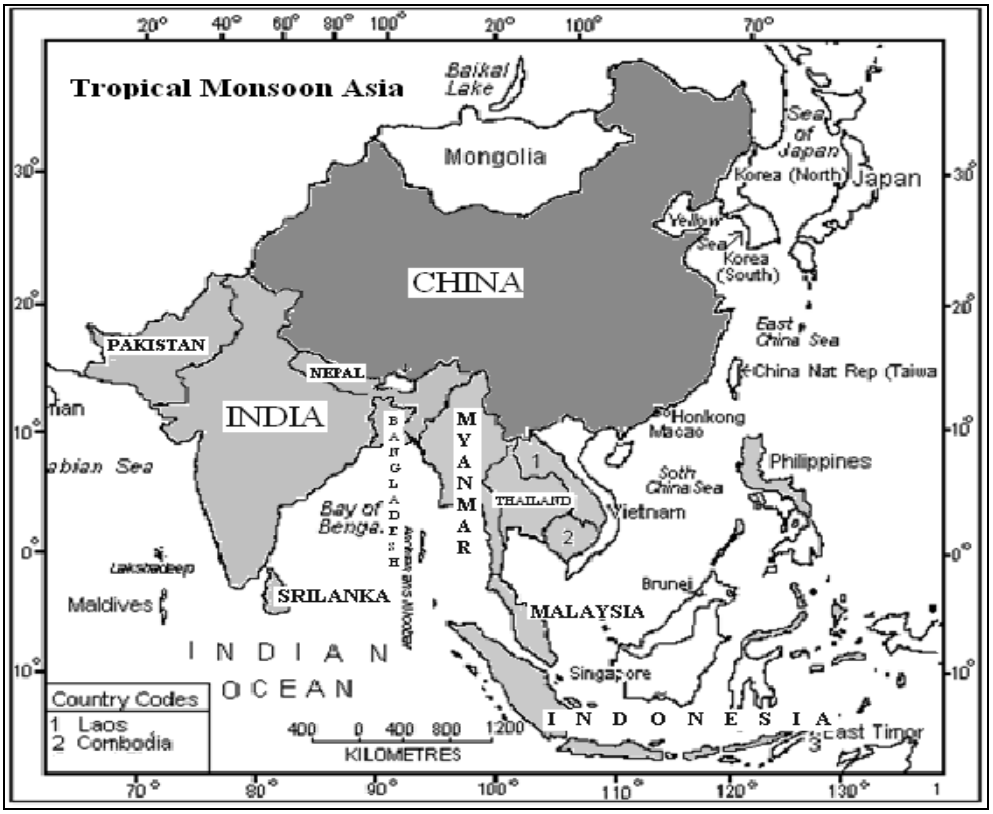

Fig. 1: Location map of the study area

4. Growth of Livestock Sector

The Tropical monsoon Asian region has high potential level for livestock development as it could not be harnessed on account of more stress on food crop production for feeding the high pressure of population in the area for centuries. The agronomic and socio economic conditions as well as saturation level of traditional cropping system opened livestock husbandry as new option for the farmers for earning their livelihoods. All species of livestock except sheep and pigs showed rather positive trend in their number and in their products. Among big ruminant cattle and buffalo witnessed amelioration during last decades. The analysis of growth rate during two period of times i.e.1991-2001 and 2001-2007, reveals that the cattle number grew up with slow rate in tropical monsoon region of the continent. It was 1.32% during 1991-2001 and 0.53 % annual growth 2001-07. This is because the giant cattle holding countries dropped the cattle heads. India exhibited negative trend at -2.79 % annual rates during the latter period as compared to 0.80 % during former period. China also showed the negative trend from 2.6 to -3.19 in cattle population during same period (Tab. 1). It is mainly attributed to the high level of mechanization of agriculture, low productivity of cows for milk production as well as prohibition of cow slaughter on religious ground especially in India (Khan and Iqubal 2008, 20-24). Changing preference for meat of mono-gastric livestock i.e. pork and poultry discouraged cattle rearing in CHINA and some other countries. Contrary to this Muslim countries like Pakistan, Bangla Desh, Malaysia and Indonesia, cattle showed positive growth as their meat and milk are preferred .Beef is highly demanded and accepted meat in these nations. Other ASEAN nations like Cambodia and Laos also improved their cattle heads rather at higher rate during 2001-2007 as compared to earlier decade as evident from table.

Tab.1: Percentage Change per year in Livestock during 1991-2001 and 2001-2007 in Tropical Monsoon countries.

Countries	Cattle		Buffalo		Sheep		Goat		Pigs		Total	
	1991-2001	2001-2007	1991-2001	2001-2007	1991-2001	2001-2007	1991-2001	2001-2007	1991-2001	2001-2007	1991-2001	2001-2007
Indonesia	0.5	0.41	-3.5	-1.25	2.1	0.52	1	2.31	-3.4	-1.97	-3.3	0.02
Malaysia	0.1	1.22	-2.3	-2.3	-5.2	-0.62	-4.7	3.26	-4.5	-1.33	-16.6	0.23
Myanmar	1.8	1.8	2	1.95	3.9	-1.64	3.6	9.3	5.3	-9.89	16.6	1.52
Thailand	-1.3	0.41	-11	-1.17	-14.7	-0.36	-1.5	19.26	5.2	-0.13	-23.3	18.01
Bangladesh	0.2	0.83	-0.1	6.54	2.3	0.32	0	7.7	0	0	2.4	15.39
India	0.8	-2.79	1.4	0.69	1.7	-0.17	0.8	0.22	3.5	2.85	8.2	0.80
Nepal	1.4	0.12	1.8	2.92	-0.9	0.32	2	3.02	4.8	-1.19	9.1	5.19
Pakistan	2.9	5.27	2.7	2.98	-1.7	-0.31	2.5	1.78	0	0	6.4	9.72
Sri Lanka	-0.1	-3.23	-2.2	-7.69	-6.9	-0.51	-0.4	-3.18	-2.8	-5.5	-12.4	-20.11
China	2.6	-3.19	0.3	-0.02	1.9	-2.04	5.4	0.22	1.6	0.9	11.8	-4.13
Cambodia	2.2	2.64	-2.4	3.37	0	0	0	0	1.7	-4.53	1.5	1.48
Laos	1.8	3.07	-1.3	1.58	0	0	8.1	-0.55	-1.9	-7.23	6.7	-3.13
Philippines	4.3	0.4	2.1	1.47	0	0	3.3	0.71	3.8	-3.09	13.5	-0.51
Average	1.32	0.53	-0.96	0.69	-1.34	-0.34	1.54	3.38	1.02	-2.39	1.58	1.88

Source: FAO 2002 and 2009.

Buffalo, the second important big ruminant, also exhibited an improving nature of growth in their head number. During the last decade of 20th century, their population declined with annual rate of -0.96% but the beginning decade of 21st century showed a tremendous improvement in buffalo rearing in tropical monsoon countries at 0.69% per annum growth. In SAARC countries like Bangladesh, India, Nepal and Pakistan, their numbers rose up at rather high rate. South East Asian

nations also have positive growth in the husbandry of same species. Goat, one of the small ruminants, number shot up at very fast rate in the study area, their annual growth rate was 1.54% during 1991-2001 and 3.32% during 2001-07. All the countries from this region excluding Sri Lanka, China and Laos witnessed remarkable changes / increase in goat number on account of increasing demand of mutton (meat) in monsoon countries due to high level of social acceptability among all religious groups unlike beef and pork. They are usually reared at household level by female members and poors who have small amount of capital to invest for big ruminants like cattle and buffalo.

Goat is considered as ATM and cows of poor and women in developing monsoon Asian countries. Their rearing is also preferred especially in Muslim families considering it as religious obligation as the most of the prophets reared goats in their lives. Besides the goats are also sacrificed every year by same community on the occasion of HAJ or EID-UL-AZHA in abundant number all over world (Khan 2008, 529-544). Sheep and swine rearing have been discouraged in the area on the ground of social and geographical conditions. The decline in common pastureland in all the countries due to increasing demand of land for cultivation of crops as well as less preference of lamb mutton led to the fall of sheep number in majority of countries of the tropical monsoon Asia. Swine rearing is unacceptable among Muslim dominated countries as their rearing, meat and any related items are strictly prohibited on religious ground. China and India are the only exception which has recorded positive growth in pig number during 2001-07 due to the fact the Chinese has good demand for pork internally. Trade of pig leather and its products in large scale from China is also one of the factors for increasing positive growth rate of swine rearing in China. The tropical monsoon Asia, however, is not well developed in livestock sector. Few countries i.e. Thailand, Bangladesh, Nepal and Pakistan exhibited growth in livestock sector at the rate above average (1.88%). Giant countries like India and China used either stagnation or decline in overall livestock number.

Tab. 2: Growth rate of Chicken Production during 1991-2001 and 2001-2007.

Country	1991-2001	2001-2007
1. Bangladesh	4.3	6.8
2. Cambodia	5.5	0.1
3. China	4.7	2.8
4. India	3.4	5
5. Indonesia	-0.8	9.9
6. Laos	4.6	8
7. Malaysia	4.8	7.4
8. Myanmar	6.7	17.7
9. Nepal	4.1	2.7
10. Pakistan	7.3	9.9
11. Philippines	4.9	2.4
12. Sri Lanka	2.2	3.6
13. Thailand	6.7	1.4
Total Average	4.32	6.03

Source: FAO 2002 and 2009.

Poultry is also showing growing rate during past two decades as it is exhibited by the Tab. 2. Its annual growth rate rose up from 4.32 % during 1991-2001 to 6.03 % during 2001-2007. All the countries of the region have shown more or less positive trend in poultry number. High level of social acceptability in all social and religious communities for poultry products is another cause of growing chicken population. This chicken meat is called as "universal meat" due to universal acceptance in all communities and religions. Besides, high rate of reproduction, quick return on capital investment, and small area requirement for their rearing are some of the major causes for fast growth rate of chicken. Myanmar exhibited an excellent record growth of 17.70% per annum during 2001-2007 against 6.7% per annum during 1991-2001. It is followed by Pakistan, Indonesia, Laos, Malaysia, Bangladesh and India. Thus positive change in poultry number is mainly attributed to increasing demand of poultry meat in Asian nations where 60% of world consumers resides.

4.1 Livestock Products

Livestock products are a source of protein and micronutrients, in which the poor are usually deficient. This could be alleviated by increased consumption of even small amounts of milk and meat, which provide the same level of nutrients, protein, and calories that a large amount of vegetables and cereals would provide (Iqubal 2010, 83-94). Various studies showed that the demand of animal products is increasing due to the increased demand of animal protein in developing countries and to cover the widening gap between projected demand and available supplies. The intensification in demand is attributed to the rapid population growth, inefficiencies in the management of the natural resources, changing consumer preferences, urbanization and increased disposable income (Devendra 2004, 6-13). To meet the demands, all the monsoon countries are in race of increasing population of livestock. Instead of this, these countries are facing shortage of animal protein. This situation is acute particularly in SAARC (South Asian Region) countries like India, Pakistan, Bangladesh, Nepal and Sri Lanka on account of increasing human population over the decades.

Tab. 3: Growth rate of milk production during 1991-2001 and 2001-2007.

Countries	1991-2001	2001-2007
Indonesia	2.5	1.45
Malaysia	2.5	-0.94
Myanmar	1.9	13.13
Thailand	15.2	8.30
Bangladesh	2.6	5.31
India	4.7	3.76
Nepal	2.8	2.79
Pakistan	6.4	3.22
Sri Lanka	0.9	-5.77
China	5.6	28.26
Cambodia	1.8	1.65
Laos	1.5	1.66
Philippines	-4.7	2.91
Total Average	3.361	5.05

Source: FAO 2002 and 2009.

However tropical Monsoon countries contributed a significant share to the world livestock and livestock products. Average growth rate of milk production, as it is

evident from the table 3, has increased from 3.36 % during 1991-2001 to 5.05 % during 2001-2007. All the countries except Malaysia and Sri Lanka showed positive growth during 2001-2007. The negative growth rate of Malaysia and Sri Lanka is attributed to the slow growth of big female ruminants like cattle and buffalo livestock for milk production during 2001-2007. Milk production from different species is differing from one region to another. But a large proportion of milk is produced from cows and buffalo. Regional analysis of annual growth of milk production during 2001-2007 indicates that China the most populous country recorded highest growth rate i.e. 28.26 %. It is followed by Myanmar, and Thailand. This vertical dynamics is also attributed to the increasing demand of milk for household consumption as well as processing units especially in China. While Myanmar and Thailand exhibited high growth due to increasing export of dairy products during post economic reform period.

The meat, highly demanded livestock products, exhibited positive trends during both points of time i. e. 1991-2001 and 2001-2007 at on an average 3.90 and 3.85 % annual growth (Table 4). But it is the most serious matter that annual growth rates in almost all countries with some exception have fallen. It is the reflection of rather inefficient productivity, unscientific management and weak extension service for development of meat production system in many countries of the region. Technological backwardness, lack of meat processing units, infrastructural facilities like refrigerated transport system and processing and marketing facilities have also resulted in meat production growth rate, though the demand for meat is rather high in and out of the region. Stagnation and negative trend in some livestock like cattle and sheep and prohibition of pig rearing in Muslim countries are other reasons responsible for rather slow growth during latter point of time.
Among the species, poultry meat production rose up rather higher rate than other meat like beef and mutton. It is highly demanded owing to its lower price, high social acceptability as well as its pro health nature.

Tab. 4: Growth rate of Meat production during 1991-2001 and 2001-2007.

Countries	1991-2001	2001-2007
Indonesia	0.1	5.59
Malaysia	3.6	2.03
Myanmar	6.6	28.23
Thailand	1.6	0.87
Bangladesh	3.4	-14.06
India	2	4.62
Nepal	2.8	2.31
Pakistan	1.7	4.18
Sri Lanka	4.8	4.96
China	7.1	1.16
Cambodia	4.6	2.35
Laos	6.5	2.93
Philippines	6	4.84
Total Average	3.90	3.85

Source: FAO 2002 and 2009.

Heart disease and sufferers from hypertension consumers are recommended for white meat i.e. poultry and fish. Proportion of such patients has been increasing tremendously over the decades. Buffalo and cattle beef grew up mainly in Muslim dominant countries where these are preferred meat. Swine (Pork) meat is concentrated with few countries like China and some countries of ASIAN groups of

monsoon region. Goat meat production improved up but its growth rate lies at third place in meat production hierarchy.

4.2 Structural Changes in livestock Sector:
Livestock sector developed from subsistence and nomadic herding to commercial and industrial form during long history of human civilization in monsoon countries. In general, livestock productions in tropical monsoon countries are increasing in response to technological development, market requirements and insufficient returns to the labor in traditional systems. Big ruminants (buffalo and cattle) and specially poultry production are developing from simple farm operation to complex vertical operation (Steinfeld 1998). Keeping in view the reduction of pasture and grazing land the choice of livestock production is also changing from big ruminants to small ruminants and chicken. It is also thought that grazing/pasture land in these countries in future will be limited, consequently poultry production will rise mainly due to the ability to convert feed efficiently into products.

Now the livestock husbandry in general is shifting from horizontal expansion to vertical expansion in most of the tropical countries. Livestock growth is decreasing in giant countries like in China, while the small countries show increasing growth rate. South East Asian countries are becoming hub for big ruminants. Among big and small ruminants, buffalo and goat respectively has the domination while among mono-gastric animal poultry has the domination. The traditional concept of livestock rearing in dry marginal areas is now shifting towards wet and agriculturally rich area. Thus the limitation of climatic effect to rear the livestock is now not a serious issue. In spite of livestock rearing alone, Intensive-crop-livestock integrated farming system is developing. The concept behind crop-livestock integrated farming system is the recycling of livestock products (dung manure) into farming and the farm products into the feeding of livestock. This is the economic approach which is widely accepted in all the tropical monsoon countries.

4.3 Livestock Husbandry and Socio Economic Change
With the revolution of livestock, societies evolve from subsistence agriculture into cash based economy as it play crucial role in economic growth of the people. This is the lone source of additional income for landless and small farmers. In all the countries particularly south Asian countries livestock husbandry has largest potential to flourish the society. The generation and health is improving up in many Asian countries due to intake of nutritious foods like meat, milk and eggs (Sugiyama 2003, 1-9).

Livestock plays an important role to eradicate poverty from the tropical Asian country. Among these tropical countries the largest numbers of poor people are found in India which reduced from 55% to 35% of the population from 1970 to 2001. Livestock husbandry is one of the major subsidiary sources of income of rural India.

Growth in livestock sector is important in many ways. First, by augmenting income and employment opportunities it would benefit millions of small landholders and the landless laborers who possess a sizeable proportion of livestock wealth. Thus, the growth in livestock sector is considered as an valuable tool to alleviate poverty. Second, increase in outputs of livestock would lead to increased consumption of livestock products, contributing towards lessening of nutrition deficiency disease. Third, acceleration in growth is reducing import dependence and facilitates export of

livestock products. Above all, being an integral part of agricultural economy, livestock would improve sustainability of the crop sector through provision of organic manure and draught power as inputs.
Moreover, Livestock husbandry is a small scale enterprise which has big potential for providing a gainful employment for rural women in their own household. Larger proportion of women's time is utilized in livestock husbandry in all the rural areas of tropical countries. Small ruminants like goat are mainly reared by women. So it is called as women's resource. The significance of livestock husbandry in empowerment process of the rural women could be evaluated with the improvement of livestock production with their empowerment of knowledge, skill as well as financial support.

5. Issues and Challenges

The livestock improved tremendously and achieved a great success in raising livestock derived products especially in developing countries of monsoon Asia. It appeared very helpful in filling the gap of demand and supply for livestock products in the recent years. But this revolutionary success occurred at the cost of environment, ecology, soils, water and genetic diversity in the region. Various issues and challenges appeared and deserve for academic and scientific discussion as a consequences of livestock revolution in world in general and tropical monsoon countries in particular.

Land and water use and availability are the most important issue in response to improving livestock husbandry and industrial sectors recently. The increasing demand for feedgrains and fodder crops have been reducing the availability of land for food crops cultivation which resulted in stress small size of landholdings owned by marginal and small farmers. The rise in livestock number and land index accelerated soil erosion in dry and mountain ecosystem on account of overgrazing. Besides, the consumption of water in the form of irrigation for feed grain production, Washing, cleaning the animals and their sheds as well as use in livestock derived product processing units could generate a crisis for water as the surface and underground water is depleting both quantitatively and qualitatively.

Atmospheric, water and soil pollution are another issues originated through intensification and scaling up of livestock husbandry. Bad unhealthy odour/smell from meat producing and producing units or places is very common event. Various lands of gasses such as carbon dioxide (CO_2), methane (CH_4), ozone (O_3), nitrous oxide (N_2O) and other trace gases (together forming greenhouse gases) affect the world's atmosphere, by contributing to "global warming" or global climate change. Livestock's contribution to that effect is estimated between 5 and 10 percent. Within this range, there are considerable problems in assigning emissions to single causes (Bolle, 1986, 157-203). It is produced as a by-product of the feed digestion of mainly ruminants and, on average, about 6 percent of the feed energy is lost in methane (U.S. Environmental Protection Agency, 1995). Mismanagement and unscientific method of disposal of livestock dung and urine in open space around water sources or near residential areas have also polluted surface water through run off waste mixed water and underground water through percolation of soluble wastes. Colour, odour, and chemical composition of water in many livestock slaughter area and near meat producing units have been observed and experimented.

Methane emission is the direct result of ruminants due to the consumption of large amounts of fibrous grasses and other feeds. This is the most aggressive greenhouse gas (320 times CO_2) contributing to global warming. Methane contributes about 25% of the greenhouse gases in which ruminant alone produce 20% of the methane (Priston 1990, 390-393). It is produced in animal manure which contributes about 0.4 million tons per year, or 7 percent of the total global anthropogenic emissions (Bouwman 1995).

Intensive generation of waste from poultry and swine units is the main polluter of surface and ground water in tropical Asian countries. In these countries particularly in India, Nepal and Pakistan dried dung are used as fuel in rural areas as well as in peri-urban areas which saves number of trees to be used as fuel. The ash produced after burning the dung cake is used as fertilizer in agriculture field. But this practice it contributes significantly in air pollution and much nitrogen goes up in smoke.

One of the most important products of livestock is its leather which is used to manufacture many sophisticated items. It contributes a large share in Indian economy. But the waste from leather production is most hazardous for the soil as well as for water. In leather production hydrogen sulphide and the most toxic component i.e. chromium is used to make the hides resistant to bacteria and temperature which is very dangerous for the water quality, fish and other aquatic life. When this water is applied to the land, the ground water as well as the productivity of soil is badly effected. It is so dangerous that the land may become infertile.

Moreover the revolution in the form of vertical integration and scaling up, the survival of millions of small livestock holders is at stake. Their scale of economy and traditional form of livestock rearing with small capital and limited land capital could not be competitive with large scale capital intensive high-tech oriented multinational companies involved in the same farming system. It may led to soci-economic crisis in developing monsoon countries where landless, marginal and small farmers are found in the largest proportion not less than 90% together.

6. Conclusion

Livestock husbandry in tropical Asian countries developed well with the variation of species and time. Various kinds of livestock species like cattle, buffalo goat, sheep, pigs, hen, etc. are reared as domestic and subsistence animals. All species showed positive growth rate with the exception of sheep and pigs. Livestock are now reared for income generation and serve as long term savings. Goat are reared at households level and needs very less investment and give short term quick output which is act as the semi annual income. While chicken among mono-gastric animal, showed high growth rate because of the large consumption by all the communities in theses tropical countries.

Growth rate of cattle increases with very slow rate. it grew up at 1.32 % per annum during 1991-2001 while during 2001-2007 it was 0.53 %. This is because the giant cattle holding countries like India and China dropped the cattle heads per year. This is also due the high level of mechanization of agriculture, low level of milk production from cows and prohibition of cow slaughter on religious background particularly in India, changing preference of meat.

Buffalo one of the big ruminants contributed a large share in livestock number and showed tremendous improvement in their number in the beginning of 21st century. While goat, the poor's and women's ATM showed amelioration during these two decades due to highly acceptability among all social and religious group in tropical monsoon countries. However swine and sheep have been discouraged and much declined during 2001-2007 on the ground of social, religious and geographical conditions. Moreover, poultry number also showed a tremendous increase during the latter decades. This is attributed to the universal acceptability in all social and religious groups.

Tropical monsoon countries contributed a significant share of livestock products due to increasing demand of the world population. The growth rate of milk increased from 3.36 % to 5.50% during 1991-2001 to 2001-2007. China recorded largest growth rate followed by Myanmar and Thailand due to increasing demand of milk for household consumption and availability of processing units in China.

Cows milk shares the highest growth rate i.e. 9.87% during 2001-2007 as compared to buffalo milk share only 3.63 %. This shows the widely acceptability and rearing of tropical monsoon countries. Similarly, meat also exhibited positive trend of growth during both points of time i.e. 3.90 and 3.85%. But with the exception of some countries it fell down in all the countries. Goat has the highest share of meat production followed by mutton/lamb and poultry due to highly acceptability of goat meat in the entire social and religious group. Thus it is an important source of food security as it provides meat and milk and other dairy products, which enrich the nutrition intake.

However, the Vertical and horizontal structural changes in livestock husbandry occurred in recent decades owing to increasing demand of livestock and their products. It changed from backyard/ household traditional nature of livestock husbandry to an industrial form with rather large size of livestock holding/keeping. Now the concentration of livestock farming and industries have been also shifting from rural to peri-urban and urban areas where demand intensity for livestock derived products is very high. Study reveals that locational shifting has been also very interesting dimension of dynamics of livestock rearing sector. The traditional concept of livestock rearing in dry marginal areas is now shifting towards wet and agriculturally rich area. Thus the limitation of climatic effect to rear the livestock is now not a serious issue.

Moreover, Livestock husbandry is a small scale enterprise which has big potential for providing a gainful employment for rural women in their own household. This is the lone source of additional income for landless and small farmers. In all the countries particularly south Asian countries livestock husbandry has largest potential to flourish the society. Thus the growth in livestock is significant for augmenting income and employment opportunities and alleviates poverty, contributing towards lessening of nutrition related problems, reducing import dependence of livestock products, and as a source of improvement in sustainability of the crop sector through provision of organic manure and draught power as inputs. But this success is achieved at the cost of decline in environment sustainability, ecological suitability, genetic diversity, and the various kinds of potential of diversification of farming systems.

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LIVESTOCK REVOLUTION IN TROPICAL MONSOON COUNTRIES: SOME CHALLENGES AND ISSUES

Summary

Livestock husbandry is one of the important demand driven sector of agriculture in world. It plays a vital role in socio economic development of farmers through the generation of employment and income as well as addition to their food intake. Demand for livestock derived products is increasing on account of increasing population, changing food habits of middle class income groups and swallowing of urban population in developing countries. The paper seeks to understand the pattern of growth of livestock number as well as their products like milk and meat, and to identify the issues and challenges emerged on account of dynamic in livestock husbandry in Monsoon Asian countries.

Livestock husbandry in tropical Asian countries developed well with the variation of species and time. Various kinds of livestock species like cattle, buffalo goat, sheep, pigs, hen, etc. are reared as domestic and subsistence animals. All species showed positive growth rate with the exception of sheep and pigs. Livestock are now reared for income generation and serve as long term savings. Goat are reared at households level and needs very less investment and give short term quick output which is act as the semi-annual income. While chicken among mono-gastric animal, showed high growth rate because of the large consumption by all the communities in theses tropical countries.

Growth rate of cattle increases with very slow rate. it grew up at 1.32 % per annum during 1991-2001 while during 2001-2007 it was 0.53 %. This is because the giant cattle holding countries like India and China dropped the cattle heads per year. This is also due the high level of mechanization of agriculture, low level of milk production from cows and prohibition of cow slaughter on religious background particularly in India, changing preference of meat.

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However, the Vertical and horizontal structural changes in livestock husbandry occurred in recent decades owing to increasing demand of livestock and their products. It changed from backyard/ household traditional nature of livestock husbandry to an industrial form with rather large size of livestock holding/keeping. Now the concentration of livestock farming and industries have been also shifting from rural to peri-urban and urban areas where demand intensity for livestock derived products is very high. Study reveals that locational shifting has been also very interesting dimension of dynamics of livestock rearing sector. The traditional concept of livestock rearing in dry marginal areas is now shifting towards wet and agriculturally rich area. Thus the limitation of climatic effect to rear the livestock is now not a serious issue.

Moreover, Livestock husbandry is a small scale enterprise which has big potential for providing a gainful employment for rural women in their own household. This is the lone source of additional income for landless and small farmers. In all the countries particularly south Asian countries livestock husbandry has largest potential to flourish the society. Thus the growth in livestock is significant for augmenting income and employment opportunities and alleviates poverty, contributing towards lessening of nutrition related problems, reducing import dependence of livestock products, and as a source of improvement in sustainability of the crop sector through provision of organic manure and draught power as inputs. But this success is achieved at the cost of decline in environment sustainability, ecological suitability, genetic diversity, and the various kinds of potential of diversification of farming systems.

THE DEVELOPMENT OF UNEMPLOYMENT IN NUTS II REGION OF EASTERN SLOVAKIA

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Abstract
The development of unemployment in nuts ii region of Eastern Slovakia
Eastern Slovakia belongs to the most undeveloped NUTS II regions of the European Union. This region reaches high level of the unemployment rate, what together with the low production of GDP per capita forms unfavourable living conditions for its inhabitants. This article studies the development of the unemployment rate and the partial structures of unemployment in the region. It identifies key factors which affect the unemployment. It turns the attention to the potential of the region in the fight against the unemployment, from the point of view of its macro-regional and meso-regional position in the European space. It identifies specific subregions within the Eastern Slovakia and analyses its intraregional disparities in the context of labour market stability.

Key words
Eastern Slovakia, unemployment, unemployment rate

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1. Introduction

The Velvet revolution in 1989 has brought big changes for former Czechoslovakia and its successive states. Political and economic systems of central planning were replaced by the market economy. Democratic society has been established. Its characteristic features were the freedom of business and the transition from ineffective state ownership to more effective private ownership. Needs of the labour market have changed. While until 1989 almost everyone was working and the working places were created mainly for people with low education and qualification, after the conversion to the market mechanism, the newly developed working places increasingly required a higher degree of qualification and education. As a result of that, lower educated and qualified labour force from the previous era had immense problems with its assertion on the labour market.

In the time of Slovak republic (SR) formation in 1993, the differences in the unemployment rate between Slovak regions where low. But from that time on, the regions formed on the territory of SR have begun to be characterized by the difference in the unemployment development. On the one hand, there were regions whose unemployment rate grew only very slowly but on the other hand, there were also regions whose rise of unemployment was very rapid. Among such regions is the NUTS II (The Nomenclature of Territorial Units for Statistics) region of Eastern Slovakia, which additionally is also among the regions with the highest unemployment rate within the whole European Union.

In 1996 and 2001 the reorganization of the territorial-administrative division took place in the Slovak republic. Thus in Slovakia (region NUTS I) came into being 4 NUTS II regions, 8 NUTS III regions, 79 LAU I regions (districts) and 2891 LAU II regions (municipalities). 8 so-called self-governing regions with rather significant autonomous powers (e.g. educational system, health service, transportation infrastructure, territorial development, etc.) were created at the level of the NUTS III regions. The NUTS II region Eastern Slovakia consists of two self-governing regions - Prešov region and Košice region.

The Statistical Office of the European Communities (EUROSTAT) monitors and evaluates the regional structure of the European Union particularly on the basis of data from NUTS II statistical regions. As reliable and accessible statistical data exist in the Slovak republic only since 1997, the development of the unemployment rate and the partial structures of unemployment in the Eastern Slovakia will be analyzed only from then on. We will try to find out mutual interconnections that have conditioned the changes in the development of these indicators.

1.1 Methodology

The development of unemployment in the Eastern Slovakia will be analyzed on the grounds of data from Labour, Social Affairs and Family Headquarters concerning the years 1997-2008. The trends in the progress of the unemployment rate will be monitored on the level of NUTS II region i.e. the Eastern Slovakia en bloc. The years during which the trends in the development have changed will be shown in the map and the situation in LAU I regions (districts) will be displayed. We will try to reveal main factors and connections that have influenced the development of the unemployment rate. We will also analyse the changes of the development of the unemployment rate in the districts within the Eastern Slovakia. The difference between the highest and the lowest value of unemployment rate in each district of

the Eastern Slovakia in 1997-2008 will be calculated and drawn in the map. By means of this method we will acquire the information about the stability of regional labour markets in the Eastern Slovakia. We will also outline the development of the partial unemployment structures.

2. The location of the region and its demographic characteristics

Eastern Slovakia with an area of 15 726 km² occupies around 32% of total country's area. 1 600 000 people inhabiting this territory form about 29% of Slovakia's population.

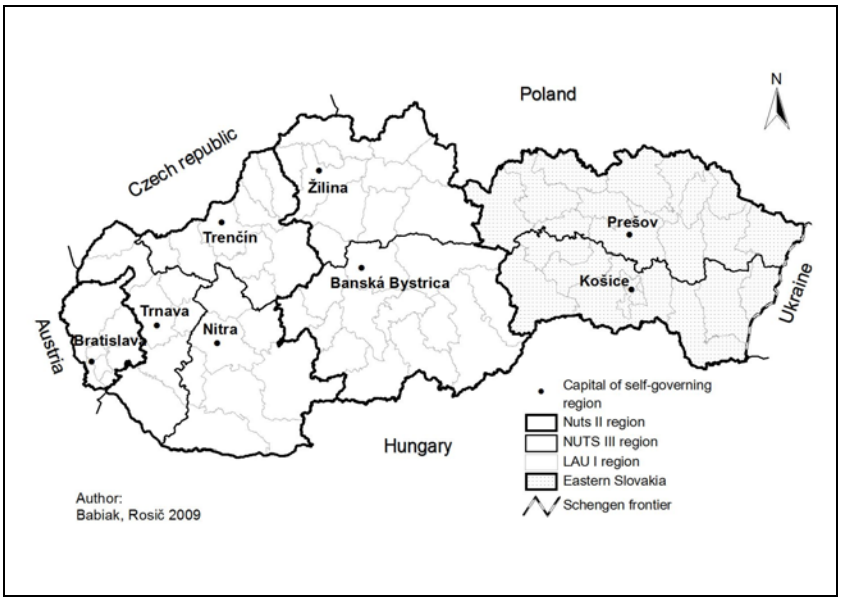

Fig. 1: Location of the Eastern Slovakia

The population is concentrated mostly in the central part of the region (area of Košice and Prešov); peripheral districts (mainly eastern and north-eastern districts) have sparse population and very specific settlement network (very high number of municipalities with very low number of inhabitants). From the total number of 1106 municipalities of the Eastern Slovakia, only 40 of them have town status whereas only 3 of them have over 50 000 inhabitants (Košice, Prešov, Poprad).

The natural increase in the Eastern Slovakia achieved the rate of 3,36 ‰ in 2008, what was highly over the average level of SR (0,78 ‰). High natural increase rate in certain districts of the Eastern Slovakia closely correlates with the ethnic structure of population. High natural increase is produced mostly by the gypsy community (that is related especially to the districts of Kežmarok, Stará Ľubovňa, Sabinov, Levoča, Spišská Nová Ves etc.). Due to high proportion of gypsy communities (distinguished by very specific demographic behaviour, which is characterised by extremely high natural increase) in the total number of population, not only the above mentioned districts but also the whole area of Eastern Slovakia have become the population epicentres of SR.

The situation in the field of the net migration is much different. Eastern Slovakia is markedly depopulating region with a net migration decrease of -1,19 ‰ in 2008. The most critical situation is in the north-eastern and eastern districts that recorded the highest net migration decreases (globally highest net migration decrease was in the city districts of Košice but the fact is conditioned by the suburbanization tendencies, when the population of the city moves into its suburbs). Districts like Svidník (-4,53‰), Stará Ľubovňa (-4,43 ‰) and Snina (-3,27 ‰) achieved the highest net migration. The reasons for the migration loss in the north-eastern districts are mainly poor socioeconomic conditions. From the aspect of net migration, the only progressive district of the Eastern Slovakia is the district of Košice-okolie (5,74 ‰). Dominant factor of its progress is the process of suburbanisation. Very negative phenomenon which was attacking the Eastern Slovakia for several years is the emigration of the qualified labour forces. The majority of emigrating labour forces are predominantly young and educated people.

In 2008, total population movement in the Eastern Slovakia reached the level of 2,17 ‰, what was over the average of SR (2,08 ‰). The reason of this state was mainly a noticeable natural increase of population. In 2008, the highest total increase was achieved in the districts of Kežmarok (10,49 ‰), Košice-okolie (9,78‰) and Levoča (6,70‰). In the same year, the highest total decrease of population was noticed in the districts of Medzilaborce (-5,36 ‰), Košice III (-4,65 ‰) and Košice I (-4,54 ‰).

The structure of population by educational attainment in the Eastern Slovakia is slightly unfavourable in comparison with the national average (according to the Population Census, 2001). In 2001, people with university education formed 8,8% of the total number of inhabitants of the Eastern Slovakia (in SR it was 9,8%); and people with elementary education formed 21,9% (21,5% in SR). What is very remarkable is the correlation between the high proportion of inhabitants with elementary education and the high proportion of inhabitants of gypsy nationality in the individual districts of the Eastern Slovakia.

2.1 The location of the region in the context of meso-regional and macro-regional relations of European space

NUTS II region of the Eastern Slovakia which does not even reach 50% of the average GDP per capita of EU-27 (in purchasing power parity) belongs to themost underdeveloped regions of the European Union. Its location is unfavourable in comparison with the developed centres of Europe that are far away from the region. It is directly joined to other least developed regions of the European Union, with which they together create continuous belt on EU's eastern border. From that point of view, we can only hardly expect an important forwarding stimulus that would come from the surrounding regions and would "start up" the Eastern Slovakia on the way of its more decisive socioeconomic development.

In the terms of economic power, Eastern Slovakia has until recently belonged to the completely weakest regions of the European Union. Its position has been relatively improved after the entry of Bulgaria and Romania into the EU. Their regions are economically even weaker. According to the unemployment indicator, Eastern Slovakia also belongs to the worst regions of the EU.

One of the distinctive problems of the European Union is the problem of regional disparities. The differences in basic economic indicators (GDP per capita,

employment, unemployment) mention 2 tendencies, namely the west-eastern gradient of poverty i.e. "the eastern the poorer" or more precisely - less economically developed; and peripheral poverty i.e. regions that are more remote from the economic centre of the country show lower quality of socioeconomic development. Great differences are also in the development of the regional disparities within the individual countries. While in new EU countries (12) the regional disparities tend to increase (mostly in Bulgaria, Slovakia and Hungary), in the countries of "old" EU (15) the differences between their regions decrease (see e.g. Eurostat Regional Yearbook).

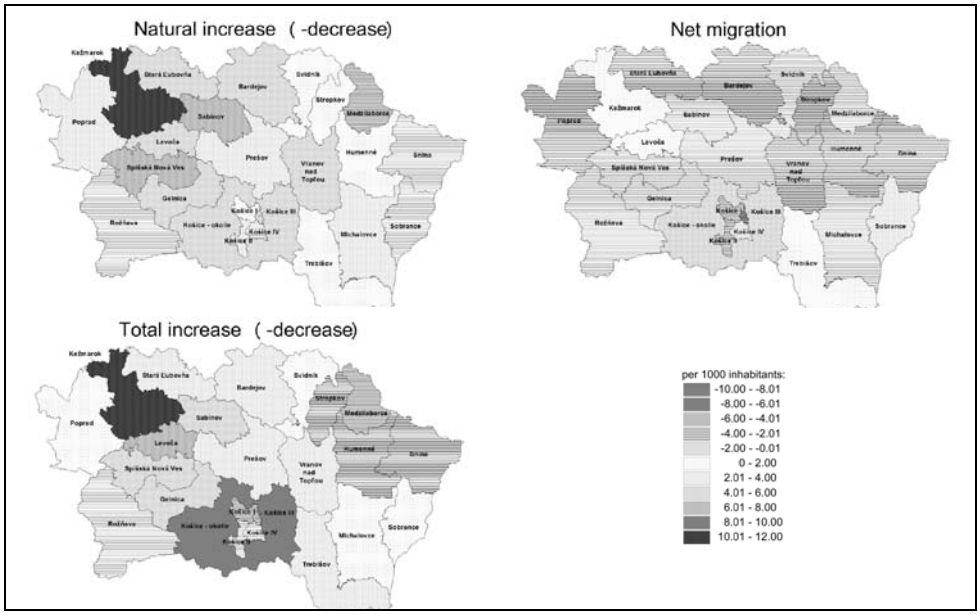

Fig. 2: Demographic characteristics of the Eastern Slovakia (2008).
Source: Statistical Office of the Slovak Republic.

Positive fact for the unemployment in the Eastern Slovakia was its entry (and the entry of the other countries) into the Schengen Area in 2007. Eastern Slovakia opened its northern (with Poland) and southern borders (with Hungary). This fact helps to establish contacts and co-operation on the meso-regional level with southern Polish regions or eventually with northern regions of Hungary. Thus the entry of the region into the Schengen Area - so far in minor sense but still - contributes to reduction of the unemployment in the Eastern Slovakia, since it supports the mobility of labour forces and capital on the both sides of the border.

Tab. 1: NUTS II regions of Europe by macroeconomic indicators (2006).

GDP per capita in PPS[2] EU27 = 100%		Unemployment rate[3] (%)	
1. Inner London (UK[1])	335,9	1. Agder og Rogaland (NO)	1,9
2. Luxembourg (LU)	267,1	2. Zeeland (NL)	2,1
3. Région de Bruxelles (BE)	233,3	3. Vestlandet (NO)	2,3
4. Hamburg (DE)	199,7	4. Praha (CZ)	2,4
5. Groningen (NL)	173,7	5. Oslo og Akershus (NO)	2,5
19. Bratislava region	148,7	57. Bratislava region	4,3
228.Western Slovakia	62,8	174. Western Slovakia	7,8
243.Central Slovakia	49,2	259. Eastern Slovakia	14,9
252.Eastern Slovakia	44,0	261. Central Slovakia	15,3
271.Poranesna Jugoslovenska Republika Makedonija (MK)	29,4	262. Sachsen-Anhalt (DE)	15,7
272.Yuzhen Tsentralen (BG)	27,8	263. Berlin (DE)	16,3
273.Severen Tsentralen (BG)	26,9	264. Région de Bruxelles (BE)	17,1
274.Severozapaden (BG)	25,4	265. Leipzig (DE)	17,2
275.Nord-Est (RO)	24,7	266. Mecklenburg-Vorpommern (DE)	17,4

1.-BE-Belgium, BG-Bulgaria, CZ-Czech republic, DE-Germany, LU-Luxembourg, MK-Macedonia, NL-Netherlands, NO-Norway, RO-Romania, UK-United Kingdom.

2.-275 regions with available data are compared (EU + Croatia and Macedonia).

3.-272 regions with available data are compared (EU except Slovenia and Denmark, but +Croatia and Norway). The regions with the highest unemployment rate are 4 French overseas departements (Reunion, Guadeloupe, Martinique, Guyane) and 2 Spanish autonomous regions (Ceuta, Mellila).

Source: Eurostat, 2009.

3. The development of unemployment rate

During the whole monitored period 1997-2008 the unemployment rate in the Eastern Slovakia was over the Slovakian average (Fig. 3). The trends of the unemployment rate development were the same on both levels; the differences were only in the intensity of the phenomenon. Years 1997-1999 were characterized by the marked increase in the unemployment rate. In 2000 and 2001, the unemployment rate on both monitored levels decreased but it consequently increased; and in 2002 the period of its continual and considerable regress has started. The period of the constant reduction of the unemployment rate lasted until 2008, when the consequences of the economic crisis became more apparent.

The situation within the districts of Eastern Slovakia was much different. In this region we can observe relatively distinctive intraregional disparities in economic efficiency among individual districts what was as well displayed at the high level of the unemployment rate that was demonstrated in each district during the whole period of monitored time. On the one hand, there were distinctively problematic districts that achieved highest accounts of the unemployment rate within all districts of the Eastern Slovakia during the monitored period. On the other hand, there were districts that during the whole period belonged to the group of with the lowest unemployment rate.

In 1997, the code of the National Council of the Slovak Republic (further only NC SR) No. 387/1996 of the Collection of Laws on unemployment has came into effect. This law “for the first time completely defines the targets of the employment politics and establishes the Labour, Social Affairs and Family Headquarters for its execution” (Gerbery 2007). In the beginning of the monitored period (1997), the unemployment rate in the Eastern Slovakia was at the level of 18,60%. In SR, the unemployment rate reached the limit of 13,37%. The unemployment rate in individual districts of Eastern Slovakia was very different and it moved in the

interval from 10,33% in the district of Košice IV to 26,85% in the district of Vranov nad Topľou.

Rapid increase of the unemployment rate was noticed in 1998. In the Eastern Slovakia it increased to 22,43%, in SR to 16,43%. Concerning individual districts, Košice I district reached the lowest value of the unemployment rate (12,54%); the highest value was in the district of Vranov nad Topľou (31,06%). Very fast increase of the unemployment rate continued also in 1999 (Fig.3). In this year, the unemployment in the Eastern Slovakia reached its historical maximum (27,15%), what was by 7,05% more than in SR (20,10%). Also the majority of Eastern Slovakia's districts reached their maximums in this year. In 1999, the absolutely highest unemployment rate was reached in the districts of Trebišov (35,21%), Sobrance (34,45%) and Rožňava (34,11%). In the same year these three districts also achieved the highest annual growth of the unemployment rate at the level of approximately 7,50%. The lowest unemployment rate achieved the districts of Košice II (16,05%), Košice I (16,13%) and Košice IV (17,41%). The rise of the unemployment during 1997-1999 is connected with significant displays of macro-economic unbalance and also with a total decrease of productivity of the Slovak economy, what in consequence meant that more and more people lost their jobs. These factors have activated a demand for stabilization of the Slovak economy. It should stop the negative trend of development and create conditions for subsequent economic increase.

Year 1998 was a distinctive milestone for the unemployment development. The election to the National Council of SR took place as well as the replacement of the previous government. New government, being conscious of the disagreeableness of the macro-economical development, entered the way of courageous economic and social reforms, whose far-reaching implications were manifested in later years.

In 2000, after many years of increase, the unemployment rate decreased. Unfortunately, the rate was not reduced because of the unemployed's integration into the labour market (in the sense of their full-time employment). The establishment of so-called public-benefit services performed by the unemployed citizens had the greatest influence on the decrease of the unemployment. It meant that a selected group of the unemployed had to carry out some compulsory work – several hours per month, for a municipality within which they were living. The sort of work was ordered by the municipality and it was done for the public purposes. Those unemployed, who practiced this kind of work, were for the statistical purposes not registered as unemployed people. Such step taken by the government was indeed contradictory. It was welcomed by municipalities which thus have gained free labour forces for some kind of work; and the performance of such work was positive for the unemployed citizens in the sense of keeping their working habits. But on the other hand, this regulation did not solve the real unemployment because the unemployment rate was reduced only formally.

The unemployment rate in the Eastern Slovakia dropped in 2000 to the level of 24,32%, in SR it was 18,80%. In 2001, after the cancellation of the public-benefit services for municipality, the unemployment rate in the Eastern Slovakia once again increased to 26%. The rate in SR has also increased and its height oscillated under 20% level. The highest unemployment rate of all districts of the Eastern Slovakia was registered in the districts of Trebišov, Rožňava and Michalovce; the lowest was in the city districts of Košice.

In 2002, the change of the trend in the development of unemployment has begun. Slovak economy was stabilized. It was caused by the government, which made some unpopular restrictive actions and economic reforms. The government thereby created convenient conditions for entrepreneurship; the position of the country in the eyes of the foreign countries was improved and the flow of the foreign investments that meant the creation of new working places has started. Since then, the unemployment rate in SR as well as in the Eastern Slovakia and all its districts has begun to decrease.

In the first year of the continual year-by-year unemployment's s decrease i.e. in 2002, the typical feature of the macro-economic development in SR was the stagnation of employment. It can be assumed that the diminution of the unemployment in this year was probably in a high degree caused by moves of one part of the unemployed people off the labour market (to retirement, outside the Slovak labour market, etc…). The unemployment rate in the Eastern Slovakia dropped in 2002 to the level of 25,15%, in SR it decreased to 18,64%. The highest rank of the unemployment was reported from the districts of Sobrance, Rožňava and Kežmarok (all of them over the level of 33%).

The favourable trend continued in 2003 as well. Besides the constantly advantageous economic situation, the effect of the Law on the unemployment also influenced the decrease of the unemployment. According to the law, registered unemployed citizens were required to report the results of the search for their job on the Labour, Social Affairs and Family offices every 14 days (they had to bring the acknowledgement from particular employer about their aspiration for the job; they had to bring a stamp from the employer). Already mentioned act also meant the rejection of some candidates for employment from the evidence. Rejected citizens were not active in the search for the job, relying only upon the Labour, Social Affairs and Family Offices (or they were registered there only for the social benefits). This is partially acknowledged by the fact that the highest decrease of the unemployment rate was in the districts with the highest share of gypsy communities. These communities are famous for the exploitation of social benefits (it is connected especially with the districts of Kežmarok, Vranov nad Topľou, Sabinov, Bardejov, Trebišov). In this year the absolutely highest unemployment rate was achieved in the districts of Sobrance, Rožňava and Trebišov; the lowest unemployment besides the city districts of Košice was also in the districts of Poprad and Stará Ľubovňa (Fig.3). The unemployment rate in the Eastern Slovakia dropped in 2003 to 22,95%, in SR it dropped to 17,04%.

Year 2004 was very important for the next development of the unemployment rate. Code which verified a tax reform in SR is in force since 1.1.2004. So-called "equal tax" was established. This fact markedly improved business environment in the country and motivated individual subjects to enterprise and thereby to create new working places. The realization of the tax reform has had a substantial effect on the inflow of the important foreign investments which supported the creation of new working places in SR. Another important change which has influenced the decrease of the unemployment rate was the Code No .5/2004 Collection of Laws on the employment services. This law has also meant the establishment of extensive arrangements within the active labour market policy, most used of which has become so-called absolvent practice. These steps were contributing for both - an employer as well as for an absolvent. In May 2004, an important event happened. It

was the entry of the Slovak republic into the European Union. For SR it meant an outflow of one part of the labour forces abroad, especially into the countries that have opened their labour markets for the new coming countries (Great Britain, Ireland, Sweden). Large part of the labour force which left the country was particularly from the Eastern Slovakia. On one hand, the outflow of the labour forces was from the reduction of the unemployment rate point of view a positive factor. On the other hand, a large portion in the structure of emigrants was formed by young and educated people, whose involvement in Slovak labour market would be much more beneficial for Slovak economic as well as for the development of the Eastern Slovakia.

In 2004 the unemployment rate in the Eastern Slovakia decreased to the level of 20,41% and in SR to 14,63%. Within the districts of Eastern Slovakia, the highest unemployment rate proved the districts of Kežmarok (27,98%), Trebišov (27,79%) and Rožňava (27,68%). The lowest unemployment rate was traditionally in the urban districts of Košice and in the districts of Stará Ľubovňa and Poprad. Considerable decrease of the unemployment rate has continued also in 2005 and 2006. Creation of new working places was constantly progressing, the economics recorded high development and the unemployment in all districts of the Eastern Slovakia decreased. Most significant drop of the unemployment rate in the period of 2005-2006 was achieved in the districts of Snina, Medzilaborce, Stropkov, Sobrance (unemployment rate reduction was here influenced not only by the creation of new working places but also by the high level of work emigration) and the district of Poprad (the important role had the expansion of the biggest concerns of the machine industry, electrical engineering and chemical industry to the district and the arrival of another important investors – as mainly the city of Poprad itself has high investment potential due to its attractive location at the foot of the High Tatras mountains and its developed infrastructure). At the end of 2006, the districts of Trebišov (24,07%), Kežmarok (24,04%) and Rožňava (23,15%) reported the absolutely highest unemployment rate.

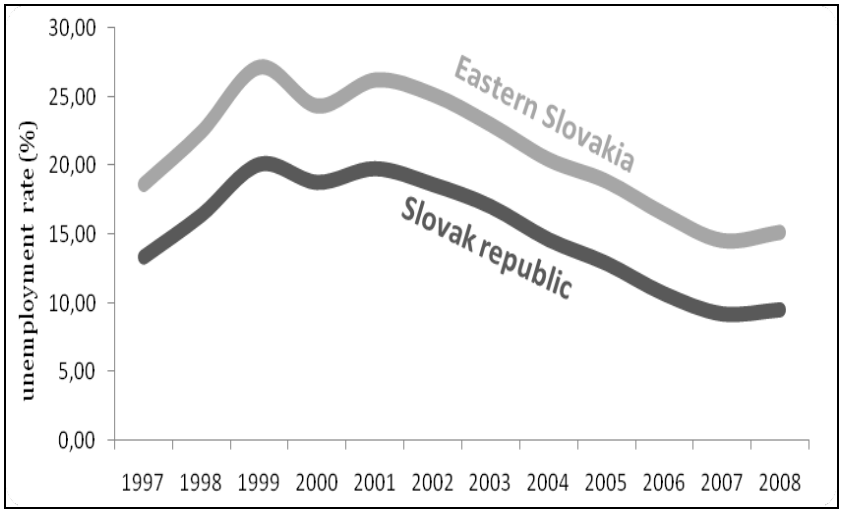

Fig.3: Unemployment rate development in 1997-2008 (as of 31.12.).
Source: Labour, Social Affairs and Family Headquarters.

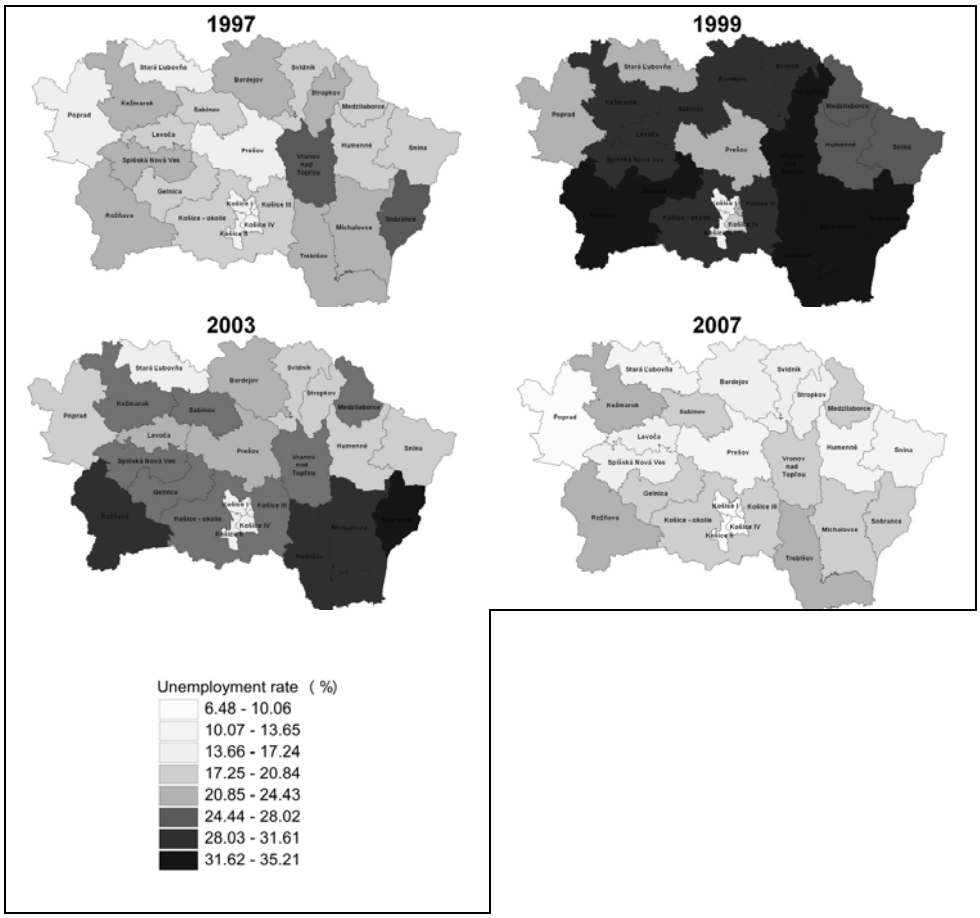

Fig. 4: Unemployment rate in the districts of the Eastern Slovakia.
Source: Labour, Social Affairs and Family Headquarters.

The lowest unemployment rate within the whole monitored period was in SR and in the Eastern Slovakia in 2007 (Fig.3). In SR as a whole the unemployment rate dropped for the first time under the level of 10% (to 9,23%) and in the Eastern Slovakia under the level of 15% (to 14,50%). The highest unemployment rate in 2007 was again in the districts of Rožňava (21,69%), Trebišov (21,12%) and Kežmarok (21,12%). The city districts of Košice and the district of Poprad achieved the lowest unemployment rate (under 10%).

Year 2008 meant the end of favourable period of the economic development and the decrease of the unemployment rate in the SR. The reason was the crisis which overgrew from the financial sector in USA to the worldwide economic crisis. The productivity of Slovak economy has begun to fall rapidly and the regress of the production in companies has started, what resulted in the increase of the number of unemployed citizens. In 2008, the unemployment rate jumped in Eastern Slovakia by 0,6% to the level of 15,10%, in SR it increased by about 0,3% to the level of 9,53%. The ranking of Eastern Slovakia's districts with regard to the height of the

unemployment rate remained the same; the lowest unemployment was still achieved in the urban parts of Košice and the district of Poprad; the highest unemployment was in the districts of Rožňava, Trebišov and Kežmarok.

4. Intraregional structure of Eastern Slovakia in the context of intensity of changes in the unemployment rate

In general, socioeconomically developed regions (usually with low unemployment rate but it is not a rule, see region Brussel and other) with diversified economic base usually have lower intensity of changes in the unemployment rate that use to change only very slowly in the period of time (it either rises or falls). On the other hand, relatively high intensity of changes in the unemployment rate that either rises or falls is the characteristic feature of the less developed regions. In such regions usually dominates so-called secondary labour market, where the working places are of lower status and of lower wage scale. The qualification demands on the employees are here much lower than on the employees in so-called primary labour market. There is only a small possibility of the further increase in qualification and career development, whereby the working places are typically less stable. On the other hand, in comparison with the primary labour market, the acquirement of new working posts on the secondary labour market is much easier. For these reasons, there is much greater fluctuation of employees within the secondary labour market than within the primary one and the regions where secondary labour market prevails, usually record big changes in unemployment rate throughout the time.

There are noticeable socioeconomic differences not only between the western and eastern part of Slovakia, but also between the individual districts of Eastern Slovakia as well. Within Slovakia so-called west-eastern gradient (the more eastern the less economically developed) and so-called peripheral marginality (peripheral regions are less developed) can be seen. One of the proofs is the different level and development of the unemployment rate in these districts. The indicator of changes in the unemployment rate (it is the difference between the highest and the lowest unemployment rate in a given district within the period 1997-2008; Fig.5) points to the narrow meso-regional connections between the individual districts of the Eastern Slovakia.

As seen in the Fig. 5, the area of the Eastern Slovakia can be - from the intensity of changes in unemployment rate viewpoint - divided into two parts: western and eastern. The boundary between these parts presents the eastern frontier of the districts of Stará Ľubovňa, Sabinov, Prešov and Košice-okolie. The western part of the divided area has had in general lower intensity of changes in the unemployment rate than the eastern part (the lighter shade predominates here). If we enlarge the scale of our research, than within the districts of eastern and wetern part we can also see some territorially compact subregions with similar intensity of changes in the unemployment rate during the monitored period 1997-2008.

The most intensive changes in the unemployment rate in the given period showed the compact belt of districts near north-eastern Slovakian frontier. This line begins with the district of Bardejov and ends with Sobrance district (the exception was the district of Medzilaborce, where the intensity of changes was lower). The reason for this case was probably the fact that this district has a very small population. Seeing that this district has a lack of working opportunities, the majority of population works outside the district, predominantly in the environs of Bratislava and in Czech

republic where they have fixed employment. Another large part of the population from the district works in the public sector [education, health services, social services, authorities of the state administration, etc…]. In contrast with the private sector, higher stability of working places is typical for the public sector, thus inhabitants of these regions have relatively stable employment. (For that reason, the changes in unemployment rate were less intensive in the district of Medzilaborce during the period of years 1997-2008 than in the neighbouring districts). The districts of north-eastern Slovakia have very similar physiogeographical and socio-economical features. From the vertical segmentation point of view, the dominant elements of land structure in this subregion are uplands (except from the district of Sobrance, where lowlands prevail). Those uplands are characteristic for the great number of small villages, with weakly developed infrastructure, what does not create favourable conditions for their development. Working places are less stable (agriculture, forestry). Some of the industrial factories which were dominant employers in the subregion for a long time have serious problems (or they have already crashed). At the same time new factories were established. They were predominantly joined with the automobile industry. Together with the economic depression in automobile industry, the crisis in the new established corporations (but not only in them) has come. So big fluctuation of the labour forces arose and the intensity of changes in the unemployment rate in this subregion during the whole evaluated period was very high.

The next regional configuration with similar development was created by the triplet of districts: Vranov nad Topľou, Trebišov and Michalovce. Relatively large changes in this region were influenced by various factors. The whole subregion is located in the East-Slovak lowland. Majority of population of this subregion is working in the fields which are connected with agriculture (either in the agriculture itself or in industrial sectors that are connected with agriculture). Gradually, with the crisis in agriculture (which was characteristic for the whole SR not only for this subregion) the problems also in these fields started and people were losing their jobs. Another reason for the increase of the unemployment rate is the ethnic structure of the population. The large gypsy community is typical mostly for the districts of Vranov nad Topľou and Trebišov. The community has also extraordinary natural increase. Seeing that Gypsies are so-called "unemployable", they constantly affect the rise of the number of the unemployed people. On the other hand, particularly during the years 2002-2007 considerable reduction of the unemployment took place in this subregion, what was in concord with the trend prevailing in the whole SR. In such ways, relatively big changes occurred in the unemployment rate within this subregion.

The western part of NUTS II region Eastern Slovakia had more steady development in the unemployment rate than the eastern part during the period of years 1997-2008. The lowest variation in the unemployment rate achieved the city districts of Košice (the only exception was the district of Košice III, where very distinctive increase of the unemployment rate occurred during the years 1997-2000 in comparison with the other city districts of Košice. Since 2001, the rate of the unemployment began to fall and in these days it is again at the level of the other city districts of Košice) which have the most diversified economic structure and which show the absolutely lowest unemployment rate within the scope of the districts in Eastern Slovakia.

As Fig. 5 shows, in the western part of Eastern Slovakian region, the territorially compact subregion with rather high intensity of changes in unemployment can be

seen. It consists of the districts of Levoča, Spišská Nová Ves and Gelnica. This subregion is mountainous; the quality of transportation infrastructure is low (on the other hand, main Slovak railway and road line run through the subregion and nowadays the highway is built). Important feature of the region is the high share of gypsy population (with their demographically and socioeconomically specifics mentioned above). During the period of Slovak economy decline and subsequent stagnation (until 2002), the unemployment rate in this subregion grew very quickly, and vice-versa, since 2002 it has dropped rapidly. As the economic base of the subregion was not much diversified and rather unstable, later on in connection with educational and qualification structure of the population, only the less stable working places were created and thus the intensity of unemployment rate changes in 1997-2008 became high.

5. Partial structures of unemployment in Eastern Slovakia

The structure of unemployment by sex was very variable with alternating dominance of males or females throughout 1997-2008 period. Approximately until 1999, the Slovak economy had immense problems. The biggest problems had the branches which employed mostly men (especially armaments and mechanical engineering industry). For the given reason, the participation of men in the unemployment by sex was rising (in 1999, the ratio of unemployed men to unemployed women in Eastern Slovakia was 58:42). Since 1999, the economic situation was stabilized and after the implementation of the reforms, the economic development of Slovakia has fully started. In connection with these reforms, foreign investments began to flow; however, they created large number of new working places mostly for men (predominantly in automobile industry and other branches of engineering industry and related subcontract branches). The result of this process was relatively noticeable increase in the unemployed of women in the structure of the unemployed by sex. The next important phenomenon was the collapse of textile industry in Slovakia in recent years. By 2007, the ratio of unemployed men to women in Eastern Slovakia has changed and at the end of the year it moved at the level of around 45:55.

The development of the unemployment by age structure (according to regular 5-years age groups) in the Eastern Slovakia in years 1997-2008, is characterised by the gradual fall of the share of the youngest age groups (up to 19 years old and between 20-24 years old), and y the maintenance of the constant share of mid-class age groups (25-44 years old) and by the growth of the share of oldest age groups (45 years old and more). The participation of individual age groups in the unemployment rate in 2007 was following: the youngest age groups - 17% (two 5-year age groups), the middle age groups - 12% (4 groups) and the oldest age groups - 6% (3 groups). By the year 2008 the ratio of the age groups became balanced, with each group maintaining the ratio of around 12% (expect of the age group up to 19 years old, which has around 2% share).

From the perspective of the unemployment structure according to duration of the unemployed's registration, the distinctive problem for Slovakia is the long-term unemployment (unemployment lasting longer than 12 months). The share of long-term unemployed was continuously rising during the period 1997-2006 (from 40% in 1997 to 57% in 2006). The change of this trend happened in 2007, when the long-term unemployment decreased (to 55%). It was connected with the favourable conditions on the labour market, especially with good labour market policy. In 2008

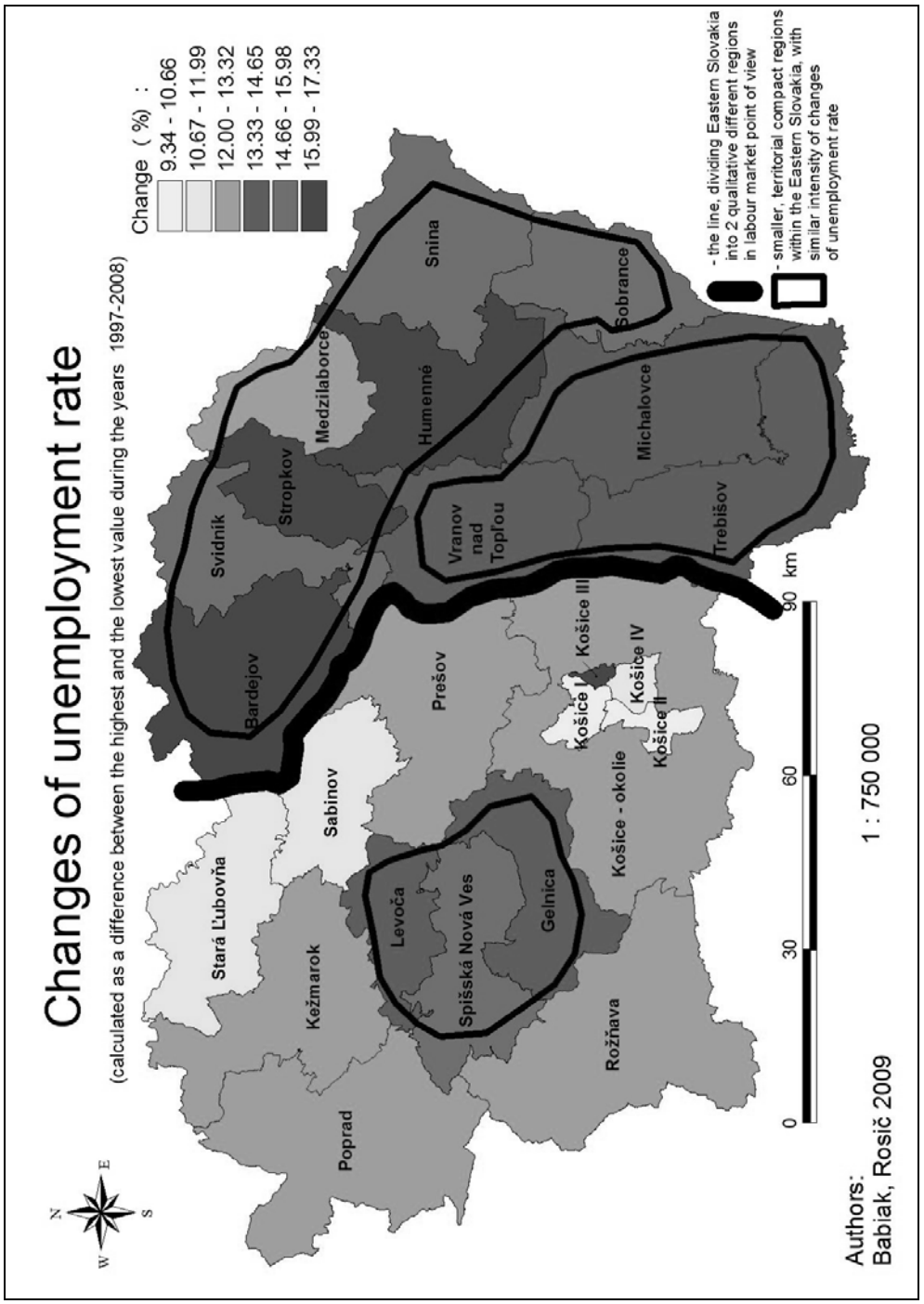

Fig. 5: Changes of unemployment rate in the years 1997-2008.

happened another, this time considerable drop in the long-term unemployed share, from 55% in 2007 to 48% in 2008. This marked decrease of long-term unemployment was not caused by increased employment on the labour market, but by the statistical effect when relatively short-term and mid-term unemployment increased, what was caused by massive redundancies on the grounds of the economic crisis.

In the structure of the unemployment by education attainment, the unemployed with elementary education dominated in Eastern Slovakia. They formed about 40% portion of the unemployment. The unemployed with secondary school education (either with GCE or not) formed 55%, the university educated population created 5% share.

6. Conclusion

Eastern Slovakia has the second highest unemployment rate in the Slovak republic. It belongs to NUTS II regions with the highest unemployment rate in the whole European Union. In spite of the fact that the region achieves favourable values of natural and total movement we assume that its demographical potential is low. Although it records quantitative increase of population, its quality as a consequence of emigration of young and educated people rather degrades.

The location of Eastern Slovakia in the context of EU regional structure is very disadvantageous. Eastern Slovakia is situated in the centre of the poorest and the most backwards macro-region of the EU which is located at its eastern frontier (this macro-region extends along the whole eastern frontier of the EU from the Baltic States on the north to Bulgaria and several north-eastern regions of Greece to the south). From that aspect, we can only hardly expect some positive development stimulus from the neighbouring NUTS II regions, which would reduce the unemployment rate in the Eastern Slovakia.

The analysis of the unemployment rate changes at the level of LAU I regions refers to heterogeneous regional structure of Eastern Slovakia as a whole. There are compact regional configurations of problematic districts within the Eastern Slovakia with similar economic base and unemployment problems.

If we resume all the factors that have favourably affected the changes of the unemployment rate and the changes of partial structures of the unemployment in Eastern Slovakia, we will find out that almost all these factors belonged to the macro economical arrangements and to the steps which were accepted at the level of SR as a whole. The factors which affect the reduction of unemployment that would go out from the endogenous activities of NUTS III regions (self-governing regions of Prešov and Košice) or some subregions are represented only in very limited extent. It points either at the insufficient endogenous activity, or at the external factors that go beyond the reach and influence of the decision-making authorities of NUTS III self-governing regions (region NUTS II Eastern Slovakia as such, in spite of the fact that it represents a basic comparative unit of the regional structure of the EU; in the law system of the SR, it does not have any decision powers nor even the competencies and authorities which would control its development as a whole; it is only clearly statistical unit, its endogenous development policy could by realized only on the basis of the coordination of the endogenous development policies of the Prešov and Košice self-governing regions).

Among these external factors are e.g. regional policy of the country, infrastructure building policy of over regional or European importance, the policy of the state grants and money distribution from the eurofunds but also the unattractive location potential of the individual regions for the input of the investments etc.

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THE DEVELOPMENT OF UNEMPLOYMENT IN NUTS II REGION OF EASTERN SLOVAKIA

Summary

NUTS II region of the Eastern Slovakia belongs in terms of macro-economic indicators to the least developed regions of the European Union. Compared to the other EU regions, it reaches not only very low GDP per capita (in purchasing power standards), but also very high unemployment rate. Eastern Slovakia is largely a rural region. From the total number of 1106 municipalities of this region, there are only 40 towns. Moreover, only 3 of them have more than 50 000 inhabitants (Košice, Prešov, Poprad). The core area of the region from the concentration of inhabitants and economic activities point of view is Košice - Prešov agglomeration.
Demographic potential of the Eastern Slovakia from the aspect of employability of its population is at least, comparing to the other Slovak NUTS II regions, rather low and becomes worse. Such negative trend is supported by two simultaneously running processes: on the one hand, the Eastern Slovakia records a negative net migration. In the structure of emigrants young and educated people who cannot find jobs on a local labour market predominate. On the other hand, although the Eastern Slovakia records very high annual natural increase, the biggest share of which is created by the Roma people, who as a whole are characterized by extremely low level of education and very high share of long-term unemployment. Therefore, potential of the Eastern Slovakia's population for integration on a labour market develops negatively.

Very disadvantageous is location of the Eastern Slovakia in the context of distribution of core economic areas of Europe. This NUTS II region is integral part of a large (and in terms of macroeconomic indicators such as GDP per capita and unemployment rate most underdeveloped) macro-region, lying on the eastern frontier of the European Union.

The development of unemployment rate in the Eastern Slovakia is due to the reorganization of the territorial-administrative division of the country in 1996 and to the existence of reliable and accessible statistical data only from 1997 on, analyzed for the period of 1997-2008. During the whole monitored period 1997-2008 the unemployment rate in the Eastern Slovakia was over the Slovak average. This period can be from the aspect of developmental trends of unemployment rate divided into two sub-periods: first sub-period (1997-2001), characterized by an increase of unemployment rate, and second sub-period (2002-2007), characterized by massive decrease of unemployment rate.

The rise of the unemployment during the first sub-period is connected with significant displays of macro-economic unbalance and also with a total decrease of productivity of the Slovak economy, what in consequence meant that more and more people lost their jobs. This negative trend was characteristic for the Slovak economy during the whole 1990's and was linked with its transition. Such processes have activated a demand for stabilization of the Slovak economy, what should cease the negative trend of development and create conditions for subsequent economic increase.

A distinctive milestone for the development of unemployment rate was year 1998, when the election to the National Council of Slovak republic took place and the previous government was replaced. New government, being conscious of the

disagreeableness of the macro-economical development, entered the way of courageous economic and social reforms. However, far-reaching implications of those reforms were manifested only in later years and unemployment rate continued to rise until 2001. Relatively marked annual decrease of unemployment rate in Eastern Slovakia was in 2000. This was, however, not a result of employing of the unemployed, but of the establishment of so-called public-benefit services, which lowered the unemployment rate only artificially.

The change of the trend in the development of unemployment in both Slovak republic and Eastern Slovakia has begun in 2002. Slovak economy was stabilized. The government made some unpopular restrictive actions and economic reforms and thereby created convenient conditions for entrepreneurship; the position of the country in the eyes of the foreign countries was improved and the flow of the foreign investments that meant the creation of new working places has started. Since then, the unemployment rate in Slovak republic as well as in Eastern Slovakia and all its districts has begun to decrease.

The marked decrease of unemployment rate in sub-period 2002-2007 was influenced by many factors. To a large extent it was a consequence of positive development of global economy, what meant a massive inflow of foreign direct investments into the Slovak economy, creation of new working opportunities and guaranty of satisfactory demand for the Slovak exporters. But this massive inflow of FDI was caused by many liberal reforms in Slovak economy, from which probably the most significant was establishment of the flat tax system. The Law on the unemployment has also changed and extensive arrangements within the active labour market policy were established. Year 2008 meant the end of favourable period of the economic development and the decrease of the unemployment rate in the Slovak republic. (Not only) Eastern Slovakia was hit by the economic crisis and the unemployment rate has begun to rise.

Intraregional structure of the Eastern Slovakia in the context of intensity of changes in the unemployment rate of its districts (LAU I regions) is heterogeneous. In the sub-periods of increase (1997-2001) and decrease (2002-2007) of unemployment rate, the region of the Eastern Slovakia as a whole did not develop harmoniously. It means that unemployment rate of particular districts of the Eastern Slovakia did not rise and fall with more or less balanced speed but that there were formed some territorially compact subregions with similar intensity of changes in the unemployment rate during the monitored period 1997-2008.

OSVETLJEVANJE KOT PREDMET GEOGRAFSKEGA SPOZNAVANJA MEST (NA PRIMERU KOPRA)

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Izvleček

Osvetljevanje kot predmet geografskega spoznavanja mest (na primeru Kopra)

Prispevek govori o osvetljevanju mesta in geografski interpretaciji tega pojava. Oblikovanje nočne podobe mesta je pomemben del mestnega imidža. Geografski pristop k spoznavanju tega pojava se omejuje na vprašanja zakaj se osvetljuje, kako je osvetljeno in kdo osvetljuje. Spoznavanje osvetlitve je prikazano na primeru Kopra.

Ključne besede

svetloba, osvetljevanje, urbana geografija, Koper

Abstract

Lightening of the city as a subject of geographical research (case study of Koper)

The paper deals with the illumination of the city and the geographical interpretation of this occurrence. The lit-at-night aspect of a city plays an important role in creating its image. A geographical interpretation of the city illumination thus focuses on three issues: why to illuminate, how to illuminate and who illuminates. This paper offers a discussion about the light and illumination of the city of Koper.

Key words

Ligth, lightening, urban geography, Koper

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1. Uvod - opredelitev teme in namen

Osvetljevanje mesta pomeni oblikovanje njegove nočne podobe, sredstvo za to sta svetloba in svetilo. Življenje v velikih mestih se ne ustavi z nočjo, nasprotno, v določenih predelih se celo intenzivira, zato postaja nočna podoba naselij enako pomembna kot dnevna. Dojemanje okolja se prav tako ne konča s sončnim zatonom - tehnološke možnosti ustvarjanja umetne svetlobe povzročajo nenehno izpostavljenost sporočilom iz okolja. Kot pravi Urry: "Živimo v družbi spektaklov, kjer so tudi mesta postala raznolik in kolektivni spektakel … izmed človekovih čutil je najbolj izpostavljeno vizualno zaznavanje" (Urry 2011, 349). V mestih lahko prepoznamo množico pojavov, v katerih ima (umetna) svetloba pomemben delež: estetizacija urbanega prostora, komercializacija javnega prostora, informatizacija javnih površin (Faßler et all 2006, Hasse 2008). V vseh primerih je svetloba sredstvo za dosego doživljajskih, urbanističnih in komercialnih ciljev. Tudi v slovenskih mestih lahko prepoznamo oblikovanje njihove nočne podobe s pomočjo svetlobe. Pri tem izstopa Koper, kjer je nova osvetlitev zasnovana velikopotezno in, za slovenske razmere, inovativno. V prispevku želimo na primeru osvetlitve Kopra pokazati geografsko razsežnost tega pojava, in sicer v morfološkem in kulturno geografskem smislu. Opozoriti želimo na svetlobo kot del fizičnega prostora, pa tudi na fenomenološko pojmovanje, na podlagi katerega nastaja poseben socialni prostor prebivalcev in obiskovalcev mesta.

2. Izhodišča za spoznavanje osvetlitve mest

Luč in osvetljenost imata, antropološko vzeto, doživljajski, simbolni in estetski pomen. Luč je nepogrešljiv del bivalnega in delovnega okolja, kot prispodobo jo najdemo v umetnosti in sporazumevanju, nasprotje med temo in svetlobo, med dnevom in nočjo, je ena najbolj prvinskih oblik doživljanja sveta. Zato ne preseneča, da sta osvetljevanje in umetna svetloba (ter s tem povezane barve) vse pomembnejši del tega estetiziranega sveta. V doživljajskem smislu je svetloba pomembna pri vzpostavljanju vzdušja, v okviru katerega dojemamo osvetljeni objekt in neposredno okolico. Pravimo, da je svetloba odločilega pomena pri izgledu (na strani objekta) in pri dojemanju (na strani subjekta). Slednje pomeni, da je od načina osvetlitve odvisno, kako objekt in neposredno okolico dojemamo, pa tudi, kaj nam osvetljeni objekt sporoča. (Umetna) svetloba je medij, ki prostor člení v pomenskem in simbolnem smislu, vanj vnaša novo vsebino, ki je podnevi ne občutimo. „Človek vidi stvari samo zato, ker so osvetljene. Vidi oblike in barve, misleč, da vidi stvari. Vendar jih vidi le toliko, kolikor so osvetljene." opisuje pomen svetlobe in osvetlitve Massimo Scaligero (Scaligero 1994, 13-15). Osvetlitev, svetloba in svetila imajo prostorske učinke – svetloba oblikuje stvari, naredi jih vidne (ali nevidne), sooblikuje prostor in mu daje poseben pomen. Vendar: osvetlitev je artefakt, rezultat človekove presoje o tem, kaj osvetliti in kako. Zato pojmuje Böhme luč kot modifikacijo prostora (Böhme 1998, 38). Iz nakazanih pomenov svetlobe in osvetljevanja lahko povzamemo, da se (geografsko) spoznavanje tematike osredotoča na štiri vsebine: *zakaj* je osvetljeno, *kako* je osvetljeno, *kaj* je osvetljeno in *kdo* osvetljuje. Naštete vsebine imajo prostorsko razsežnost in so prostorsko relevantne. Kot bo prikazano v nadaljevanju, je svetloba sredstvo prostorske členitve mesta. Hkrati imajo te vsebine socialno razsežnost – dojemanje svetlbe je, tako kot dojemanje celotnega okolja, socialno in kulturno pogojeno (več o tem glej Body-Gendrot 2011, 606-616). Osvetlitev je lahko kriterij za opredeljevanje osebnega prostora (na nivoju posameznika) oziroma element, ki vzpostavlja socialni prostor (na nivoju skupnosti). Teoretska podstat tega je

doživljanje prostora v smislu fenomenološkega dojemanja, pri čemer se sprašujemo o sporočilnosti razmer v prostoru. Drugo teoretsko izhodišče je pojem „bivanje" v fenomenološkem smislu. O prostorskih razsežnostih bivanja vemo veliko več na splošni, deklarativni ravni, kakor v podrobnostih. Mar ne obsega pojem „bivanje" poleg bivalne enote (stanovanje, del naselja, naselje) in statističnih kazalcev, s katerimi je ta prikazana (gostota, opremljenost, velikost), še estetiko bivalnega okolja, občutenje domačnosti, identitetne povezanosti s stanovanjem? Te vsebine imajo prav tako prostorsko dimenzijo! Doživljanje prostora iz vidika njegove izraznosti (kaj ureditev sporoča) je zgolj na subjektivnih elementih sloneča interpretacija fizičnega prostora.

3. Osvetlitev kot simbolni in pomenski element mesta

Osvetljenost mesta ima več namenov:
- Varnost. Osvetljenost prometnic in drugih javnih odprtih površin je namenjena večji varnosti v prometu, kot preventiva proti nasilništvu, vandalizmu in drugim oblikam kriminalitete. To je bil eden od razlogov za osvetljevanje mest. Varnost je gotovo primarna funkcija osvetlitve starega dela mesta Koper, kar sklepamo po razmestitvi in vrsti svetilk, saj je neosvetljen del ulice med dvema svetilkama zelo majhen. Podobno je v stanovanjskih območjih v Semedeli in Žusterni, kjer so osvetljene samo ulice, ne pa tudi grajeni objekti.
- Orientacija. Eno od vodil urejanja mest je vzpostaviti mrežo orientacijskih točk, z namenom boljšega dojemanja okolja. Potreba po orientacijii ponoči je enako pomembna kot podnevi. Kot elementi orientacije (podnevi) služijo vertikalni poudarki, robovi, monumentalni objekti, osi, deli naravnega okolja (Lynch 1984). Glavno sredstvo za orientacjio ponoči pa je osvetljenost orientacijskih točk - ključnih objektov, vertikalnih poudarkov, prometnih poti in delov naravnega okolja. V Kopru je veliko več osvetlitve namenjene orientaciji v novem, poslovnem delu mesta, kakor v historičnem.
- Poudarjanje grajene strukture. Z osvetlitvijo je mogoče poudariti objekte, ki ustvarjajo identiteto mesta, na primer kulturne spomenike in objekte javnih ustanov. V novejšem času so osvetljeni tudi sedeži velikih podjetij, ki na ta način opozarjajo nase. Poleg monumentalnih objektov so pogosto predmet osvetlitve skupine objektov, ki so del identitete in pejsaža, kot na primer obzidja, mostovi, deli naravnega okolja (obala, vzpetine, previsne stene), tehnični spomeniki. Namen tega je narediti jih vidne, prispevati k orientaciji in prepoznavnosti. Na ravni posameznika bi lahko dejali, da je namen osvetljevanja ustvariti poseben prostor, katerega posebnost bo posameznik zaznal. Kajti, kot pravi Ludwig Fromm, izraz stvari povzroči določen vtis na strani opazovalca (Fromm 2008, 79). Tudi v Kopru je nekaj objektov osvetljenih s tem namenom – deli obzidja, mestna vrata in trg za njimi ter nekatere palače v mestnem jedru.
- Oblikovanje ambientov in vzpostavljanje posebnega vzdušja. Z osvetlitvijo je možno doseči posebno vzdušje v okolici osvetljenih objektov. Ludwig Fromm navaja, da ustvarja kakovost grajene strukture v prvi vrsti vzdušje, ki jo prostorska ureditev vzbuja, ne pa arhitektura sama, kot je razširjeno mnenje (Fromm 2008, 92). Vzpostavljanje posebnega vzdušja je še posebej pomembno na ulicah, trgih, zelenih površinah in pred monumentalnimi objekti, kjer se običajno zadržuje več ljudi. Tovrstne osvetlitve je v Kopru več. Najmarkantnejša je ob obali in na prometnem obroču ob srednjeveškem mestu ter ob vpadnicah v mestno središče. Poseben ambient je vzpostavljen tudi na osrednjem trgu v starem delu mesta, kjer Pretorska palača in nasproti stoječa Loža s pritajeno osvetlitvijo izstopata iz skoraj

neosvetljene okolice. Omeniti velja še osvetlitev mogočnih in simbolno pomembnih dreves, palm, platan in oljk, ki prav tako dopolnjujejo podobo mesta.

4. Osvetlitev kot prostorski poudarek

Luč mora osvetljevati objekt, v kolikor ga želimo dojeti. Doživljajski potencial osvetljevanja lahko ovrednotimo le, če presojamo osvetljenost objekta. Gre za ustvarjeno realnost, kot to imenuje Hasse (Hasse 2004, 424), ki nekaj na svojstven način sporoča. Poleg podobe (izgleda) osvetljenega objekta je relevanten še simbolni pomen osvetljenega objekta. Za različne namene osvetljevanja se uporabljajo različne vrste osvetlitve, različni tipi svetil, različna barva svetlobe, različna razmestitev (položaj) svetil in različna moč svetilnih teles. Seveda se različni načini osvetlitve in različne funkcije osvetljevanja ne izključujejo povsem, pa vendar je za dosego posebnega ambienta potrebna drugačna osvetlitev od tiste, ki je prvenstveno namenjena varnosti. V Kopru smo prepoznali naslednje vrste osvetlitve.

- Nevtralna osvetlitev – v to skupino sodi osvetlitev ulic in drugih javnih odprtih površin, katere namen je zagotavljanje varnosti in orientacije. Takšna osvetlitev se razlikuje od dekorativne ulične osvetlitve, kjer je zaznaven še oblikovni učinek. V Kopru so nameščene običajne viseče in stenske svetilke, ki sevajo belo do rumeno svetlobo. Z nevtralno osvetlitvijo je osvetljena večina ulic v mestnem središču in v stanovanjskih soseskah na robu mesta.
- Usmerjena osvetlitev – ta osvetljuje izbrani objekt s svetlobnim snopom (običajno z žarometom). Osvetljeni objekt izstopa iz neosvetljene okolice, zato je jasno viden in prepoznaven. Pogosto je poseben učinek dosežen s svetlobo različnih barv, pomemben je tudi položaj svetila. To je lahko oddaljeno, lahko pa je skrito v objektu, zaradi česar je vidna samo silhueta objekta. Posebna oblika usmerjene osvetlitve v Kopru je osvetlitev pomolov v Luki. Ker je vrsta osvetlitve povsem prilagojena funkciji (proizvodnemu procesu), je v nadaljevanju ne obravnavamo. V Kopru so z usmerjeno svetlobo osvetljeni samo nekateri identitetni objekti, med njimi nekdanja tržnica soli Taverna, vrata v srednjeveško mesto Muda, Pretorska palača, objekt Lido in grad v Semedeli.
- Izstopajoča osvetlitev je osvetlitev, katere vir svetlobe je objekt sam. Takšne so svetlobne reklamne table. Največ jih je v novem delu Kopra, na območju Bonifike in Škocjana. Nakupovalna središča so praviloma osvetljena na izstopajoč način. Veliko je primerov, ko je svetlobno telo del fasade, kar ustvarja vtis svetlečega objekta.
- Pritajena (dekorativna) osvetlitev – ne osvetljuje, temveč razsvetljuje, opozarja na objekt, zarisuje njegove konture, lahko pa stoji sama zase kot svetlobno telo. Takšna osvetlitev ni vpadljiva, njen namen je opozarjati, ustvariti vzdušje in oblikovno nadgraditi ambient. V Kopru je pritajene osvetlitve največ ob prometnicah na robu srednjeveškega mesta, kjer je osvetljen drevored palm, na pomolu oziroma ob obali v mestnem središču, najdemo jo tudi na nekaterih rondojih ter na nastajajoči promenadi, kjer z modro in belo svetlobo v spodnjem delu uličnih svetilk prispevajo k barvitosti ulice. Na pritajen način sta osvetljena še vodometa – eden v krožišču, drugi pa v parku ob mestni tržnici.

Slika 1: Nevtralna in dekorativna osvetlitev v Kopru.
Vir: avtor.

Slika 2: Izstopajoča in usmerjena osvetlitev v Kopru.
Vir: avtor.

Na podlagi vrste osvetlitve je umestno vprašanje, kaj predstavlja identiteto Kopra? Predpostavljamo, da je osvetljeno tisto, kar bi naj bilo videno in prepoznano kot mestna posebnost. Pri tem se omejujemo predvsem na pritajeno, usmerjeno in izstopajočo vrsto osvetlitve, saj je človekova presoja, kaj osvetliti, pri tem najbolj izražena. Ugotavljamo naslednje:
- Največ dekorativne osvetlitve je ob obali, na stiku med morjem in mestom. Izstopa osvetlitev valobrana, ki z barvo svetlobe in obliko svetil daje temu predelu poseben značaj. Posebnost je barva svetlobe, ki ima izključno dekorativni pomen, saj pomola ne osvetljuje, temveč razsvetljuje, vzbuja pozornost. Podobna je osvetlitev obalne poti med starim mestom in Semedelo, čeprav ni tako dekorativna in barvita. Je pa toliko nenavadna, da ustvarja privlačno promenado. V tem pogledu je način osvetlitve bistven element javne odprte površine, ki bi brez svetlobe in

svetil ostala manj atraktivna. Zaradi dekorativne osvetlitve izstopa tudi drevored palm, kar bi lahko razumeli kot poudarjanje sredozemskosti mesta. Palma ima močan simbolni pomen, v mitologiji je znamenje zmage, vzpona, preporoda, nesmrtnosti (Chevalier 1993, 432); v tem kontekstu bi osvetljen drevored palm lahko razumeli kot način manifestacije mesta.
- Dekorativno osvetljena je prometnica okoli srednjeveškega Kopra, ki je opremljena z modernim tipom svetil, talno osvetlitvijo palmovega drevoreda in modro – belo svetlobo, ki sveti iz spodnjega dela stoječih svetilk. Dekorativno osvetljeni sta še krožišči ob mestnih vpadnicah. Krožno pot okoli srednjeveškega dela mesta dopolnjujejo barvne svetilke, s pritajeno svetlobo osvetljeno obzidje in talne svetilke. Takšno osvetlitev razumemo kot jasno ločnico med starim in novim delom mesta ter kot zametek mestne promenade.
- Glede na osvetlitev je pomemben del koprske identitete komercialni del mesta z nakupovalnimi središči in objekti javnih služb. Tod prevladuje izstopajoča osvetlitev, ki opozarja na gospodarske subjekte. Če sklepamo po številu nakupovalnih središč, velikosti komercialnega območja in očitnem oblikovalskem presežku objektov, tudi zaradi uporabe svetlobe (dekorativna osvetlitev krožišč in fasad), daje mesto vtis razvitega regionalnega središča z dejavnostmi nadregionalnega pomena. Nevtralna in dekorativna osvetlitev prometnic vzpostavljata številne orientacijske točke in vozlišča, kar je ena od značilnosti avtomobilskega mesta. Zaradi osvetlitve je tipološko poenotena zasnova nakupovalnih središč videti atraktivnejša.
- Značilnost osvetljevanja Kopra je oblikovni presežek v osvetljevanju prometnic, ne pa javnih odprtih površin ali identitetnih objektov. Največ dekorativne osvetlitve je ob prometnih poteh, tako ob prometnem obroču okoli starega mesta, kot ob vpadnicah v mestno središče. Lahko bi dejali, da je osvetlitev bolj kot pešcem in sprehajalcem, namenjena motoriziranim obiskovalcem. Sprehajalci lahko doživljajo slikovitost nočne podobe mesta predvsem na obali.
- Opozoriti je potrebno še na območja, kjer prevladuje nevtralna osvetlitev. Takšna so stanovanjska območja Semedela, Žusterna in Škocjan ter rob mesta. Na območju, ki je veliko za dva stara Kopra, je osvetljen z usmerjeno osvetlitvijo samo grad (vila) v Semedeli, najti je moč še nekaj iztopajoče osvetljenih gospodarskih objektov, vsa ostala osvetlitev je nevtralna. Takšna ureditev kaže, da kot mesto pojmujemo samo trgovski in historični del. V stanovanjska območja pa potreba po prepoznavnosti in dekorativnosti bivalnega okolja še ni prodrla.
- Med značilnostmi osvetlitve Kopra je množica neosvetljenih kulturnih spomenikov v mestnem jedru, ki v temnem delu dneva, z izjemo Pretorske palače in nasproti stoječe Lože, ne iztopajo v mestni podobi. Osvetljeni so toliko kot druge stanovanjske hiše. Takšno stanje si razlagamo na dva načina: ali v procesu osvetljevanja še niso prišli na vrsto in je zgolj vprašanje časa, kdaj bodo tudi mestne palače zasijale v dekorativni osvetlitvi, ali pa gre za načrtno ustvarjanje kontrasta med osvetljeno obalo in temnim srednjeveškim jedrom, v smislu upoštevanja kontinuitete osvetljevanja iz preteklosti, ko so bila srednjeveška mesta neosvetljena.

5. Osvetljevanje kot element členitve mesta

Različni načini osvetljevanja prispevajo k različnem dojemanju posameznih delov mesta ponoči. V Kopru lahko ločimo vsaj štiri območja, kjer se predmet in način osvetlitve močno razlikujeta:
- Minimalistična osvetlitev mestnega jedra. Kot je bilo že omenjeno, je to osvetljeno le z nevtralno osvetlitvijo ulic in usmerjeno osvetlitvijo redkih identitetnih objektov.
- Dekorativna osvetlitev cestnega obroča okoli starega jedra in vpadnic v mesto.

- Izstopajoča osvetlitev komercialnega dela mesta.
- Nevtralna osvetlitev stanovanjskih območij na robu mesta.

Relevantno pri tem je razmerje med podobo mesta podnevi in ponoči. Gre za vprašanje, koliko je dnevna podoba mesta skladna z nočno podobo; povedano drugače: ali osvetlitev mesta sledi dnevni podobi in jo nadgrajuje, ali pa gre za dve „sliki", dnevno in nočno. Primerjava med (makro) morfološko - fiziognomskimi deli mesta, kakršne zaznavamo v Kopru podnevi in ponoči, pokaže nekaj razhajanj:

Preglednica 1: Morfološko fiziognomski deli mesta, kakršne zaznavamo podnevi in ponoči.
Vir: avtor.

Podnevi	**Ponoči**
Staro mesto	Obroč okoli starega mesta
Komercialno poslovni del	Obala
Rekreacijski del	Komercialno poslovni del
Komunalni del ob tranzitni cesti	Luka
Stanovanjska območja	
Luka	

Podnevi zaznavamo večje število morfološko-fiziognomskih predelov kakor ponoči, kar pomeni, da nekateri deli mesta ponoči niso vidni. Morda najočitnejše je razhajanje ob glavni silhueti – podnevi izstopa silhueta mesta na otoku z dvema vertikalama (cerkvenim zvonikom in stanovanjsko stolpnico), v nočni silhueti pa topografskega položaja ne začutimo, ker stari del mesta ni osvetljen. Pač pa kljub pritajeni osvetlitvi izstopa obala in izstopajoče osvetljen komercialni del mesta, kar pa v dnevni veduti ni tako očitno.

Slika 3: Razlika med dnevno in nočno podobo mesta; v nočni veduti staro mestno jedro ni vidno.
Vir: avtor.

Še večja je razlika med identitetnimi objekti v starem delu mesta in objekti, osvetljenimi z usmerjeno osvetlitvijo. Z usmerjeno osvetlitvijo osvetljenih objektov je zelo malo, zato menimo, da je razkorak med osvetljenim in vrednim osvetlitve velik. Podoben vtis, vendar v obratni smeri, ponuja osvetlitev prometnic, ki vodijo proti središču. Zaradi nevtralne in dekorativne osvetljenosti prometnic, je vtis o monumentalnosti mesta ponoči večji kot podnevi. Izpostaviti je potrebno še osvetljenost stanovanjskih predelov, kjer najdemo samo nevtralno osvetlitev

prometnic, čeprav je na območju več ambientov, katerih nočna podoba bi nadgradila zasnovo stanovanjskih sosesk in poudarila naravno kuliso mesta.

6. Osvetljevanje kot medij kapitala in javnega interesa

Osvetljevanje je del mnogih gospodarskih dejavnosti, ki skušajo s svetlobo opozarjati na svojo prisotnost; na ta način lahko razumemo osvetljevanje nakupovalnih središč, poslovnih objektov in najrazličnejše svetlobne reklame s komercialno vsebino. Kdo osvetljuje in s tem oblikuje mesto ter po kakšnih načelih? Hasse govori o „ekonomiji estetizacije", s čemer želi izpostaviti gospodarski interes pri osvetljevanju in način, kako se ta v prostoru pojavlja (Hasse 2008: 129). Osvetljevanje je stvar javnega interesa predvsem pri zagotavljanju varnosti ter pri oblikovanju nočne podobe ter stvar zasebnega (komercialnega) interesa, kamor sodi (samo)osvetljevanje poslovnih objektov in gospodarskih delov mesta. Glede tega lahko v splošnem, pa tudi v Kopru, ločimo naslednja območja:
- Stanovanjska območja in staro mestno jedro, kjer je prisoten javni interes, zato prevladuje tod nevtralno osvetljevanje, brez dekorativnega presežka.
- Nakupovalna središča in gospodarski deli mesta, kjer je močneje izražen komercialni interes zasebnega kapitala, zato več izstopajočega osvetljevanja ter osvetljeni obekti gospodarskih družb.
- Obala, kjer se pojavljata javni in komercialni interes, zato dekorativna in izstopajoča osvetlitev, ki prispevata k atraktivnejši nočni podobi mesta.

7. Zaključek

Osvetljevanje je pomemben element mestne podobe. Obstaja več razlogov zakaj mesto osvetljevati; poleg varnosti so geografsko najbolj merodajni orientacija, lep videz ter poudarjanje identitetno pomembnih objektov. Za dosego tega obstajajo različne vrste osvetljevanja, opredelili smo nevtralen, izstopajoč, dekorativen in pritajen način. Glede na vrsto osvetljevanja in predmet osvetlitve, lahko mesto razčlenimo na območja, kjer prevladuje določena vrsta osvetlitve. Če osvetljevanje mesta razumemo kot rezultat presoje, kaj osvetliti in kako, lahko v tem prepoznamo še sporočilo, ki ga nosilci osvetljevanja posredujejo prebivalcem in obiskovalcem mesta. To sporočilo ima zagotovo tudi kulturno in socialno razsežnost, kar je še dodaten argument za geografsko spoznavanje osvetljevanja mesta. Velja pa tudi naslednje spoznanje: neoblikovana nočna podoba mesta pomeni siromašenje njegovega videza in prikrajšanost prebivalcev za doživljanje simbolnega pomena luči in grajenega okolja ponoči. In še: ne vključevnje nočne podobe mesta v (geografsko) spoznavanje pomeni pomanjkljivo vedenje o zgradbi mesta in človekovem oblikovanju prostora.

Omeniti je potrebno še ekološko dimenzijo osvetljevanja. Iz prispevka bi lahko nastal napačen vtis, da se ne zavedamo potrebe po premišljeni uporabi in varčevanju z energijo ter zmanjšanju svetlobnega onesnaženja. Po izkušnjah izvedenih projektov v tujini, je mogoče s sodobnimi tehnikami osvetljevanja, porabo energije zmanjšati, ob hkrati boljši osvetlitvi ulic in objektov (Schmidt 2006, 230). Zavzemanje za načrtovanje nočne podobe mesta ne pomeni zapostavljanje skrbi za okolje in sonaravno urejanje mest. Tako kot bi bilo napačno zaradi varovanja okolja odpovedati se pozitivnim učinkom osvetljevanja, bi bilo napačno ob osvetljevanju spregledati potrebo po varovanju okolja in racionalni rabi energije. Kompromis med obema stališčema je gotovo mogoč. Dokaz za to je tudi nova osvetlitev Kopra, kjer

se je količina porabljene energije v skupnem seštevku zmanjšala, v posameznih delih mesta pa minimalno povečala (internet 1).

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LIGHTENING OF THE CITY AS A SUBJECT OF GEOGRAPHICAL RESEARCH (CASE STUDY OF KOPER)

Summary

The image of the city at daylight is much different than at night - the light and the illumination make the difference. The light is crucial for the appearance (from the object side) and for the perception (from the subject side) of the lit object. Night light is an artifact, the result of human judgment about what is needed and what is useful when it comes to visibility and illumination. Given that the decision is conscious, illumination is connected to the intellect on one side (what needs to be illuminated) and to the feeling on the other (what would be worth illuminating and how). The reasoning about and discovering the illumination of the city offers many possible interpretations; from the cultural-geographical one to town planning; from the question as to the who, what and how to light, to the effects of lightening on the cultural self-awareness of inhabitants and the image of the city. The starting point of this debate is the term personal space and the aesthetisation of living environment. There are many reasons for illumination of the city, like security, orientation, creating an image. There are also many different ways about how to illuminate individual objects and other buildings (direct, neutral and dim light are just a few possibilities). The result of the city illumination is a specific differentiation of the city area and the varied communication of lightened objects. This paper offers a discussion about the light and illumination of the city of Koper. It is a cultural-geographical study in the field of urban geography.

PETDESET LET DELOVANJE ODDELKA ZA GEOGRAFIJO IN ŠTUDIJA GEOGRAFIJE V MARIBORU

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Izvleček

Petdeset let delovanje Oddelka za geografijo in študija geografije v Mariboru

V letu 2011 mineva 50 let od ustanovitve Pedagoške akademije v Mariboru, katere ena od naslednic je tudi Filozofska fakulteta v Mariboru. V prispevku je prikazan razvoj Oddelka za geografijo in študija geografije v Mariboru, ki je v tem obdobju prešel skozi različna razvojna obdobja, tako v smislu organizacijskih oblik ter kadrovske zasedenosti, kot tudi glede na vrsto izvajanja izobraževalnih programov ter obsega znanstvenoraziskovalnega dela. Temeljno poslanstvo oddelka, to je izobraževanje kadrov za poučevanje geografije v osnovni in srednji šoli, se je izvajalo s pomočjo različnih študijskih programov. Leta 1985 je Pedagoška akademija prerasla v Pedagoško fakulteto in s tem dveletni višješolski študij geografije v štiriletni visokošolski študij, ki je bil od leta 1995 univerzitetni. Z ustanovitvijo Filozofske fakultete v Mariboru je leta 2006 Oddelek za geografijo postal del le-te, istočasno pa je prehod na nove študijske programe, ki so pripravljeni v skladu z Bolonjsko deklaracijo, prinesel vrsto novosti, pa tudi izzivov; tako za izvajalce kot študente.

Ključne besede

geografija, študij geografije, Maribor, Slovenija

Abstract

Fifty years of the Department of Geography and the study of geography in Maribor

The year 2011 marks the 50th years from establishment of the Academy of Education in Maribor. One of its successors is also Faculty of Arts, where is conducted the study of geography. The paper discusses the development of the Department of Geography and the study of geography in Maribor, which in fifty years passed through the various developmental periods: in the terms of organization, courses, research and human resources. The basic mission of the department, (training of personnel for teaching geography in primary and secondary schools) was conducted through using a variety of courses. In 1985 the Academy changed to Faculty of Education. With the establishment of the Faculty of Arts in 2006 the Department of Geography became part of it. The transition to new study programs, which have been prepared in accordance with the Bologna declaration, brought a series of innovations, as well as challenges; both for teachers and students.

Key words

geography, study of geography, Maribor, Slovenia

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1. Uvod

Glavno poslanstvo geografije kot znanosti je spoznavanje oblik preoblikovanja pokrajine ter procesov, ki se v njej odvijajo, z namenom ugotoviti prostorsko dimenzijo človekovega bivanja in s spoznanji prispevati h kulturnem, socialnem in gospodarskem razvoju določenega območja. Povpraševanje po strokovnjakih s področja geografije je konstantno že skozi daljše obdobje, s povečevanjem ekološke osveščenosti in zavedanjem o pomembnosti poznavanja življenjskega prostora, pa postopoma narašča. Geografija namreč že dolgi ni več le deskriptivna veda, ki prinaša opise pokrajin. Z razvojem teoretske misli in izvirnimi metodami se vedno bolj uspešno vključuje tudi v projekte na področju varovanja okolja, urejanja prostora, raziskovanja kulturnih, socialnih in gospodarskih vidikov ustroja družbe, ob tem pa še vedno predstavlja eno njenih osnovnih poslanstev izobraževanje učencev, dijakov in odraslih. Prav slednje je vodilo k temu, da je bil študij geografija prisoten na Pedagoški akademiji v Mariboru že od vsega začetka.

Razvoj Oddelka za geografijo in študija geografije v Mariboru je povezan z ustanovitvijo Pedagoške akademije v letu 1961. Prvim študijskim smerem se je že v drugem letu delovanja, pridružil tudi študij geografije. Za to so bili zaslužni profesorji dr. Vladimir Bračič (tudi prvi rektor Univerze v Mariboru), dr. Borut Belec (zaslužni profesor Univerze v Mariboru) in dr. Mavricij Zgonik, nekaj let kasneje pa sta se jima pridružila še dr. Božidar Kert in Ludvik Olas.

V petdesetletnem obdobju (ki ga bomo obeležili v letu 2012) je Oddelek za geografijo prešel skozi različna razvojna obdobja; tako v smislu organizacijskih oblik ter kadrovske zasedenosti, kot tudi glede na vrsto izvajanja izobraževalnih programov ter obsega znanstvenoraziskovalnega dela. Temeljno poslanstvo oddelka, t. j. izobraževanje kadrov za poučevanje geografije v osnovni in srednji šoli, se je izvajalo s pomočjo različnih študijskih programov. Leta 1985 je Pedagoška akademija prerasla v Pedagoško fakulteto in s tem višješolski študij geografije v štiriletni visokošolski študij, ki je bil od leta 1995 univerzitetni. Leta 1999 smo pričeli prvič izvajati podiplomski študij geografije. Z ustanovitvijo Filozofske fakultete v Mariboru je leta 2006 Oddelek za geografijo postal del le-te, istočasno pa je prehod na nove študijske programe, ki so pripravljeni v skladu z Bolonjsko deklaracijo, prinesel vrsto novosti tudi v študiju geografije v Mariboru.

V študijskem letu 2008/09 smo pričeli izvajati nov bolonjski univerzitetni dvopredmetni študijski program prve stopnje Geografija. Diplomanti (z nazivom dipl. geograf) z njim pridobijo znanja, spretnosti in sposobnosti, ki po mednarodnih standardih veljajo za temeljna s področja geografije. Dosežena izobrazba jim omogoča vpis v magistrski dvopredmetni pedagoški študijski program druge stopnje Geografija, ki smo ga pričeli izvajati v študijskem letu 2011/12. Program je namenjen pridobivanju znanja in veščin za poučevanje geografije v osnovnih in srednjih šolah (diplomanti pridobijo naziv mag. prof. geografije). Nadgradnjo magistrskega študijskega programa predstavlja doktorski študijski programa tretje stopnje Geografija, ki smo ga prav tako pričeli izvajati v študijskem letu 2011/12, in je namenjen izobraževanju kadrov z nazivom doktor znanosti, ki so usposobljeni za ustvarjanje in razvijanje novega znanja, novih raziskovalnih metod ter novih oblik prenosa znanja s področja geografije. V pripravi pa je tudi dvopredmetni študijski program druge stopnje Regionalne okoljske študije, ki bo namenjen pridobivanju znanj s področja reševanja okoljskih problemov ter pridobivanju in aplikaciji znanj pri vodenju in izpeljavi razvojnih projektov lokalnih območij.

2. Obdobje Pedagoške akademije Maribor (1961-1986) - višješolski dvopredmetni študijski program Geografija in …

Prvim študijskim smerem na novoustanovljeni Pedagoški akademiji v Mariboru (Razredni pouk, Slovenščina - Srbohrvaščina, Slovenščina - Nemščina, Slovenščina - Angleščina, Matematika - Fizika, Tehnična vzgoja - Fizika, Likovna vzgoja in glasba) se je že v drugem letu delovanja, t. j. v študijskem letu 1962/63, pridružila dvopredmetna pedagoška študijska smer Geografija - Zgodovina, na katero se je najprej vpisalo 18 rednih študentov, v naknadnem razpisnem roku pa se jim je pridružilo še nekaj rednih in izrednih študentov (Bračič 1984).

Preglednica 1: Število vseh vpisanih študentov na PA Maribor od leta 1961 do leta 1964 po načinu študija in številu vpisanih na študijsko smer Geografija - Zgodovina.

Študijsko leto	PA redni študij	PA izredni študij	GEO-ZGO redni študij	GEO-ZGO izredni študij
1961/62	52	204	0	0
1962/63	92	260	32	48
1963/64	251	368	37	51

Vir: Bračič, 1984.

Temelje študija geografije v Mariboru so postavili profesorji dr. Vladimir Bračič, dr. Borut Belec in dr. Mavricij Zgonik, nekaj let kasneje pa sta se jima pridružila še dr. Božidar Kert in Ludvik Olas. V 70. in 80. letih so kot pogodbeni sodelavci v pedagoškem procesu sodelovali tudi mag. Vladimir Drozg, mag. Anka Kristan, mag. Zoran Kus, Miro Štefanc in dr. Franc Lovrenčak (Kolenc Kolnik 2006).

Preglednica 2: Seznam redno zaposlenih sodelavcev za geografijo na PA Maribor med letoma 1962 in 1985.

dr. BELEC BORUT	redni profesor	1962 kot pogodbeni sodelavec, 1963 - 1985
dr. BRAČIČ VLADIMIR	redni profesor	1962 - 1967, 1973 - 1979, po 1979 kot pogodbeni sodelavec
dr. ZGONIK MAVRICIJ	izr. profesor	1964 - 1977
dr. KERT BOŽIDAR	izr. profesor	1968 - 1985
OLAS LUDVIK	višji predavatelj	1975 - 1985
STERNIŠA BORIS	asistent	1964 - 1966

Vir: Bračič, 1986.

V študijskem letu 1964/65 se je študijski smeri Geografija - Zgodovina pridružila nova študijska smer Geografija - Telesna vzgoja, v študijskega leta 1974/75 pa še smer Geografija - Družbenomoralna vzgoja (DMV). Na dvoletnem študijskem programu je bil urnik predavanj razdeljen v štiri semestre. Po prvem študijskem semestru so morali študenti opraviti obvezno enotedensko pedagoško prakso, s katero so dobili vpogled v delovanje šole oz. šolskega sistema. Po tretjem semestru so opravljali obvezno dvotedensko pedagoško prakso, ki je vključevala 10 učnih hospitacij in štiri učne nastope. Prvotno regionalnogeografsko usmerjen študijski načrt geografije so skoraj vsako študijsko leto dopolnjevali in prilagajali novim zahtevam (Bračič 1984).

Skupno je med letoma 1962 in 1985 na Pedagoški akademiji v Mariboru diplomiralo 444 študentov geografije in ene izmed treh omenjenih študijskih vezav. Prejeli so naziv »predmetni učitelj geografije in … (s približno 85 % je prevladovala vezava z zgodovino). V istem obdobju je na celotni akademiji diplomiralo 4.405 študentov,

tako da so diplomanti geografije predstavljali približno 10 % vseh njenih diplomantov (Brumec et al 1986).

Že v prvem obdobju delovanja oddelka se je pričelo mednarodno sodelovanja, saj so zaposleni navezali stike z geografskima oddelkoma na Visoki učiteljski šoli v Szombathelyu in Univerzi J. Komenskega v Trnavi. V okviru Slovenije pa je bilo zelo intenzivno sodelovanje z Oddelkom za geografijo na Filozofski fakulteti v Ljubljani, ki je potekalo tako na pedagoškem kot raziskovalnem področju.

3. Obdobje Pedagoške fakultete Maribor (1986-2006) - visokošolski oz. univerzitetni dvopredmetni pedagoški študijski program Geografija in …, podiplomski študijski program Geografija

Pedagoška akademija je bila po zakonu iz leta 1961 sicer štiriletna visoka šola, a je to zares postala šele leta 1986 z ustanovitvijo Pedagoške fakultete Maribor. Istočasno je v letih 1983-1985 potekala splošna reforma visokega šolstva v Sloveniji, tako da je bil tudi študij geografije, tako kot vsi ostali študiji, generalno spremenjen.

Z novim študijskim programom je leta 1986 dvoletni višješolski dvopredmetni študijski program Geografija - (vezava) prerasel v štiriletni visokošolski dvopredmetni pedagoški študijski program Geografija in … (vezava), ki je bil od leta 1995 univerzitetni študijski program. Na Pedagoški fakulteti v Mariboru in izven nje (npr. na Teološki fakulteti) se je lahko kombiniral kar s 17 dvopredmetnimi študijskimi smermi. Celotno obdobje delovanja Pedagoške fakultete je namreč naraščalo tako število novih študijskih programov in študijskih smeri, kot tudi število možnih študijskih vezav, ki so v tem obdobju postale prosta izbira študentov (Brumec, 1986). Na začetku je bila še vedno najpomembnejša vezava študija geografije z zgodovino in sociologijo (Borstner et al 1995), kasneje pa so bile skoraj vse študijske vezave dokaj enakomerno zastopane.

Univerzitetni dvopredmetni pedagoški študijski program Geografija in … je bil v osnovi namenjen študentom, ki so se želeli usposobiti za pedagoški poklic. Diplomanti/ke so z uspešnim zagovorom diplomskega dela pridobili naziv profesor/ica geografije in .... (vezava) in so bili usposobljeni za poučevanje geografije v srednjih in osnovnih šolah. Poleg pridobljenih znanj s področja geografije, pedagogike, psihologije in didaktike so diplomanti pridobili tudi interdisciplinarna znanja in širok strokovni pogled na stanje in razvoj sodobnega sveta, znali so vrednotiti pokrajino, njene sestavine in dejavnike razvoja in pri tem uporabljati številne geografske raziskovalne metode, kar jim je omogočalo uspešno zaposlitev tudi na drugih področjih.

Tekom študija so študenti v prvih dveh letih študija pridobili znanja iz fizične geografije (o zemeljskem površju, prsteh, vegetaciji, podnebju in vodovju) in družbene geografije (o prebivalstvu, poselitvi, gospodarstvu in prometu). V tretjem in četrtem letu so spoznali regionalnogeografske značilnosti posameznih kontinentov in Slovenije ter nekatera posebna področja geografije (ekološka geografija, urejanje prostora, geografija podeželja). Hkrati so se na svoj bodoči poklic pripravljali s hospitacijami in nastopi (didaktika geografije), na katerih so se seznanili s posredovanjem pridobljenega znanja in oblikovanjem lika bodočega profesorja. V vsakem letniku so se kot aktivna oblika študija izvajale terenske vaje, poleg teh pa so se študenti udeleževali tudi strokovnih ekskurzij. Praktično usposabljanje

študentov je potekalo tudi ob laboratorijskem delu.

Preglednica 3: Predmetnik univerzitetnega dvopredmetnega pedagoški študijski program Geografija in … (po zadnji spremembi).

1.letnik: - Uvod v metodologijo znanstveno-raziskovalnega dela - Pedagogika - Uvod v geografijo - FG I – Klimatogeografija in geomorfologija - FG II – Hidrogeografija - DG I – Geografija prebivalstva	2. letnik: - Psihologija - Didaktika - Multimedia - FG II – Pedogeografija in biogeografija - DG II – Ekonomska geografija - Regionalna geografija Evrope - Kvantitativne metode – statistika
3. letnik: - Multimedia - DG III – Geografija turizma, prometa, naselij - Regionalna geografija Afrike in Azije - Regionalna geografija Amerike in Avstralije - Didaktika geografije I	4. letnik: - Geografija Slovenije s seminarjem - Urejanje prostora - Ekološka geografija - Geografija podeželja - Didaktika geografije II

Vir: Geografija- študijski program, Univerza v Mariboru, 1998.

V prvi letnik se je letno vpisalo 60 rednih in do 20 izrednih študentov. Večina jih je prihajala iz območja severovzhodne in vzhodne Slovenije. Analiza vpisa, izdelana v letu 2006 (Kolenc Kolnik, 2006), je pokazala, da je med mladimi vladalo precejšnje zanimanje za študij geografije in vsako leto so bila zapolnjena vsa vpisna mesta za redni študij. Po letu 2000 pa se je močno spremenila struktura vpisanih na izredni študij. Pred tem so se nanj vpisovali v pretežni meri učitelji geografije, ki so bili diplomanti Pedagoške akademije in so želeli nadaljevati izobraževanje na univerzitetni stopnji, po tem obdobju pa so se v izredni študij vpisovali le maturanti, ki niso dosegli ustreznega števila točk za vpis na redni študij geografije. To dejstvo je močno vplivalo na skromen uspehu teh študentov in relativno veliko število absolventov na izrednem študiju. Zato smo v zadnjih letih opažali precej zmanjšan interes za vpis v 1. letnik izrednega študija geografije in od študijskega leta 2004/2005 dalje niso bila več zasedena vsa razpisana prosta mesta. Analiza uspešnosti študija in vpisa je pokazala, da se v prvi letnik ponovno vpisalo kar četrtina rednih študentov, medtem ko je bilo v višjih letnikih ponovnih vpisov v letnik bistveno manj. Povprečno so študenti na Oddelku za geografijo v obdobju med letoma 1999 in 2006 zaključili študij v 6,2 letih (Kolenc Kolnik 2006).

Preglednica 4: Število vpisanih študentov na univerzitetnem dvopredmetnem pedagoškem študijskem programu Geografija in … med letoma 1999 in 2006, glede na način študija.

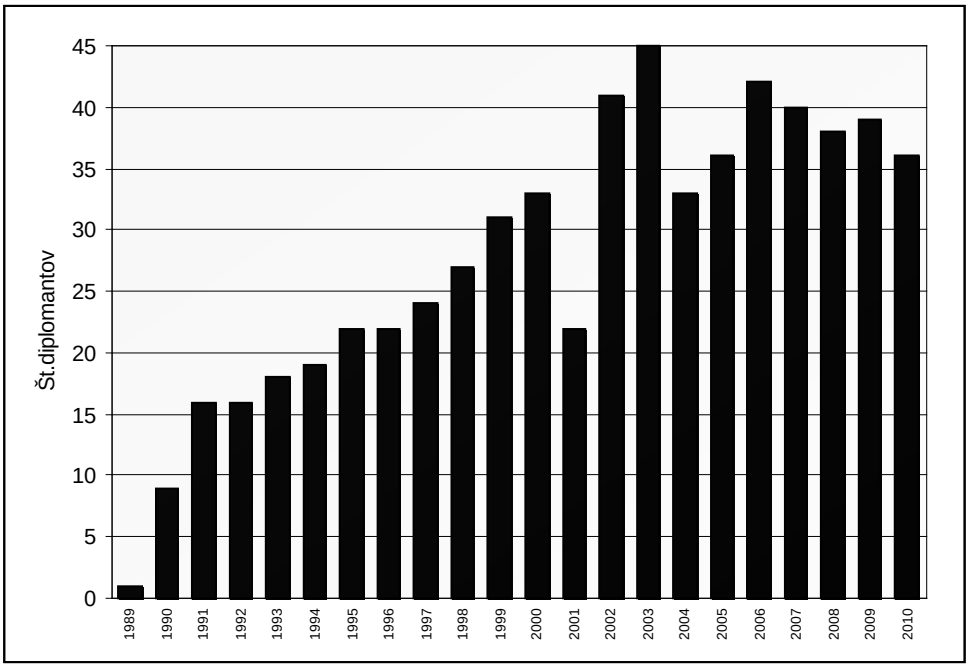
Leto vpisa	Število študentov						
	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006
Redni študij	208	197	213	214	199	210	206
Izredni študij	54	77	68	69	73	74	54
Skupaj	262	274	281	283	272	284	260

Vir: Skupne službe Pedagoške fakultete Maribor - Referat za študentske zadeve, 2006.

Prvi diplomant je na štiriletnem dvopredmetnem visokošolskem pedagoškem študijskem programu Geografija in … končal svoj študij leta 1989 (to je bil Igor

Žiberna, ki se je po diplomi kot mlad raziskovalec tudi zaposlil na oddelku in kasneje postal univerzitetni učitelj za področje fizične geografije). Število diplomantov se je nato vsako leto povečevalo. V zadnjem obdobju je letno diplomiralo od 30 do 40 študentov (največ jih je bilo leta 2003, ko je študij zaključilo 45 študentov). V obdobju med letoma 1989 in 2006 (t.j. v času ko je bil Oddelek za geografijo na Pedagoški fakulteti) je diplomiralo 457 študentov geografije, v obdobju med letoma 2007 in 2010 (ko se je ta program izvajal na Filozofski fakulteti) pa je diplomiralo nadaljnjih 153 študentov geografije. Skupaj je v obeh obdobjih študij končalo 610 diplomantov, oziroma v povprečju 27,7 diplomantov na leto. Večji del se jih je še vedno zaposlil v pedagoškem poklicu, čeprav je v zadnjih letih na trgu dela vse manj možnosti za to zaposlitev.

Grafikon 1: Število diplomantov visokošolskega oziroma univerzitetnega (po letu 1995) dvopredmetnega pedagoškega študijskega programa Geografija in ..., ki so prejeli strokovni naziv »profesor geografije in ... « na Pedagoški fakulteti oziroma Filozofski fakulteti (po letu 2006) v Mariboru med letoma 1989 in 2010.



Vir: Geografija (predstavitvena publikacija Oddelka za geografijo FF UM, pripravil U.Horvat, Maribor, 2010)

Seznam diplomantov visokošolskega oziroma univerzitetnega (po letu 1995) dvopredmetnega pedagoškega študijskega programa Geografija in ..., ki so prejeli strokovni naziv »profesor geografije in ... « na Pedagoški fakulteti oziroma Filozofski fakulteti (po letu 2006) v Mariboru med letoma 1989 in 2010.

- 1989: (1) Žiberna Igor.
- 1990: (9) Emeršič Darja, Horvat Dolores, Kokol Jelka, Kuzman Renato, Plošinjak Samo, Potočnik Dragan, Radovanovič Sašo, Stavbar Vlasta, Vovk Ana.
- 1991: (16) Bohnec Magdalena, Čeh Suzana, Goropevšek Branko, Gregorec Lidija, Jarc Marija, Kladnik Tomaž, Kobale Mitja, Kokol Milena, Koler Mira, Lorenci Petra, Otič Marta, Pleterski Roman, Ristič Zdenka, Štebih Karmen, Urih Davorin, Vobovnik Franc.
- 1992: (16) Bertoncelj Vanda, Grajfoner Tatjana, Horvat Nives, Karba Pavla, Klasič Blanka, Kljajić Damijan,

Koncilja Vesna, Košutnik Romana, Pernat Mira, Puhar Milena, Rauter Suzana, Rom Blanka, Rošker Štok Helena, Slana Meznarič Renata, Toš Marjan, Velički Alojz.
- 1993: (18) Augustinovič Drago, Fijan Andreja, Gubenšek Anica, Hertiš Iris, Hozjan Bojan, Kancler Jovita, Kosi Darja, Krampl Jelka, Kričej Viktorija, Lilek Danijel, Pernat Marjetka, Petauer Milena, Pintarič Bernarda, Plavec Karmen, Selak Šijanec Alja, Serdinšek Alojz, Šterbal Janja, Vičič Maja.
- 1994: (19) Arh Anita, Bombač Barbara, Bračko Karl, Golob Valentina, Goričan Martina, Jelen Mirjana, Krabonja Boris, Kralj Bruno, Krnjić Sandra, Kutnjak Vesna, Lopert Tomaž, Marinič Robert, Prendl Silvija, Princes Kastelic Barbara, Skutnik Tatjana, Starc Marja, Šavora Milica, Velunšek Simona, Vodušek Marija.
- 1995: (22) Ambrož Boris, Bornšek Jasmina, Brumen Damjan, Bukovnik Mateja, Burjak Matjaž, Cafnik Nataša, Cingerli Bojana, Gašperšič Božo, Hebar Martina, Hrga Lidija, Korže Danijela, Krajnc Dimitrij, Kukovičič Katarina, Petar Janja, Rakuša Marija, Rojko Dušan, Simončič Dunja, Skutnik Irena, Šulek Franc, Trstenjak Mirjana, Založnik Roman, Žerjav Lijana.
- 1996: (22) Čerič Marica, Deutsch Suzana, Duh Franjo, Fekonja Anica, Gregorič Aleksander, Horvath Ferenc, Jaunik Simona, Kladnik Melita, Kodrič Lidija, Kovačič Ksenija, Krušič Jože, Krušič Marjeta, Lazar Lenke, Nedelko Zita, Podgoršek Peter, Rebernak Bojan, Rudaš Jutka, Sardinšek Nataša, Senekovič Stanislav, Sojč Natalija, Utenkar Iztok, Zafošnik Milena.
- 1997: (24) Butolo Anton, Dobnik Jerica, Kelbič Mojca, Kodre Zlatka, Konečnik Eva, Kovač Gabrijela, Kovačič Ildiko, Krajnc Vesna, Kristovič Suzana, Lazarev Vojislav, Letnar Helena, Lovrenčec Ciril, Meža Zvone, Oman Mojca, Pačnik Helena, Petek Suzana, Podgoršek Marjeta, Potočnik Milena, Prah Klemen, Radej Bernardka, Sagadin Metka, Šoštarič Sergeja, Vidovič Melita, Županič Jasna.
- 1998: (27) Babič Leonida, Bačani Smiljan, Brantuša Agata, Čuš Franc, Damjanović Dean, Ferčak Sonja, Filipčič Dragica, Germ Nataša, Harkai Štefan, Ivanovič Melita, Jesenek Mirjana, Kolerič Darja, Krpič Jasminka, Kržan Franc, Majcen Franc, Mejavšek Martina, Milatič Andreja, Petek Sonja, Pojbič Darja, Pungartnik Matjaž, Pustoslemšek Natalija, Rošer Irena, Rubelj Gordana, Škrabel Koser Lidija, Umer Debora, Žerjal Gabrijela, Ževart Marija.
- 1999: (36) Buršič Ruda, Butolen Milenka, Celcer Vesna, Čontala Polona, Ferjanc Stanislava, Ferk Boris, Flogie Julija, Frece Biljana, Guček Verica, Horvat Marinela, Jelnikar Kristina, Jeršič Aleksander, Kelc Manfred, Kočevar Marija, Kop Gregor, Koprivnjak Lidija, Mandl Mateja, Možič Marjetka, Mravljak Janja, Pirman Matjaž, Podgoršek Urška, Pozne Tomaž, Pučnik Mateja, Rančigaj Lučka, Škerget Jasna, Škornik Cvetka, Štih Aleksandra, Tomažič Polona, Tratnik Hrabro, Vargazon Simona, Vrabec Radovan.
- 2000: (33) Arl Maja, Bec Saša, Bedrač Jasmina, Bevc Mateja, Čuš Suzana, Drobne Natalija, Flis Renato, Gorišek Petra, Gorišek Tomo, Gorjup Mojca, Hriberšek Valerija, Kamplet Irena, Kotnik Mateja, Petek Bernard, Potočnik Melita, Premec Inka, Pustatičnik Jožica, Ris Snježana, Samastur Silvestra, Stubelj Tatjana, Šebjanič Tatjana, Šiško Andreja, Šovegeš Gordana, Tement Danijel, Tihec Aleš, Tomažič Dušan, Uranc Simona, Veić Lilijana, Visočnik Danica, Vrbnjak Metka, Zidar Matejka, Žibret Božidar, Žumer Aleš.
- 2001: (22) Ajtnik Lidija, Božič Neža, Brežnik Nataša, Cizej Helena, Čeh Maja, Črnivec Gordana, Fras Maksimiljan, Godunc Tjaša, Gostenčnik Helena, Hanjže Janja, Jelen Brigita, Kodrič Lidija, Kolarič Tamara, Kosmač Vesna, Lipič Nikolaj, Lukman Stojan, Pušnik Mateja, Sakač Simona, Sterže Jana, Zupanc Tadeja, Žunko Mojca, Županc Breda.
- 2002: (41) Brenčič Miha, Brezovac Boris, Cizerl Mateja, Červek Natalija, Dragšić Simon, Firer Peter, Fruhtvirt Polona, Galun Tanja, Gutman Lea, Herman Uroš, Horvat Lidija, Hren Sandra, Hrnec Jasmina, Kaube Anita, Kerin Zorica, Korošec Nataša, Kosem Iztok, Kostanjevec Nataša, Košir Suzana, Kukovec Sebastjan, Kušar Dejan, Lang Monika, Lazar Urška, Majerič Boštjan, Marin Bojana, Marinčič Anica, Merzdovnik Gordana, Motaln Natalija, Petrič Mateja, Poljanšek Urška, Poredoš Zoran, Potočnik Maja, Povh Irena, Sedar Lidija, Slivnik Darja, Stermšek Darja, Studnička Alenčica, Vrešak Katarina, Zalokar Tatjana, Železnik Miran, Žmaher Nataša.
- 2003: (45) Andrejčič Anton, Gabrijel Dušan, Gognjavec Vera, Grafenauer Danijel, Hari Matek Romana, Hren Tatjana, Habot Zoran, Hribernik Miro, Jerot Katja, Jesenek Petra, Karakaš Jasmina, Kolar Nataša, Krumpak Mateja, Lenartič Andrej, Likar Jasmina, Lončar Nina, Majdič Melanija, Marđetko Aleš, Mikola Danica, Mirič Klavdija, Mlakar Marjetka, Novak Jasna, Panjan Stanislava, Pauman Sebastjan, Pincolič Vlasta, Plevnik Jure, Plohl Igor, Polanec Martina, Pritržnik Marko, Pulko Radovan, Rečnik Tanja, Roškar Branka, Sabo Sibila, Skok Marko, Srdinšek Marija, Strašek Simona, Šijanec Branka, Šuman Tatjana, Tajnikar Alenka, Uršič Jožica, Zadravec Igor, Zrilič Tina, Zrnec Robert, Zupan Shaar Marija, Žorž Irena.
- 2004: (33) Berglez Sušek Danijela, Bukovnik Matej, Časl Petra, Čerček Aleš, Domitrovič Tjaša, Fridl Mojca, Gomboc Silvestra, Hvala Katja, Javernik Igor, Kelemina Aleksander, Kelhar Jurij, Kelt Saška, Kikec Tatjana, Knez Jure, Kocjan Ljudmila, Košak Metka, Krivec Karmen, Kumer Petra, Lončar Simona, Muš Silvija, Nemec Bogomir, Ogriz Maja, Pelcar Simona, Petek Jasmina, Piko Mihaela, Polanec Anita, Purkert Vilma, Rotar Biserka, Rus Andreja, Taučer Maja, Vauh Helena, Zdovc Natalija, Zelko Mateja.
- 2005: (36) Bezenšek Anton, Brence Nataša, Dervarič Daniela, Domiter Barbara, Donko Tanja, Došen Milan, Dreven Alan, Fištravec Petra, Florjanc Katja, Godec Gregor, Gorupić Daria, Habjanič Matjaž, Hanžič Severina, Hozjan Boris, Jerman Rok, Kasjak Mojca, Kerček Matjaž, Klemenčič Jerneja, Knap Barbara, Kolbl Boštjan, Kolenko Vesna, Koper Aleš, Kovač Jovita, Kramberger Dejan, Krašovec Urška, Marčič Urška, Nemec Ernest, Oršič Tomaž, Rampre Simona, Rebernak Lilijana, Šauer Marija, Štinjek Martin, Štrafela Darko, Videc Andreja, Voljč Marko, Žinko Vesna.
- 2006: (42) Belec Simon, Bratuša Milena, Bratuša Sabina, Gaber Irena, Gal Tina, Golob Tomislav, Goltes Nataša, Hajnc Andrej, Holsedl Zdenka, Ješovnik Aleš, Kamenik Tanja, Katalinić Evelina, Keber Igor, Kocutar Stanislav, Kopinč Igor, Kotnik Lidija, Kotnik Nevenka, Krefl Saša, Lovše Maja, Mešiček Jožek, Mežič Mateja,

Mohorko Petra, Mosbruker Mojmir, Moškotevc Marko, Ošlaj Andreja, Podrzavnik Janja, Pozeb Liljana, Pungaršek Martina, Radišek Jure, Rajh Primož, Špindler Urška, Štefanič Maja, Težak Alenka, Topolovec Metka, Trstenjak Tadej, Turk Mateja, Vičič Janez, Vršič Barbara, Vugrinec Vanja, Vusič Simona, Žunko Irena, Žuran Putora Tanja.
- 2007: (40) Amon Irena, Arnšek Metka, Barl Vlasta, Borovnik Aleksandra, Brglez Boštjan, Ekselenski Zdenka, Gregor Dejan, Jakulin Petra, Jurač Vesna, Kac Dejan, Karlovšek Ambrož, Klaneček Jasna, Kocuvan Kristina, Kolenc Janja, Kovač Iris, Kozmus Urška, Kraner Matej, Krček Andrej, Lešnik Jasna, Milharčič Andreja, Osojnik Darinka, Petek Miran, Petrovič Sonja, Pisar Valentina, Podjed Maja, Pušnik Barbara, Ružič Aleksander, Seibert Tina, Skrbinjek Vesna, Stanek Špela, Strmšek Tine, Strniša Lea, Škornik Danijela, Škrinjar Boris, Šnofl Ana, Šrajner Maja, Štraus Saša, Tratar Jožefa, Vračko Kristina, Zorjan Barbara.
- 2008: (38) Bauman Jan, Bratuša Petra, Brdnik Tanja, Bunšek Sabina, Čuček Primož, Drobnič Alenka, Fučec Suzana, Globovnik Nina, Golob Dušan, Gostonj Natalija, Gošnik Sašo, Gradišnik Peter, Grum Tanja, Jelenčič Nenad, Jevšnik Nataša, Kališnik Boštjan, Kokot Mojca, Koštric Uroš, Kotnik Nataša, Leopold Matjaž, Leskovar Rok, Marguč Karmen, Matavž Maja, Meklav Tanja, Nunčič Vladko, Paušič Andrej, Pernat Katarina, Peršuh Anita, Poš Milojka, Pušnik Barbara, Rup Davor, Steiner Monika, Suša Tanja, Šadl Kristjan, Škrubej Barbara, Vilčnik Vesna, Zabavnik Milan, Žibret Marija.
- 2009: (39) Ačanski Darja, Bornekar Staša, Dobršek Manica, Dobnik Vesna, Gobec Simona, Gošte Martina, Herič Suzana, Ivajnšič Danijel, Jakopič Jasmina, Javornik Darja, Jazbinšek Kristina, Kidrič Aleksander, Kociper Doroteja, Kotnik Renata, Križanec Mojca, Kustec Aleš, Lah Petra, Letnik Viktorija, Magdič Barbara, Mihalič Alenka, Murko Klavdija, Murko Uroš, Mušič Nataša, Neureiter Jasmina, Ocvirk Matej, Onuk Lilijana, Ošlak Vesna, Paulin Karmen, Paušič Igor, Potočnik Tamara, Rojs Lenka, Špilak Jožek, Tomc Jasmina, Tome Mateja, Valenčak Mojca, Varga Maja, Vindiš Polonca, Zahrastnik Anja, Zorko Sabina.
- 2010: (36) Bratuša Barbara, Dobnikar Milanka, Furman Vanja, Gojkovič Katja, Hebar Simon, Hriberšek Ivan, Hriberšek Nina, Hronek Lilijana, Ilijev Katarina, Jakob Jernej, Kamnik Ana, Kovač Nina, Krečič Jernej, Križan Jerneja, Krojs Branko, Kržišnik Helena, Kukovec Albina, Mandalenič Petra, Mauko Jernej, Onič Polona, Opravž Lea, Ošlak Vesna, Pahole Jasmina, Plešnik Teja, Pupavac Maša, Rakuša Silva, Rejec Patricija, Renko Maja, Rozman Lončar Simona, Senekovič Jasna, Šoba Katja,Tomšič Tibor, Vindiš Jasmina, Žagar Jerneja, Železnik Jožef, Žokš Mateja.
Vir: COBISS, 2011.

Novo obdobje v razvoju Oddelka za geografijo predstavlja pričetek izvajanja podiplomskega študijskega programa, ki ga je leta 1998 potrdil Svet za visoko šolstvo RS, na Pedagoški fakulteti pa se je pričel prvič izvajati v študijskem letu 1999/2000. **Podiplomski študijski program Geografija za področje izobraževanja** je pomenil uresničevanje pogojev za raziskovalno dejavnost na področju pedagoške geografije in za vzpodbujanje profesionalne rasti učiteljev geografije. Med pomembne namene uvajanja podiplomskega študija štejemo tudi utrjevanje vloge Pedagoške fakultete v Mariboru kot celovite izobraževalne ustanove in dopolnitev ponudbe podiplomskega študija na slovenskih univerzah, saj je bil tovrstni študijski program edini v Sloveniji (Kolenc Kolnik 2006).

Magistrski študij je trajal dve leti, doktorski študij pa štiri leta. Podiplomski študenti so pridobili znanja tako iz geografskih kot izobraževalnih raziskovalnih metod in vsebin aktualnih prostorskih procesov. Usposabljali se za prenašanje teoretičnega znanja v pedagoško prakso in za samostojno raziskovalno delo na področju šolske geografije. Za vsakega študenta se je izdelal individualni študijski program, ki je vključeval t.i. obvezne predmete (npr. Komunikacija z učitelji, Izbrana poglavja iz pedagoškega raziskovanja, Regionalna geografija Slovenije) in izbirne predmete, ki so bili odvisni od individualne študijske orientacije študenta. Kandidat je v treh semestrih študija absolviral 9 obveznih in 3 izbirne predmete, ki jih je izbral med 12 možnimi. Za dokončanje študija je bilo potrebno izdelati magistrsko nalogo in jo uspešno zagovarjati pred komisijo. Za dokončanje doktorskega študija pa je moral kandidat opraviti raziskovalno delo, ki je moralo biti inovativno in metodološka ali vsebinska novost v stroki. Po dokončanju magistrskega študija je kandidat pridobil naziv »magister geografije za področje izobraževanja«, po opravljenem doktorskem študiju pa »doktor geografskih znanosti za področje izobraževanja«.

Podiplomski študenti so prihajali iz celotne države in so bili večinoma diplomanti Oddelka za geografijo Pedagoške fakultete v Mariboru. Število vpisanih v prvi letnik

je nihalo od 1 študenta v prvem letu razpisa podiplomskega študija do največ 7 novincev v študijskem letu 2001/2002. V zadnjem obdobju se je vpis v podiplomski študijski program zmanjševal, saj je bil študij precej zahteven in ga je ob delu končalo le manjše število vpisanih študentov. Zadnji vpis je bil v študijskem letu 2008/2009, saj so bili takrat z bolonjsko reformo ukinjeni vsi stari podiplomski študijski programi.

Preglednica 5: Število vpisanih študentov v 1. letnik podiplomskega študijskega programa Geografije za področje izobraževanja med letoma 1999 in 2009.

	1999 /00	2000 /01	2001 /02	2002 /03	2003 /04	2004 /05	2005 /06	2006 /07	2007 /08	2008 /09
1. letnik	1	4	7	5	5	2	1	1	0	1

Vir: Referat za podiplomski študij Pedagoške in Filozofske fakultete Maribor, 2011.

- Naziv »magister geografije za področje izobraževanja« so pridobili: Prah Klemen (2006), Kosmač Vesna (2007), Rojko Dušan (2010).
- Naziv »doktor geografskih znanosti za področje izobraževanja« so pridobili: Konečnik Kotnik Eva (2008), Prah Klemen (2009).

V obdobju konec 80. in v začetku 90. let je prišlo na Oddelku za geografijo do menjave generacij univerzitetnih učiteljev, obenem pa se je oddelek tudi kadrovsko okrepil in osamosvojil, saj sta iz Oddelka za geografijo in zgodovino sta nastala dva samostojna oddelka. V preglednici so navedeni redno zaposleni sodelavci oddelka (glede na čas delovanja), kot pogodbeni sodelavci pa so pri izvajanju študijskega programa različno število let (zlasti v času uvajanja novega študijskega programa v 80. letih) sodelovali tudi mnogi zunanji sodelavci (večina s Filozofske fakultete v Ljubljani): dr. Andrej Černe, dr. Matjaž Jeršič, dr. Vladimir Klemenčič, mag. Anka Kristan, dr. Jurij Kunaver, mag. Zoran Kus, dr. Franc Lovrenčak, dr. Mirko Pak, dr. Rajko Pavlovec, dr. Stane Pelc, dr. Dušan Plut, dr. Marjan Ravbar in dr. Igor Vrišer (Kolenc Kolnik, 2006).

Preglednica 6: Seznam redno zaposlenih sodelavcev Oddelka za geografijo Pedagoške fakultete v Mariboru v letih 1986 – 2006.
Vir: Skupne službe Pedagoške fakultete Maribor – Kadrovska služba, 2006.

dr. BELEC BORUT	redni profesor, zaslužni profesor Univerze v Mariboru	1986 - 2000
dr. BRAČIČ VLADIMIR	redni profesor	1986 - 1991
dr. DROZG VLADIMIR	izr. profesor	1989 - … (2011)
dr. HORVAT UROŠ	docent	1987 - … (2011)
dr. KOLENC–KOLNIK KARMEN	izr. profesorica	1990 - … (2011)
dr. KERT BOŽIDAR	izr. profesor	1986 do 1998
mag. KONEČNIK-KOTNIK EVA	asistentka	1999 - …(2011)
dr. KRAJNC DIMITRIJ	asistent	1996 - 2001, 2003 - 2004
mag. KUS ZORAN	asistent	1989 - 1990
dr. LORBER LUČKA	dr. docentka	2002 - … (2011)
OLAS LUDVIK	višji predavatelj	1986 - 1991
mag. PETAUER MILENA	asistentka	2000 - 2011
mag. POČKAJ HORVAT DAMIJANA	asistentka	1987 - 1999
dr. VOVK KORŽE ANA	red. profesorica	1990 - … (2011)
dr. ŽIBERNA IGOR	docent	1989 - … (2011)

4. Obdobje Filozofske fakultete Maribor (2006-2011) - »bolonjski« študijski programi 1., 2. in 3. stopnje

Obsežnost pedagoških in raziskovalnih nalog fakultete, predvsem pa raznolikost fakultetnih programov in rast števila slušateljev, so prerasli okvire ene fakultete, tako da se je v letu 2006 Pedagoška fakulteta v Mariboru preoblikovala v tri fakultete. Oddelek za geografijo se je vključil v Filozofsko fakulteto, ki je postala središče humanističnega in družboslovnega razvoja v severovzhodni Sloveniji.

Nastanek nove fakultete se je časovno prekrival tudi s prenovo visokošolskega študija, ki potekalo po vsej Evropi. Ta je narekovala poenotenje strukture in strategije dodiplomskega in podiplomskega izobraževanja in s tem večjo primerljivost in prehodnost med fakultetami ter dvig kvalitete študija. Novo oblikovani študijski programi so bili izdelani na podlagi nove visokošolske zakonodaje (Zakon o visokem šolstvu, 2004) in usklajeni z načeli Bolonjske deklaracije. Med drugim študijskimi in normativnimi novostmi so prinašali večjo izbirnost in bolj individualno zastavljene študijske poti. To je zahtevalo tematsko bolj usmerjene študijske predmete in več sodelovanja med oddelki znotraj fakultete in med fakultetami, obenem pa se je povečevala tudi interdisciplinarnost, kar je predstavljalo priložnost in hkrati nov izziv za geografijo kot interdisciplinarno vedo (Kolenc Kolnik 2006).

Vse navedeno je prineslo vrsto novosti pri študiju geografije v Mariboru. Dotedanji štiriletni univerzitetni dvopredmetni pedagoški študijski program Geografija in … (zadnji vpis v 1. letnik v študijskem letu 2007/2008) ter podiplomski študijski program Geografija za področje izobraževanja (zadnji vpis v 1. letnik v študijskem letu 2008/2009) so pričeli postopoma zamenjevati novi študijski programi, pripravljeni v skladu z Bolonjsko deklaracijo (3+2+3):

- 1. stopnja: v študijskem letu 2008/2009 smo pričeli izvajati nov bolonjski univerzitetni dvopredmetni študijski program prve stopnje Geografija. Diplomanti (z nazivom »diplomiran geograf«) z njim pridobijo znanja, spretnosti in sposobnosti, ki po mednarodnih standardih veljajo za temeljna s področja geografije, in so usposobljeni za samostojno spoznavanje in interpretacijo pokrajine. Dosežena izobrazba jim omogoča uspešen vpis v magistrski študijski program s področja geografije.
- 2. stopnja: v študijskem letu 2011/2012 smo pričeli izvajati dvopredmetni pedagoški študijski program druge stopnje Geografija, ki je (kot naslednik dosedanjega pedagoškega programa) namenjen pridobivanju znanja in veščin za prenašanje znanja na mlajše generacije in poučevanje v osnovnih in srednjih šolah (diplomanti pridobijo naziv »mag. profesor geografije«). V postopku izdelave je tudi dvopredmetni študijski program druge stopnje Regionalne okoljske študije, ki bi omogočil nadaljevanje podiplomskega študija tudi študentom, ki jih ne zanima pedagoška usmeritev. Glavni cilj predvidenega študijskega programa je usposobiti študenta za samostojno in poglobljeno analizo, sintezo in interpretacijo pokrajinskih razmer, ter za pridobivanje znanj s področja reševanja okoljskih problemov ter pridobivanje in aplikacijo znanj pri vodenju in izpeljavi razvojnih projektov lokalnih skupnosti (opomba: trenutno še ni znano, kdaj bo študijski program akreditiran in se bo pričel izvajati).
- 3. stopnja: nadgradnjo magistrskega študijskega programa predstavlja doktorski študijski programa tretje stopnje Geografija, ki smo ga pričeli izvajati v študijskem letu 2011/2012, in je namenjen izobraževanju kadrov (z nazivom »doktor znanosti«), ki so usposobljeni za ustvarjanje in razvijanje novega znanja, novih

raziskovalnih metod ter novih oblik prenosa znanja s področja geografije

Temeljni cilji **univerzitetnega dvopredmetnega študijskega programa 1. stopnje Geografija** so:
- izobraževanje kadrov, ki bodo pridobili znanja, spretnosti in sposobnosti, ki po mednarodnih standardih veljajo za temeljna iz področja geografije;
- izobraževanje kadrov, ki bodo usposobljeni za prepoznavanje in analizo aktualnih procesov in razmer v pokrajini in za prenos teh spoznanj v dokumente in dejanja, ki so pomembna za razvoj naše skupnosti;
- izobraževanje kadrov, ki bodo sposobni kritično vrednotiti socialne, gospodarske in ekološke razmere v pokrajini, z namenom vzpostavljanja trajnostnega gospodarskega in socialnega razvoja;
- poglabljanje znanja o prostorskih strukturah na globalnem, regionalnem in lokalnem nivoju, še posebej na območju Slovenije in njenega severovzhodnega dela;
- izobraževanje kadrov tako, da jim bo zaključeni študij omogočil uspešno vključevanje v magistrske študijske programe s področja geografije in sorodnih prostorskih ved.

Splošne in predmetnospecifične kompetence, ki jih pridobi diplomant, so navedene v akreditacijski vlogi in dostopne na spletni strani Filozofske fakultete v Mariboru (http://www.ff.uni-mb.si/oddelki/geografija/studijski-programi.dot), kjer se nahajajo tudi vsi drugi podatki o študijskem programu (pogoji za vpis, predmetnik, učni načrti predmetov, pogoji za napredovanje, idr.).

V študijski program se lahko vpiše kdor je opravil maturo, oziroma kdor je pred 1. 6. 1995 končal katerikoli štiriletni srednješolski program. Predviden je vpis 60 študentov na redni študij in 20 študentov na izredni študij. Študij traja 6 semestrov. Predmetnik je sestavljen iz 23 učnih enot, od tega je 18 obveznih (75 ECTS) in 5 izbirnih (15 ECTS). Izbirne učne enote izbere študent s seznama izbirnih geografskih predmetov.

Preglednica 7: Predmetnik univerzitetnega dvopredmetnega študijskega programa 1. stopnje Geografija.

Semester	Nosilec	Učna enota	ECTS
1.	Kolnik	Uvod v geografijo	3
	Žiberna	Planetarna geografija	3
	Žiberna	Geomorfologija	4
	Horvat	Geografija prebivalstva	5
2.	Žiberna	Klimatogeografija	5
	Vovk Korže	Hidrogeografija	4
		Izbirni geografski predmet 1	3
		Izbirni geografski predmet 2	3
3.	Horvat	Kartografija in GIS	5
	Lorber	Statistika v geografiji	3
	Lorber	Ekonomska geografija	7
4.	Vovk Korže	Geografija prsti in rastlinstva	5
	Drozg	Socialna in kulturna geografija	4
		Izbirni geografski predmet 3	3
		Izbirni geografski predmet 4	3
5.	Vovk Korže	Geografija slovenskih pokrajin	4
	Lorber	Socioekonomske strukture slovenskih pokrajin	3
	Drozg	Geografija naselij	5
	Žiberna	Ekološka geografija	3
6.	Drozg	Regionalna geografija Evrope	5
	Horvat	Geografija turizma	4
		Izbirni geografski predmet 5	3
		Diplomski seminar	3

Vir : http://www.ff.uni-mb.si/oddelki/geografija/studijski-programi.dot.

Izbirni geografski predmeti (3 ECTS): (Kolnik) Projektno in timsko delo v geografiji, (Žiberna) Antropogene klimatske spremembe, (Vovk Korže) Sonaravno urejanje voda, (Vovk Korže) Varovanje prsti, (Vovk Korže) Terenske in laboratorijske raziskave v pokrajini, (Lorber) Prometna geografija, (Drozg) Geografija podeželja, (Horvat) Turistične regije v Evropi, (Kolnik) Aplikativnost geografije v družbi.

Po opravljenih vseh s študijskim programom predpisanih študijskih obveznosti diplomant(ka) pridobi naslov: diplomirani geograf (UN) (kratica: dipl. geog. (UN)) oz. diplomirana geografinja (UN) (kratica: dipl. geog. (UN)) in naslov, ki ga pridobi na drugem delu univerzitetnega dvopredmetnega študijskega programa.

Temeljni cilji (magistrskega) **dvopredmetnega pedagoškega študijskega programa 2. stopnje Geografija** so:
- izobraževanje kadrov, ki bodo ob zaključku študijskega programa pridobili znanja, spretnosti in sposobnosti, ki po mednarodnih standardih veljajo za temeljna iz področja izobraževanja učiteljev geografije, s čimer bodo usposobljeni za poučevanje geografije na osnovnošolskem in srednješolskem nivoju;
- izobraževanje kadrov, ki bodo usposobljeni za prepoznavanje in analizo aktualnih procesov in razmer na področju izobraževanja in za prenos teh spoznanj v dokumente in dejanja, ki so pomembna za razvoj izobraževanja v občem smislu kot v smislu pouka geografije;
- izobraževanje kadrov, ki bodo sposobni kritično vrednotiti naravnogeografske, socialne, gospodarske in ekološke razmere v pokrajini oz. v geografskem prostoru, z namenom izobraževanja za trajnostni razvoj.

Splošne in predmetnospecifične kompetence, ki jih pridobi diplomant, so navedene v akreditacijski vlogi in dostopne na spletni strani Filozofske fakultete v Mariboru (http://www.ff.uni-mb.si/oddelki/geografija/studijski-programi.dot), kjer se nahajajo tudi vsi drugi podatki o študijskem programu (pogoji za vpis, predmetnik, učni načrti predmetov, pogoji za napredovanje, idr.).

V študijski program se lahko vpiše kdor je končal študijski program prve stopnje v obsegu najmanj 180 ECTS s področja geografije. Vpišejo se lahko tudi kandidati, ki so končali študijski program prve stopnje v obsegu najmanj 180 ECTS s področja drugih družboslovnih, humanističnih in naravoslovnih ved, če je pred vpisom opravil študijske obveznosti, ki so bistvene za nadaljevanje študija na dvopredmetnem pedagoškem študijskem programu druge stopnje Geografija. Te obveznosti obsegajo do 15 ECTS, kandidat pa jih doseže z opravljanjem diferencialnih izpitov pred vpisom. Izpiti se kandidatu določijo individualno, izberejo pa se iz nabora študijskih predmetov). Ostali pogoji so razvidni iz vsakokratnega razpisa. Predviden je vpis 40 študentov na redni študij in 15 študentov na izredni študij.

Študij traja 4 semestre. Predmetnik sestavljata dva sklopa študijskih predmetov; t.s. študijski predmeti s področja geografije (30 ECTS), ki so usmerjeni v spoznavanje različnih prostorskih enot (od lokalnega, regionalnega, kontinentalnega do globalnega nivoja) ter študijski predmeti s področij pedagogike, didaktike in psihologije (60 ECTS), s pomočjo katerih študenti pridobivajo teoretična in praktična znanja s področja izobraževanja in poklica učitelja geografije. Predmeti iz drugega sklopa (*) so skupni obema študijskima področjema dvopredmetnega študijskega programa.

Po opravljenih vseh s študijskim programom predpisanih študijskih obveznosti diplomant(ka) pridobi naslov: magister profesor geografije (kratica: mag. prof. geog.) oz. magistrica profesorica geografije (kratica: mag. prof. geog.) in naslov, ki ga pridobi na drugem delu dvopredmetnega pedagoškega študijskega programa.

Preglednica 8: Predmetnik dvopredmetnega pedagoškega študijskega programa 2. stopnje Geografija.

Semester	Nosilec	Učna enota	ECTS
1.	Pšunder	Pedagogika	3*
	Javornik Krečič	Didaktika	5*
	Bakračevič, idr.	Psihologija učenja in razvoj mladostnika	5*
	Schmidt	Delo z otroki s posebnimi potrebami	3*
	Bakračevič, idr.	Interdisciplinarna opazovalna praksa	2*
	Kolnik	Didaktika geografije 1	3
	Kolnik	IKT pri pouku geografije	3
2.		Izbirni pedagoški predmet 1	3*
		Izbirni pedagoški predmet 2	3*
	Kolnik	Didaktika geografije 2	5
	Kolnik	Pedagoški praktikum Geografija 1	3
	Horvat	Regionalna geog. Severne Amerike in Avstralije	4
3.	Kolnik	Didaktika geografije 3	3
	Vovk Korže	Regionalna geografija Azije	4
	Vovk Korže	Regionalna geografija Afrike	4
	Horvat	Regionalna geografija Latinske Amerike	4
4.	Kolnik	Pedagoški praktikum Geografija 2	4
		Izbirni geografski predmet	3
		Magistrski seminar in magistrsko delo	8

Vir : http://www.ff.uni-mb.si/oddelki/geografija/studijski-programi.dot.

* Predmeti s področij pedagogike, didaktike in psihologije so skupni obema študijskima področjema dvopredmetnega študijskega programa.
Izbirni pedagoški predmeti (3 ECTS): na seznamu je 23 predmetov in se izvajajo na različnih oddelkih FF UM (http://www.ff.uni-mb.si/oddelki/geografija/studijski-programi.dot).
Izbirni geografski predmeti (3 ECTS): (Vovk Korže) Terensko delo pri pouku geografije - Fizična geografija, (Drozg) Terensko delo pri pouku geografije - Družbena geografija, (Žiberna) Podnebne spremembe, (Vovk Korže) Trajnostni razvoj zavarovanih območij, (Lorber) Globalizacija.

Temeljni cilji (doktorskega) **študijskega programa 3. stopnje geografija** so:
- izobraževanje kadrov, ki bodo usposobljeni za ohranjanje in prenašanje znanja iz področja geografije ter kritičnega vrednotenja dosedanjih dosežkov geografske znanosti;
- izobraževanje kadrov, ki bodo usposobljeni za ustvarjanje in razvijanje novega znanja iz področja geografije, novih raziskovalnih metod ter novih oblik prenosa znanja uporabnikom;
- izobraževanje kadrov, ki bodo usposobljeni prepoznati in ob uporabi znanstvenih metod ter etičnih načel, ovrednotiti obravnavani pojav;
- izobraževanje kadrov, ki bodo po zaključku študijskega programa usposobljeni za raziskovalno delo na področju geografije, aplikativne geografije in šolske geografije.

Splošne in predmetnospecifične kompetence, ki jih pridobi diplomant, so navedene v akreditacijski vlogi in dostopne na spletni strani Filozofske fakultete v Mariboru (http://www.ff.uni-mb.si/oddelki/geografija/studijski-programi.dot), kjer se nahajajo tudi vsi drugi podatki o študijskem programu (pogoji za vpis, predmetnik, učni načrti predmetov, pogoji za napredovanje, idr.).

V študijski program se lahko vpiše kdor je končal magistrski študijski program 2. stopnje. Vpiše se lahko tudi kandidat, ki je končal univerzitetni študijski program,

sprejet pred 11. 6. 2004 ali visokošolski strokovni študijski program, sprejet pred 11. 6. 2004, in študijski program za pridobitev specializacije. Kandidatom se določijo študijske obveznosti v obsegu 60 ECTS, kandidat pa jih doseže z opravljanjem diferencialnih izpitov pred vpisom v doktorski študijski program. Diferencialni izpiti se kandidatu določijo individualno, izberejo pa se iz nabora študijskih predmetov. Predviden je vpis 10 študentov na redni študij.

Študij traja 6 semestrov. Predmetnik je sestavljen iz obveznih in izbirnih predmetov. Obvezni predmeti se nanašajo na splošna teoretska in metodološka znanja iz geografije in splošna znanja o metodologiji raziskovalnega dela. Izbirne predmete kandidat izbere glede na vsebino disertacije in lasten študijski interes. Tudi vsebina individualnega raziskovalnega dela (IRD) se praviloma navezuje na temo disertacije, lahko pa obsega sodelovanje v raziskovalnem projektu oddelka. Takšna zasnova predmetnika je v čim večji meri prilagojena raziskovalnemu področju in interesu kandidata. Po opravljenih vseh s študijskim programom predpisanih študijskih obveznosti kandidat(ka) pridobi naslov: doktor znanosti oz. doktorica znanosti (kratica: dr.)

Preglednica 9: Predmetnik študijskega programa 3. stopnje Geografija.

Semester	Nosilec	Učna enota	ECTS
1.	Žiberna	Teorije in metode v fizični geografiji	15
	Drozg	Teorije in metode v družbeni geografiji	15
2.	Vovk Korže	Teorije in metode v regionalni geografiji	15
	Čagran	Metodologija raziskovalnega dela	5
		Individualno raziskovalno delo 1	10
3.		Izbirni predmet 1	10
		Izbirni predmet 2	10
		Individualno raziskovalno delo 2	10
4.		Izbirni predmet 3	10
		Izbirni predmet 4	10
		Individualno raziskovalno delo 3	10
5.		Doktorsko delo 1. del	30
6.		Doktorsko delo 2. del	30

Vir : http://www.ff.uni-mb.si/oddelki/geografija/studijski-programi.dot

Izbirni predmeti (10 ECTS): (Vovk Korže) Prsti v pokrajini, (Vovk Korže) Vode v pokrajini, (Žiberna) Podnebje in človek, (Žiberna) Geomorfološki sistemi, (Lorber) Socialnoekonomska tranzicija obmejnih območij, (Lorber) Geografija podeželja, (Lorber) Ekonomska geografija in regionalni razvoj, (Horvat) Geografija turizma, (Horvat) Geografija prebivalstva, (Drozg) Urejanje prostora, (Drozg) Zgradba mesta, (Kolnik) Učenje geografije na prostem, (Kolnik) Geografsko izobraževanje za trajnostni razvoj, (Kolnik) Didaktika geografije in raziskovalni trendi, (Kolnik) Geografski kurikul kot proces, (Pšunder) Komunikacija v izobraževanju.

V preglednici je navedeno število vpisanih študentov v nov univerzitetni študijski program 1. stopnje, ki se izvaja od študijskega leta 2008/2009. Letno smo v ta študijski program v prvi letnik vpisali 60-65 študentov. V preglednici niso prikazani študenti, ki so bili vpisani v tem obdobju v star štiriletni dvopredmetni pedagoški program, ki ga je postopoma nadomeščal nov bolonjski univerzitetni program 1. stopnje. V študijskem letu 2010/2011 smo imeli tako vpisano zadnjo generacijo (4. letnik) starega univerzitetnega programa, obenem pa smo septembra 2011 dobili tudi prve diplomante novega univerzitetnega programa 1. stopnje. Njihovo število je bilo precej nizko, saj je bil v prvi generaciji bolonjskih študentov precejšen osip, obenem pa se jih je večina odločila za vpis v absolventski staž. V študijskem letu

2011/2012 smo prvič vpisali študente v nov magistrski pedagoški program in v doktorski program.

Preglednica 10: Število vpisanih študentov na univerzitetnem dvopredmetnem študijskem programu 1. stopnje Geografija med letoma 2008 in 2011.

Letnik	2008/09	2009/10	2010/11	2011/12
1.	63	57	65	64
2.	-	32	43	42
3.	-	-	24	33
Skupaj	63	89	132	139

Vir: Referat za študentske zadeve Filozofske fakultete v Mariboru, 2011.

Na Oddelku za geografijo je bilo v študijskem letu 2010/11 redno zaposlenih šest visokošolskih učiteljev, ena asistentka in ena mlada raziskovalka. Število asistentov se je v primerjavi s preteklim obdobjem zmanjšalo, predvsem zaradi manjšega števila pedagoških ur, do katerega je prišlo s krčenjem ur v predmetniku v zadnjih dveh študijskih letih, ko smo morali obseg kontaktnih ur (predavanj, seminarjev in seminarskih vaj) v študijskem programu prilagoditi razpoložljivim finančnim sredstvom. Pri visokošolskih učiteljih so v preglednici navedene tudi učne enote, ki jih izvajajo v univerzitetnem dvopredmetnem študijskem programu 1. stopnje Geografija in dvopredmetnem pedagoškem študijskem programu 2. stopnje Geografija. Kot zunanji sodelavec je sodeloval asistent Danijel Ivajnšič.

Preglednica 11: Seznam redno zaposlenih sodelavcev Oddelka za geografijo Filozofske fakultete v Mariboru v letu 2011.

- red. prof. ddr. ANA VOVK KORŽE, ana.vovk@uni-mb.si (Hidrogeografija, Geografija prsti in rastlinstva, Geografija slovenskih pokrajin, Sonaravno urejanje voda, Varovanje prsti, Terenske in laboratorijske raziskave v pokrajini, Regionalna geografija Azije, Regionalna geografija Afrike, Terensko delo pri pouku geografije-Fizična geografija, Trajnostni razvoj zavarovanih območij)
- izr. prof. dr. VLADIMIR DROZG, vlado.drozg@uni-mb.si (Socialna in kulturna geografija, Geografija naselij, Regionalna geografija Evrope, Geografija podeželja, Terensko delo pri pouku geografije-Družbena geografija)
- izr. prof. dr. KARMEN KOLNIK, karmen.kolnik@uni-mb.si (Uvod v geografijo, Projektno in timsko delo v geografiji, Aplikativnost geografije v družbi, Didaktika geografije 1, 2, 3, Pedagoški praktikum Geografija 1, 2, IKT pri pouku geografije)
- doc. dr. UROŠ HORVAT (predstojnik oddelka), uros.horvat@uni-mb.si (Geografija prebivalstva, Kartografija in GIS, Geografija turizma, Turistične regije v Evropi, Regionalna geografija Severne Amerike in Avstralije, Regionalna geografija Latinske Amerike)
- doc. dr. LUČKA LORBER, lucka.lorber@uni-mb.si (Ekonomska geografija, Socioekonomske strukture slovenskih pokrajin, Statistika v geografiji, Geografija prometa, Globalizacija)
- doc. dr. IGOR ŽIBERNA, igor.ziberna@uni-mb.si (Planetarna geografija, Klimatogeografija, Geomorfologija, Ekološka geografija, Antropogene klimatske spremembe, Podnebne spremembe)
- asistentka dr. EVA KONEČNIK KOTNIK, eva.konecnik@uni-mb.si
- mlada raziskovalka MOJCA KOKOT KRAJNC, mojca.kokot@uni-mb.si

Vir: Kadrovska služba Filozofske fakultete v Mariboru, 2011.

Znanstveno-raziskovalna dejavnost članov Oddelka za geografijo se je vse od začetka delovanja odzivala na aktualne družbene potrebe. V 80. letih je bila usmerjena predvsem v agrarno in regionalno geografijo, v začetku 90. let pa v preučevanje obmejnih območjih v severovzhodni Sloveniji, v izdelavo regionalnogeografske monografije Slovenije ter razvijanje učnih gradiv s področja didaktike geografije. V zadnjem desetletju se je raziskovalno področje precej razširilo. Obstoječim temam so se pridružile nove, zlasti s področja fizične in družbene geografije (predvsem klimatogeografije, hidrogeografije, pedogeografije, ekonomske geografije, geografije turizma, geografije naselij, ekološke geografije, varstva okolja, ekoremediacij) ter didaktike geografije. Kot primer lahko navedemo

vključevanje članov oddelka v nekatere mednarodne, bilateralne in domače projekte v zadnjem desetletju: Ecoprofit International, Competence Network »Water Resources and Their Management«, Comenius 2.1 »Förderung von Minderheitensprachen im mehrsprachigen Raum in der Lehrerbildung«, Herodot - Exciting Geography of Europe, EUBIS – EU-Burgerschaft: »Geselschafthes Engagement fur Europa beginnt in der Schule«, Partnerstvo fakultet in šol, GRUNDTVIG 2 »Environmental Heritage«, Leonardo da Vinci, »Water for Life - Education for Water«, Slovenija - vodna učna pot Evrope, Politika inovacij na Češkem in v Sloveniji: institucije, mreženje in regionalni razvoj, Vpliv industrije na regionalni razvoj Slovenije in Bosne in Hercegovine, ReTInA – »Revitalization of Traditional Industrial Areas in SE Europe«, Strategija prostorskega razvoja mestne občine Maribor, idr.

Člani oddelka se redno udeležujejo številnih mednarodnih geografskih konferenc, seminarjev, sodelujejo z geografskimi institucijami doma in tujini. Intenzivno je tudi strokovno delo, saj delujejo kot pisci učbenikov ter člani v različnih strokovnih organih na državni in lokalni ravni. Razvijajo aplikativne študije, povezane zlasti z regionalnim razvojem v SV Sloveniji, organizirajo in sodelujejo na mladinskih raziskovalnih taborih in poletnih šolah, idr. Med pedagoškimi dejavnostmi je potrebno opozoriti še na obliko stalnega strokovnega spopolnjevanja delavcev v vzgoji in izobraževanje, ki ga oddelek izvaja v okviru Centra za pedagoško izobraževanje in strokovno spopolnjevanje, ter sodelovanje članov oddelka na strokovnih seminarjih, ki jih prirejata Zavod za šolstvo in šport ter Ministrstvo za šolstvo, kot pomembnih oblik profesionalizacije ter vseživljenjskega izobraževanja učiteljev geografije. Na seminarjih in pedagoških delavnicah predavatelji posredujejo učiteljem geografije aktualne novostmi s področja geografije in njihove didaktične aplikacije (Kolenc Kolnik, 2006).

Že od 70. let dalje je oddelek v okviru fakultete občasno izdajal posamezne publikacije, ki so bile v večini učna gradiva, poročila znanstveno-raziskovalnih projektov in zborniki različnih domačih in mednarodnih znanstvenih srečanj, ki so bila organizirana v Mariboru. Po letu 1991 je potrebno omeniti predvsem naslednje **publikacije** (vir COBISS): znanstvena monografija Maribor – Marburg (1994), zbornik mednarodne konference Nove smeri prostorskega razvoja (1996), zbornik mednarodne konference Obmejna območja (2001), zbornik Teorija in praksa regionalizacije Slovenije (2004), zbornik Priložnosti v izobraževanju z bolonjsko reformo v Sloveniji (2007), zbornik Slowenien:Transformationen und kleinräumige Vielfalt (pripravljen v Mariboru, izdan v Frankfurtu 2008), idr. Zadnji odmevni zbornik New Challenges for Sustainable Rural Development in the 21st Century smo izdali leta 2009 ob do sedaj največji in najpomembnejši mednarodni geografski konferenci, ki smo jo organizirali v Mariboru, t. j. 17. srečanju komisije Mednarodne geografske zveze (IGU) za trajnost in ruralne sisteme, ki se jo je udeležilo preko 80 udeležencev z vseh kontinentov.

V letu 2006 je Oddelek za geografijo pričeli izdajati znanstveno periodično publikacijo **Revija za geografijo**, ki izhaja dvakrat letno in je poleg tiskane oblike v celoti brezplačno dostopna tudi v elektronski obliki na spletni strani FF UM (http://www.ff.uni-mb.si/zalozba-in-knjigarna). Mednarodni uredniški odbor sestavljajo priznani geografi iz Slovenije in tujih univerz (iz Avstrije, Nemčije, Češke republike, ZDA, Avstralije, Japonske, Brazilije). Članki prinašajo nova znanstvena spoznanja s področja geografije in sorodnih znanstvenih disciplin. V letu 2011 je bila revija uvrščena v naslednje sekundarne bibliografske baze: Current Geographical

Publications, Ulrich's, International Bibliography of the Social Sciences (IBSS) in EBSCOhost, kar jo pri točkovanju v bazi SICRIS uvršča v kategorijo C.

V okviru **mednarodnega sodelovanja** imajo člani oddelka posebej intenzivne stike s Katedro za gospodarsko geografijo Univerze v Bayreuthu, Inštitutom za didaktiko geografije Univerze J.W. Goethe v Frankfurtu, Inštitutom za geografijo Univerze v Gradcu, Katedro za geografijo Univerze v Olomoucu, Geografskim oddelkom Univerze v Pecsi, Visoko pedagoško šolo v Szombathelyu, Geografskim oddelkom Univerze v Zagrebu, idr. Rezultat sodelovanja so številna znanstvena in strokovna srečanja ter publikacije.

V zadnjem obdobju mednarodno sodelovanje vse bolj temelji na bilateralnih sporazumih ter programih mobilnosti. V okviru **programa mobilnosti** Erasmus ima Oddelek za geografijo v letu 2011 sklenjene bilateralne sporazume, ki omogočajo mobilnost profesorjev in študentov, z univerzami v Grazu (Avstrija), Gentu (Belgija), Olomoucu, Pragi (Češka), Pecsi (Madžarska), Bayreuthu, Marburgu (ZRN), Amsterdamu (Nizozemska), Krakovu (Poljska), Banjski Bistrici (Slovaška) in Istambulu (Turčija) (http://www.ff.uni-mb.si/dotAsset/20072.pdf). Poleg programa mobilnosti Erasmus je zelo pomemben tudi srednjeevropski program mobilnosti CEEPUS, v okviru katerega Oddelek za geografijo v Mariboru koordinira univerzitetno mrežo GeoRegNet. Program mobilnosti vključuje 17 partnerskih univerz, t. j. iz Maribora, Ljubljane, Kopra (Slovenija), Gradca (Avstrija), Prage, Olomouca (Češka), Prešova (Slovaška), Krakova (Poljska), Pecsi (Madžarska), Zagreba, Zadra (Hrvaška), Sarajeva, Tuzle, Mostarja (Bosna in Hercegovina), Novega Sada (Srbija), Sofije (Bolgarija) in Oradee (Romunija) (http://www.ff.uni-mb.si/mednarodno-sodelovanje/mobilnost/ceepus). Preko mreže GeoRegNet se vsako leto povečuje število mednarodnih izmenjav študentov in profesorjev. V letu 2008 smo v Mariboru s pomočjo geografov z večjega dela navedenih univerz organizirali prvo geografsko poletno šolo, ki se v naslednjih letih izvaja na drugih partnerskih univerzah v okviru mreže.

Vse **informacije** o Oddelku za geografijo, t. j. o zaposlenih, študijskih programih, gradivih, idr., so dostopne na spletni strani Filozofske fakultete v Mariboru (http://www.ff.uni-mb.si/; http://www.ff.uni-mb.si/oddelki/geografija/). Od začetka leta 2011 je oddelek zastopan tudi na socialnem omrežju Facebook, s skupino »Oddelek za geografijo, FF UM«, ki je namenjena druženju in informiranju študentov in diplomantov geografije v Mariboru in je v njo vključenih že preko 400 članov (http://www.facebook.com/home.php#!/group.php?gid=109780372417496). Na tej spletni strani lahko najdete tudi številne fotografije, ki dokumentirajo živahen utrip dela na oddelku, zlasti na terenskih vajah.

5. Zaključek

Pregled izobraževalnih in znanstveno raziskovalnih dosežkov geografije v Mariboru v zadnjih petdesetih letih kaže velik kvalitativen in kvantitativen napredek. Ta je viden tako v povečevanju števila in vrst študijskih programov, kot tudi v povečevanju števila diplomantov, raziskovalnih projektov, kadrovskih okrepitvah in same odmevnosti doseženih rezultatov dela. Kvalitativni napredek se kaže v prehodu iz višješolskega študija geografije na univerzitetni študij ter možnostih nadaljevanja študija na magistrski in doktorski stopnji. Pomemben kvalitativni premik je opazen tudi v izvedbi (oblikah in metodah) študija ter njegovi povečani fleksibilnosti in interdisciplinarnosti, do česar je prišlo še posebej ob prehodu na t. i. »bolonjske«

študijske programe. V prihodnosti je ob magistrskem pedagoškem dvopredmetnem študiju geografije načrtovan tudi dvopredmetni magistrski nepedagoški študij, kar postavlja pred člane oddelka za geografijo nove izzive, tako v smislu samega oblikovanja študijskega programa, ki bo dovolj atraktiven za študente in bo obenem ponujal alternativo obstoječim magistrskim študijskem programom v Sloveniji in obenem omogočal zaposlitev diplomantov, kot tudi v smislu same kadrovske izvedbe programa (kadrovske okrepitve oddelka). Pri tem računamo tudi na naše diplomante, saj so le-te že do sedaj kadrovsko okrepili oddelek, ki je ob svoji ustanovitvi imel le dva stalna sodelavca. Danes se oddelek lahko pohvali z vrsto uglednih strokovnjakov, ki so zrasli skupaj z njim.

Oddelek za geografijo Filozofske fakultete v Mariboru ima v svoji sedanji sestavi formirane visokošolske učitelje, ki delujejo na različnih znanstvenoraziskovalnih področjih, zlasti tistih, ki jih druge raziskovalne institucije v Sloveniji ne premorejo v tako intenzivni meri. Pri tem je potrebno izpostaviti predvsem področje šolske geografije, biogeografije, proučevanje mikroklime, ekonomske geografije, geografije turizma in urbane geografije. Člani oddelka imajo pomembne reference tako s področja izobraževanja in raziskovanja, kot tudi s področja aplikacije znanstvenih rezultatov. Udeležujemo se mednarodnih geografskih konferenc in seminarjev ter sodelujemo s številnimi geografskimi institucijami doma in tujini. V študijskem procesu dajemo velik poudarek stalnemu izboljševanju kvalitete izobraževanja, obsežnemu terenskemu delu, povezovanju raziskovalnega in pedagoškega dela ter prenosu raziskovalnih dosežkov v prakso in študijski proces.

Omeniti je potrebno tudi obsežno znanstvenoraziskovalno in strokovno delo v zadnjem obdobju. Oddelek za geografijo je organiziral številna znanstvena in strokovna srečanja ter vabil številne tuje predavatelje. V zadnjih letih še posebej spodbujamo tudi mednarodno mobilnost študentov ter njihovo samostojno raziskovalno delo. V letu 2006 smo pričeli izdajati znanstveno revijo Revija za geografijo, ki se je v petih letih izhajanja že uvrstila v številne sekundarne bibliografske baze.

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FIFTY YEARS OF THE DEPARTMENT OF GEOGRAPHY AND THE STUDY OF GEOGRAPHY IN MARIBOR

Summary

The year 2011 marks the 50th years from establishment of the Academy of Education in Maribor. One of its successors is also Faculty of Arts, where is conducted the study of geography. In 1985 the Academy changed to Faculty of Education, and with the establishment of the Faculty of Arts in 2006 the Department of Geography became part of it. An overview of the educational and research achievements of development of geography in Maribor in the last fifty years shows great qualitative and quantitative progress. This is evident both in increasing the number and types of courses, as well as increasing the number of graduates, research projects, strengthening of human resources and of course in the visibility of achieved research results (citations). Qualitative progress is reflected in the transition from the college level of geography studies to university level of studies, and the possibility of further studies on the masters and doctoral level. An important progress is evident in the increased flexibility and interdisciplinarity of the new "Bologna" study programs, which brought a series of innovations, as well as challenges; both for teachers and students.

Department of Geography has in its current composition formed academics that have grown with it, and working in the different scientific fields, particularly those that other geographical institutions in Slovenia do not have in such an intense degree. It is necessary to highlight the particular area of school geography, biogeography, the study of microclimates, economic geography, geography of tourism and urban geography. Members of the department have important references in the field of education and research, as well as applied projects. They participate in international geographical conferences and seminars, and collaborate with a number of geographical institutions at home and abroad. They placed in the academic process great emphasis on continuous improvement of quality of education, intensive fieldwork, linking research and teaching, and transfer research results into practice and study process. In recent years, we especially encourage the international mobility of students and their research work.

It is necessary to highlight the intensive scientific research and professional work in the last period. Department of Geography has organized numerous scientific and professional meetings and invites a number of foreign lecturers. In 2006 we started to publish the scientific journal Journal of Geography, which was within five years of publishing already included in many of the secondary bibliographic database.

All information about the Department of Geography (the staff, curricula, materials, etc.) and the Journal of Geography are available on the website of the Faculty of Arts in Maribor (http://www.ff.uni-mb.si/). Since early 2011, the department also takes part in the social network Facebook, with a group of "Department of Geography, FF UM", designed for socializing and inform students and graduates in geography in Maribor, and it has already involved over 400 members. On this website you can find many photos documenting the vibrant heartbeat of the department, especially during the fieldworks.

NAVODILA ZA PRIPRAVO ČLANKOV V REVIJI ZA GEOGRAFIJO

1. Sestavine članka

Članki morajo imeti naslednje sestavine:
- glavni naslov članka,
- ime in priimek avtorja,
- avtorjeva izobrazba in naziv (na primer: dr., mag., profesor geografije in zgodovine, izredni profesor),
- avtorjev poštni naslov (na primer: Oddelek za geografijo Filozofska fakulteta Univerza v Mariboru, Koroška 160, SI – 2000 Maribor, Slovenija),
- avtorjev elektronski naslov,
- izvleček (skupaj s presledki do 800 znakov),
- ključne besede (do 8 besed),
- abstract (angleški prevod naslova članka in slovenskega izvlečka),
- keywords (angleški prevod ključnih besed),
- članek
- summary (angleški prevod povzetka članka, skupaj s presledki do 8000 znakov).

2. Citiranje v članku

Avtorji naj pri citiranju med besedilom navedejo priimek avtorja in letnico, več citatov ločijo s podpičjem in razvrstijo po letnicah, navedbo strani pa od priimka avtorja in letnice ločijo z vejico, na primer: (Drozg 1995, 33) ali (Belec in Kert 1973, 45; Bračič 1975, 15 in 16).

Enote v poglavju Viri in literatura naj bodo navedene po abecednem redu priimkov avtorjev, enote istega avtorja pa razvrščene po letnicah. Če je v seznamu več enot istega avtorja iz istega leta, se letnicam dodajo črke (na primer 1999a in 1999b). Vsaka enota je sestavljena iz treh stavkov. V prvem stavku sta pred dvopičjem navedena avtor in letnica izida (če je avtorjev več, so ločeni z vejico, z vejico sta ločena tudi priimek avtorja in začetnica njegovega imena, med začetnico avtorja in letnico ni vejice), za njim pa naslov in morebitni podnaslov, ki sta ločena z vejico. Če je enota članek, se v drugem stavku navede publikacija, v kateri je članek natisnjen, če pa je enota samostojna knjiga, drugega stavka ni. Izdajatelja, založnika in strani se ne navaja. Če enota ni tiskana, se v drugem stavku navede vrsta enote (na primer elaborat, diplomsko, magistrsko ali doktorsko delo), za vejico pa ustanova, ki hrani to enoto. V tretjem stavku se za tiskane enote navede kraj izdaje, za netiskane pa kraj hranjenja.

3. Preglednice in slike v članku

Vse preglednice v članku so oštevilčene in imajo svoje naslove. Med številko in naslovom je dvopičje. Naslov konča pika. Primer:

Preglednica 1: Število prebivalcev Ljubljane po posameznih popisih.

Vse slike (fotografije, zemljevidi, grafi in podobno) v članku so oštevilčene enotno in imajo svoje naslove. Med številko in naslovom je dvopičje. Naslov konča pika. Primer:

Slika 1: Rast števila prebivalcev Ljubljane po posameznih popisih.

Slika 2: Izsek topografske karte v merilu 1 : 25.000, list Kranj.

Za grafične priloge, za katere avtorji nimajo avtorskih pravic, morajo avtorji od lastnika avtorskih pravic pridobiti dovoljenje za objavo. Avtorji naj ob podnapisu dopišejo tudi avtorja slike.

4. Sprejemanje prispevkov

Avtorji morajo prispevke oddati natisnjene v enem izvodu na papirju in v digitalni obliki, zapisane s programom Word. Digitalni zapis besedila naj bo povsem enostaven, brez zapletenega oblikovanja, poravnave desnega roba, deljenja besed, podčrtavanja in podobnega. Avtorji naj označijo le mastni (krepki) in ležeči tisk. Besedilo naj bo v celoti izpisano z malimi črkami (razen velikih začetnic, seveda), brez nepotrebnih krajšav, okrajšav in kratic. Zemljevidi naj bodo izdelani v digitalni vektorski obliki, grafi pa s programom. Fotografije in druge grafične priloge morajo avtorji oddati v obliki, primerni za skeniranje, ali pa v digitalni rasterski obliki z ločljivostjo vsaj 120 pik na cm oziroma 300 pik na palec, najbolje v formatu TIFF ali JPG.

Avtorji morajo za grafične priloge, za katere nimajo avtorskih pravic, priložiti fotokopijo dovoljenja za objavo, ki so ga pridobili od lastnika avtorskih pravic.

Avtorji naj prispevke pošiljajo na naslov urednika:

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5. Recenziranje člankov

Članki se recenzirajo. Recenzijo opravijo člani uredniškega odbora ali ustrezni strokovnjaki zunaj uredniškega odbora. Če recenziji ne zahtevata popravka ali dopolnitve članka, se avtorju članka recenzij ne pošlje. Uredniški odbor lahko na predlog urednika ali recenzenta zavrne objavo prispevka.

POROČILO RECENZENTA

1. Avtor prispevka

2. Naslov prispevka

3. Recenzent (ime in priimek, znanstveni ali strokovni naziv)

4. Pomen prispevka (ali prinaša nova znanstvena spoznanja)
a) da
b) ne
c) delno

5. Primernost prispevkov (ali naslov primerno poda vsebino)
a) da
b) ne
c) delno

6. Uporaba znanstvenega aparata, ustrezno navajanje virov in literature
a) da
b) ne (opozori na morebitne pomanjkljivosti)
c) delno

7. Pripombe in predlogi za izboljšanje besedila (priložite na posebnem listu)

8. Priporočam, da se prispevek sprejme:
a) brez pripomb
b) z manjšimi popravki
c) po temeljiti reviziji (na osnovi pripomb recenzenta)
d) zavrne

Datum: Podpis recenzenta: