



Dela

53

Oddelek za geografijo,
Filozofska fakulteta Univerze v Ljubljani

Department of Geography,
Faculty of Arts, University of Ljubljana

LJUBLJANA 2020

ISSN 0354-0596

DELA

53

2020

Elektronska izdaja — Electronic edition

ISSN 1854-1089

Založnik — Published by

Znanstvena založba Filozofske fakultete Univerze v Ljubljani

Izdajatelj — Issued by

Oddelek za geografijo, Filozofska fakulteta Univerze v Ljubljani

Za založbo — For the Publisher

Roman Kuhar, dekan Filozofske fakultete

Mednarodni uredniški odbor — International Editorial Board

Marko Krevs, Simon Kušar, Karel Natek, Darko Ogrin, Irma Potočnik Slavič,
Dejan Rebernik, Serge Schmitz (Liège, Belgija), Laura Šakaja (Zagreb, Hrvaška),
Katja Vintar Mally, Miroslav Vysoudil (Olomouc, Češka)

Urednika — Editors

Dejan Cigale (glavni urednik), Mojca Ilc Klun

Upravnik — Editorial Secretary

Nejc Bobovnik

Namizno založništvo — Desktop Publishing

Žiga Valetič

Tisk — Printed by

Birografika Bori, d. o. o.

Naklada — Edition

400 izvodov

Naslov uredništva — Publisher's address

Oddelek za geografijo, Filozofska fakulteta Univerze v Ljubljani, Aškerčeva 2, SI-1000 Ljubljana

Elektronski dostop — On-line access

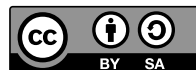
<http://revije.ff.uni-lj.si/Dela>

DELA so vključena v – DELA is included in

Scopus, CGP – Current Geographical Publications, DOAJ, ERIH PLUS, GEOBASE,
Central and Eastern European Academic Source, GeoRef, Russian Academy of Sciences Biblio-
graphies, TOC Premier, International Bibliography of the Social Sciences

*Izdano s finančno pomočjo Javne agencije za raziskovalno dejavnost Republike Slovenije in
Oddelka za geografijo FF Univerze v Ljubljani.*

To delo je ponujeno pod licenco Creative Commons Priznanje avtorstva-Deljenje pod enakimi pogoji 4.0 Mednarodna licenca / This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.



VSEBINA CONTENTS

RAZPRAVE PAPERS

Aleš Grlj

Omejevanje kraških kotanj z analizo polrezov	5
<i>Karst depression delineation using half-section analysis (Summary)</i>	21

Uroš Stepišnik

Kraška polja v Sloveniji	23
<i>Karst poljes in Slovenia (Summary)</i>	42

Boštjan Rogelj

Spremembe volilnih enot za izvedbo volitev v državni zbor RS	45
<i>Changes of electoral units for the conduct of elections to the National Assembly of the Republic of Slovenia (Summary)</i>	67

Bojan Ćudić, Matjaž Klemenčič, Jernej Zupančič

The influence of COVID-19 on international labor migrations from Bosnia and Herzegovina to EU	71
<i>Vpliv COVID-19 na mednarodne delovne migracije iz Bosne in Hercegovine v EU (Povzetek)</i>	94

Anatoly Stepanov, Alexander Burnasov, Maria Ilyushkina, Yury Kovalev

Hidden geographical opportunities for convergence of Russian-Kazakh border area	97
<i>Skrite geografske priložnosti za konvergenco rusko-kazahstanskega mejnega območja (Povzetek)</i>	109

Béla Kobulniczky, Oana-Ramona Ilovan

Forum theatre – assessing openness to temporary participatory use practices of the Someşul Mic river area in Cluj-Napoca, Romania	111
<i>Forumsko gledališče – presojanje odprtosti za prakse začasne participativne rabe ob reki Someşul Mic v mestu Cluj-Napoca, Romunija (Povzetek)</i>	<i>128</i>

Mădălin-Sebastian Lung, Gabriela-Alina Mureşan

Migratory dynamics of the rural population of the Apuseni Mountains in the post-socialist period	131
<i>Migracijska dinamika podeželskega prebivalstva v gorski pokrajini Apuseni v postsocialističnem obdobju (Povzetek)</i>	<i>150</i>



OMEJEVANJE KRAŠKIH KOTANJ Z ANALIZO POLREZOV

*Izvirni znanstveni članek
COBISS 1.01
DOI: 10.4321/dela.53.5-22*

Izvleček

Razvoj metod daljinskega zaznavanja, računalnikov in programske opreme za obdelavo prostorskih podatkov se je dotaknil tudi področja geomorfologije. Vse troje omogoča hitrejšo analizo večjih količin podatkov, ne pa tudi natančnejše. Vzrok za to je slaba matematična definiranost nekaterih geomorfoloških oblik. V raziskavi se osredotočamo na omejevanje kraških kotanj. Za ta namen smo razvili nov pristop, ki pri določanju roba kotanje analizira njene polreze ter učinkovito zaznava tudi robove kotanj na pobočjih. Metoda omogoča pridobivanje natančnejših morfografskih in morfometričnih podatkov o kotanjah. Metodo smo razvili in preizkusili na petih kotanjah Podgrajskega podolja (JZ Slovenija) ter rezultate primerjali z rezultati metode, ki za omejevanje kotanj uporablja hidrološko modeliranje. Opažamo bistveno izboljšanje rezultatov pri omejevanju z novo metodo.

Ključne besede: kraške kotanje, samodejno omejevanje, GIS, polrez, geomorfologija

* Inštitut za antropološke in prostorske študije, Znanstveno raziskovalni center Slovenske akademije znanosti in umetnosti, Novi trg 2, SI-1000 Ljubljana; Oddelek za geografijo, Filozofska fakulteta, Univerza v Ljubljani, Aškerčeva ulica 2, SI-1000 Ljubljana; Slovenski center odličnosti za vesoljsko znanost in tehnologije, Aškerčeva ulica 12, SI-1000 Ljubljana
e-pošta: ales.grlj@zrc-sazu.si

KARST DEPRESSION DELINEATION USING HALF-SECTION ANALYSIS

Abstract

The development of remote sensing methods, computers and spatial data processing software has also affected the field of geomorphology. All three allow for faster analysis of larger amounts of data, but not more accurate. The reason for this is the poor mathematical definition of some geomorphological forms. The research focuses on the delimitation of karst depressions. For this purpose, we have developed a new approach that analyzes its half-sections when determining the edge of a depression and also effectively detects the edges of depressions on slopes. The method allows obtaining more accurate morphographic and morphometric data on depressions. The method was developed and tested on five depressions of the Podgrajsko podolje (SW Slovenia), and the results were compared with the results of a method that uses hydrological modeling to delimit the depressions. We observe a significant improvement in the results obtained with the new method.

Keywords: karst depressions, automatic delineation, GIS, half-section, geomorphology

1 UVOD

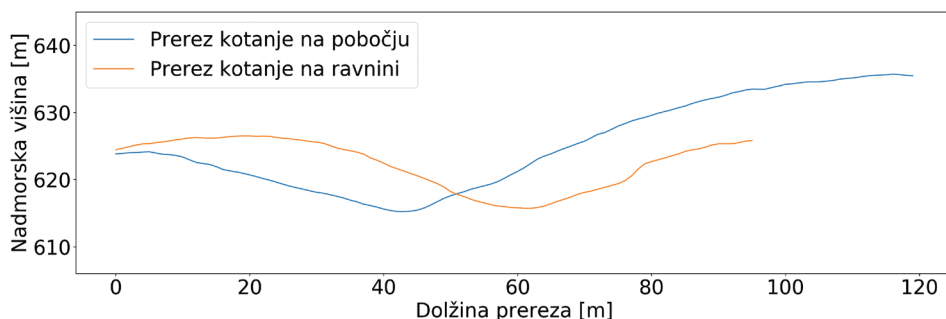
Kotanje navadno razumemo kot vbočene oblike nekega površja. Gre za del površja, ki je v vseh smereh, glede na izhodišče v dnu, nižji od površja, na katerem se nahaja. Najdemo jih praktično na vseh površinah ter jih dojemamo kot anomalije ali suboptimalno stanje na idealno ravni oziroma gladki površini. V tem smislu jih obravnavamo kot območja, kjer je snov na površju bolj izpostavljena obrabi, koroziji ali pa odraža mesta nezveznosti, šibkosti snovi ter je zaradi tega tudi bolj izpostavljena obema navedenima in še drugim procesom. V geomorfologiji se pogosto ukvarjamo s kotanjami v zemeljskem površju. Slednje se lahko pojavljajo na različnih tipih površja ter obsegajo različne velikostne razrede (Gabrovšek, Stepišnik, 2011; Sauro, 2012; Stepišnik, 2015; Stepišnik, 2017; Šušteršič, 1986; Waltham, Bell, Culshaw, 2010). Kot take lahko obravnavamo vulkanske kaldere, kotanje za čelnimi morenami nekdanjih ledenikov, zaprte nižine med sipinami ali endoreična porečja. Kotanje so tipične in zelo pogoste, po nekaterih avtorjih tudi indikativne, oblike kraškega reliefa (Ford, Williams, 2007; Sweeting, 1972; Waltham, Fookes, 2003). Izraz kraške kotanje tako označuje kotanje, ki se pojavljajo na kraškem tipu reliefa (Obu, 2011). Pri nas se za kraške kotanje največkrat štejejo vrtače, udornice, uvale, kraška polja, slepe doline in konte (Obu, 2011). V splošnem gre za mesta hitrejšega oziroma močnejšega raztapljanja in odnašanja

kraških kamnin. Vzrok za to je povečan vtok ali infiltracija vode, ki je navadno posledica nezveznosti v kraških kamninah. Na podlagi dimenzij, razporeditve in odnosov med kraškimi kotanjami na površju lahko torej sklepamo na oblike in procese, ki se odvijajo v podzemlju (Vrvišar, 2016). Iz tega dejstva izhaja potreba po geomorfološki analizi kraških kotanj. S tem se je ukvarjalo več avtorjev, navedenih v nadaljevanju. Večinoma gre bodisi za terensko preučevanje oblike ali pa za analizo razporeditve in morfometrije na podlagi topografskih kart. Analize na podlagi slednjih so a priori podvržene slabšim rezultatom zaradi kakovosti vira zajema podatkov ter subjektivnosti dojemanja obsega kotanje (slika 1). Razvoj metod daljinskega zaznavanja, računalnikov ter programske opreme v zadnjih desetletjih geomorfologom omogoča obdelavo podatkov na večjih območjih. Tako kot druge površinske oblike so tudi kotanje dočakale metode, s katerimi jih lahko samodejno prepoznamo in omejimo.

Z razvijanjem metod za samodejno prepoznavanje reliefnih oblik se je ukvarjalo več avtorjev, med njimi Krevs (1992) ter Podobnikar in Možina (2008). Pri delu Obuja (2011) gre za popolnoma avtomatiziran postopek zaznavanja kotanj na podlagi digitalnega modela višin (DMV). Podoben pristop z iterativnim zapolnjevanjem kotanj DMV in odštevanjem izvirnega DMV od zapolnjenega je opisan v objavi Grlja in Grigilla (2014). Slednji pristop je uporabila tudi Novljan (2019), ki se je ukvarjala z zaznavanjem in morfometrijo vrtač na pobočjih. Nekoliko drugačno morfometrično analizo vrtač, ki temelji na izračunih s pomočjo DMV s prostorsko ločljivostjo enega metra, izdelanega iz podatkov lidarskega snemanja, je na Menišiji opravil Mihevc (2014). Vrtače je iz modela površja zaznaval z izračunom indeksa konkavnosti površja v treh različnih merilih, podatke pa je nato med seboj prekril in uporabil tiste, ki so bili bolj natančni. Iz podatkov je nato izločil zaznane kotanje, ki niso vrtače, izmed preostalih zaznanih vrtač pa je izračunal površino, globino in polmer povprečne vrtače na preučevanem območju (Mihevc, 2014). Nabor tuje literature s področja avtomatiziranega zaznavanja kraških kotanj je nekoliko večji. Rahimi in Alexander (2013) sta primerjala rezultate različnih metod kartiranja in zaznavanja vrtač v Minnesoti. V programu MATLAB sta razvila algoritem, ki v treh korakih samodejno prepozna vrtače, ter rezultate primerjala z drugimi pristopi k rešitvi problema. Podobno kot prejšnja raziskava tudi prispevek Doctorja in Younga (2013) primerja več načinov zaznave kraških kotanj. Prvi način je ročno kartiranje kotanj na podlagah, izdelanih iz DMV (osenčenost reliefa, osenčenost naklonov, indeks topografskega položaja), ter na letalskih posnetkih. Drugi način temelji na obdelavi DMV: od zapolnjevanja kotanj, odštevanja hidrološko pravilnega modela reliefa od originalnega modela do končne vektorizacije kotanj. Nekoliko drugačen pristop k samodejnemu zaznavanju kraških kotanj sta razvila Liang in Du (2013). Način, opisan v raziskavi, temelji na prepoznavanju petih običajnih površinskih kraških pojavov: osamljenih hribov, osamljenih vrtač, gruč hribov, gruč vrtač ter gruč hribov z vrtačami, na podlagi sklenjenih plastnic. Guimarães in sodelavci (2005) so pri obdelavi modela reliefa uporabili isto metodo kot Doctor in Young (2013), iz satelitskega posnetka pa so izračunali

normirani diferencialni vegetacijski indeks (NDVI). Tri različne načine zaznavanja vrtač je primerjal Bauer (2015). Preučevano območje je analiziral z že predstavljenima metodama skrajne sklenjene plastnice z ekvidistanco enega metra in zaznavanja vrtač s pomočjo izdelave hidrološko pravilnega reliefa ter z metodo določanja porečja, pri čemer vsaka kotanja predstavlja svoje porečje. Preizkušene metode so dale različne rezultate tako po morfometriji vrtač kot tudi po njihovem številu (Bauer, 2015). Podobno primerjavo so naredili tudi Telbisz in sod. (2016), pri čemer so se osredotočili predvsem na prednosti DMV-ja, izdelanega iz podatkov lidarskega snemanja, v primerjavi s topografskimi kartami. Primerjali so rezultate omejevanja vrtač s pomočjo topografske karte 1:10.000, pri čemer so uporabili metodo skrajne sklenjene plastnice, vrtač, zaznanih iz digitaliziranih plastnic DMV-ja, ter vrtač, zaznanih iz DMV-ja s pomočjo izdelave hidrološko pravilnega porečja. Ugotovili so, da so vrtače, zaznane z avtomatiziranimi metodami, po površini večje od tistih, zaznanih s klasičnimi metodami (Telbisz in sod., 2016).

Slika 1: Primerjava profilov kotanj na ravnini in na pobočju.



Vse navedene metode omejevanja kotanj imajo različne pomanjkljivosti. Ročen zajem z digitalizacijo obodov iz DMV, topografskih kart in slikovnih podob površja je zamuden in subjektiven. Samodejne metode odpravijo te pomanjkljivosti, vendar vpeljejo nove. Modeliranje oboda kotanj s hidrološkim zapolnjevanjem omeji kotanje na plastnico, ki povezuje točke z isto višino, kot je višina najnižje točke oboda. Ta pristop deloma deluje na uravnava, odpove pa na pobočjih in pri kotanjah z razčlenjenim obodom, kjer definicija kotanje z najnižjo točko oboda ni več ustrezna. Najbolj realistično obod kotanje opišejo metode zaznavanja z izračunom konkavnosti in povprečevanjem DMV s konvolucijo. Ta pristop vselej nekoliko podceni površino in globino kotanje ter je zelo odvisen od oblike in velikosti obravnavanega sosedstva.

V članku predstavljamo novo metodo določanja skrajnih točk oboda kotanje na podlagi analize polrezov. Polrez je višinski profil kotanje, ki ga definirata središče kotanje ter točka na obodu kotanje. Polrez kotanje lahko obravnavamo kot trend v vrsti podatkov

o višinah, kotanjo pa kot anomalijo v tem trendu. Z uporabo linearne regresije trend pobočja odstranimo ter določimo vrhove nove funkcije. Ti vrhovi ustrezajo lokacijam skrajnih točk kotanj. Namen raziskave je razvoj nove in natančnejše metode zaznavanja obodov kotanj. Z natančnejšimi podatki o kotanjah bomo lahko v prihodnosti natančneje morfografsko in morfometrično opisali značilnosti kraških kotanj.

2 OBRAVNAVANO OBMOČJE IN UPORABLJENI PROSTORSKI PODATKI

Kotanja je lahko kateri koli objekt v rastrskih podatkih, ki ima vrednosti slikovnih točk nižje od svoje okolice. Na infrardečem kanalu satelitske podobe ali podatkih radarskega skeniranja je to lahko vodna površina. V podatkih o nadmorskih višinah so to lahko kraške kotanje, kot so vrtače ali udornice. Slednje smo si tudi izbrali za testiranje razvite metode. Obravnavane kotanje se nahajajo na Podgrajskem podolju. Podgrajsko podolje je kraška uravnava med Brkini na severovzhodu in pogorjem Slavnika na jugozahodu. Sestavljeno je iz apnencev, dolomitov in breče obeh kamnin. Kamnine so v celoti kredne starosti. Podolje je splošno gledano uravnava, vendar je v grobem razdeljeno na dva dela. Severozahodni del v smeri Kozine je bolj uravnan in nižji. Jugovzhodni del v smeri Staroda je dvignjen in vertikalno bolj razčlenjen. Oba dela zaznamuje velika gostota kraških kotanj, predvsem vrtač. Vzdolž stika z nekraškimi kamninami Brkinov se oblikuje niz slepih dolin, ki velja za najlepši primer kontaktnega krasa v tem delu sveta. V zaledju ponorov v slepih dolinah ob in na presečiščih prelomov in pretrtih kamnin se nahajajo udornice, ki na površini nakazujejo podzemni tok vode.

Za razvoj in preverjanje rezultatov metode smo si izbrali nabor kotanj, ki se nahajajo v jugovzhodnem delu Podgrajskega podolja. Kot je že bilo navedeno, je ta del podolja vertikalno bolj razčlenjen. To pomeni, da se kraške kotanje tu pojavljajo na neravni površini in njihovi obodi niso v vodoravni ravnini, temveč so v ravnini pobočja, na katerem se nahajajo. Poleg tega so obodi izbranih kotanj dodatno razčlenjeni in lokalno odstopajo od ravnine pobočja. Na takem površju so dejanski obodi kraških kotanj, kot jih dojame človek, najbolj različni od hidrološko modeliranih obodov. Kot take jih je tudi veliko težje samodejno računalniško modelirati.

3 METODOLOGIJA

V nadaljevanju opisan pristop modeliranja oboda kraških kotanj obsega dva sklopa. V prvem sklopu je opisan že znan pristop, ki temelji na hidrološkem modeliranju oboda kotanj. Pristop omeji kotanjo z zaprto plastnico, katere nadmorska višina ustreza višini najnižje točke oboda. Drugi sklop opisuje nadgradnjo hidrološkega modela. S

prvim sklopom iz DMV prepoznamo zaprte konkavne oblike, kotanje v hidrološkem smislu, ki bi ob simuliranju vodnega toka preko DMV delovale kot ponori oziroma ozezeritve. Rezultati tega modeliranja so vhodni podatek za drugi metodološki sklop. V slednjem zgolj popravimo vhodne obode glede na DMV, tako da upoštevajo naklon pobočja ter rob kotanje postavijo na mesta pregiba pobočja v kotanjo. Pregibi se določajo na profilih polrezov površja med središčem hidrološke kotanje in točko, ki jo določata kot (azimut) med središčem in izbranim ogliščem oboda kotanje ter večkratnik razdalje med središčem in izbranim ogliščem.

Za izvedbo analize v prvem sklopu smo uporabili program, ki smo ga razvili v predhodni raziskavi (Grlj, Grigillo, 2014). Napisan je v programskem jeziku Python in uporablja orodja knjižnice ArcPy, ki jo za namen avtomatizacije opravil v programu ArcGIS razvija *Environmental Systems Research Institute* (ESRI). Tako kot prvi je tudi drugi metodološki sklop izveden v programskem jeziku Python. Za razliko od prvega uporablja izključno brezplačne knjižnice.

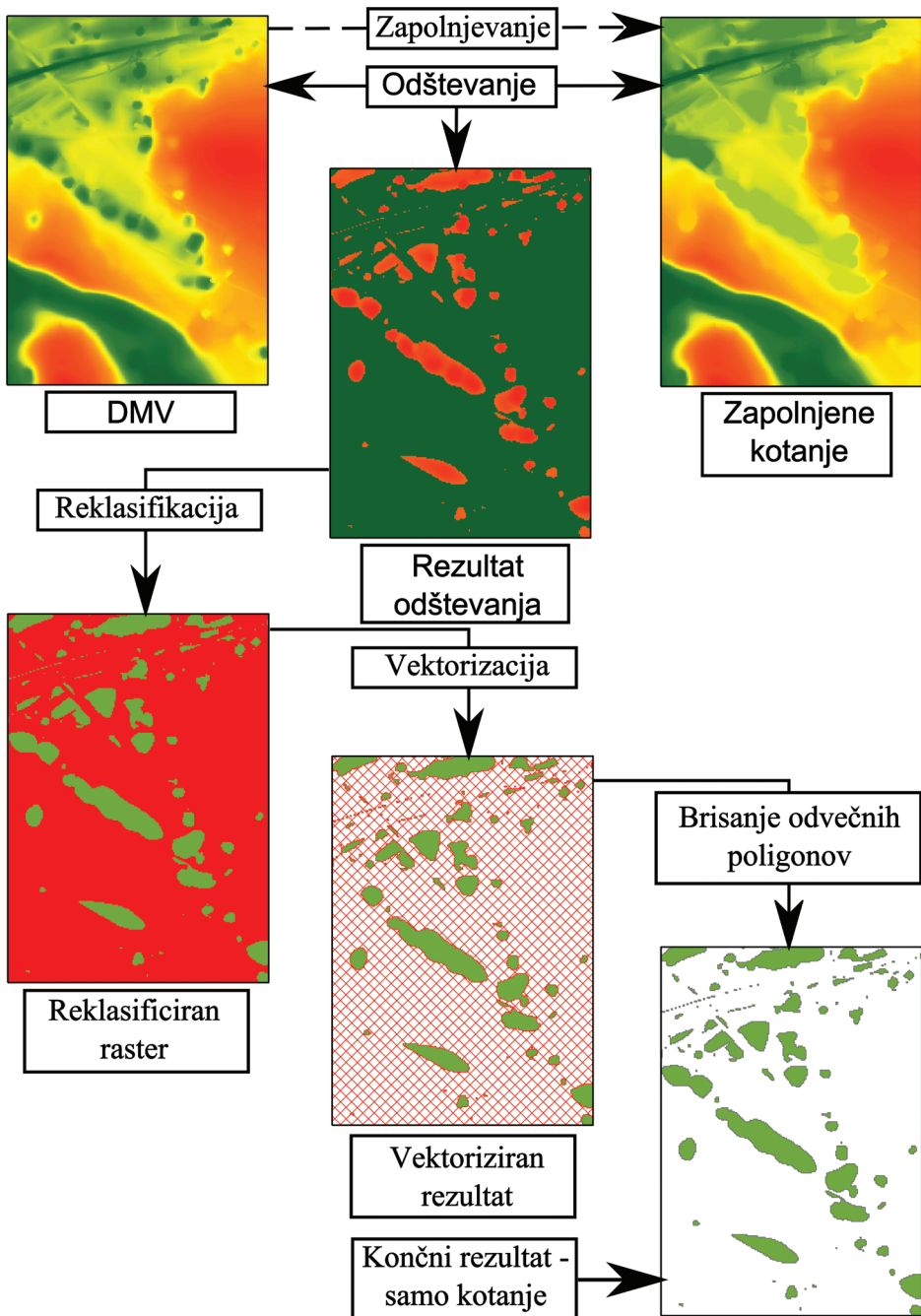
Edini vhodni podatek je DMV obravnavanega območja v prostorski ločljivosti 1 m (Lidar ARSO, 2014). Izdelan je bil z interpolacijo vektorskih podatkov laserskega snemanja Slovenije iz klasificiranega oblaka točk. Uporabljene so bile samo talne točke. Podatke smo interpolirali po metodi najbližjega sosesa (ang. *nearest neighbour*).

3.1 Hidrološko modeliranje oboda kotanj

Za modeliranje hidrološko pravih obodov kotanj smo izbrali v predhodnih raziskavah razvito metodo (Grlj, Grigillo, 2014). Metoda temelji na uporabi orodij za izdelavo hidrološko pravih DMV za izračun redov vodnih tokov in porečij. Slika 2 prikazuje konceptualni model tega pristopa. Temeljno orodje je orodje *Fill*, ki je v osnovi namenjeno odstranjevanju (zapolnjevanju) majhnih kotanj v DMV, ki onemogočajo nemoteno simulacijo vodnega toka. Od rezultata tega orodja odštejemo prvotni DMV, da dobimo podatek, kje se zmanjševanec in odštevanec razlikujeta. Slikovne točke, ki imajo po odštevanju vrednost različno od 0, predstavljajo kotanje.

Po tem se vrednosti razlike pretvorijo v 1 za vse vrednosti različne od 0 in 0 za vse vrednosti enake 0. rastrski sloj s takimi kategoričnimi vrednostmi celih števil enostavno pretvorimo v vektorski sloj poligonov, ki predstavljajo površine kotanj. Orodju *Fill* lahko s parametrom *z-limit* omejimo globino zapolnjevanja. To pomeni, da bodo zapolnjene samo kotanje z globino, manjšo od vrednosti tega parametra. Z iteracijo opisanega postopka in večanjem vrednosti parametra *z-limit* v vsaki ponovitvi lahko s programom zaznamo kotanje vseh redov oziroma gnezdene kotanje. Rezultat hidrološkega modeliranja je, poleg DMV, vhodni podatek drugega koraka omejevanja kotanj.

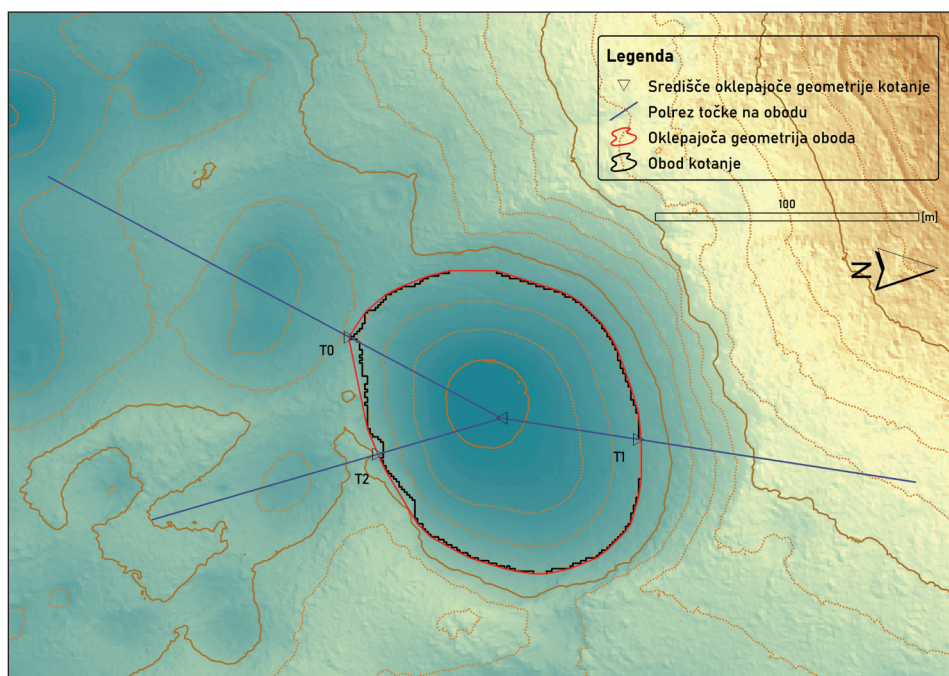
Slika 2: Konceptualni model omejevanja kotanj s hidrološkim modeliranjem (Grlj, Grigillo, 2014).



3.2 Modeliranje oboda kotanj s polrezi

Vektorski sloj, ki ga smo ga pridelali v prvem koraku obdelave podatkov, uporabimo za določitev središča poligona kotanje. Oblika poligona kotanje zaradi izvora v rastrskem sloju nima idealnih robov za nadaljnjo analizo. Pomanjkljivosti odpravimo z izračunom minimalne oklepajoče geometrije oziroma konveksne ovojnice. S tem odpravimo nazobčane robove oboda in vbokline na obodu. Z zgostitvijo oglišč na geometriji oboda odpravimo primanjkljaj oglišč na daljših ravnih odsekih oboda. S tem zagotovimo zadostno število oglišč za določitev poteka daljic polrezov. Z določitvijo centroida tako pripravljenegega poligona oboda kotanje imamo na voljo dovolj podatkov za izvedbo analize.

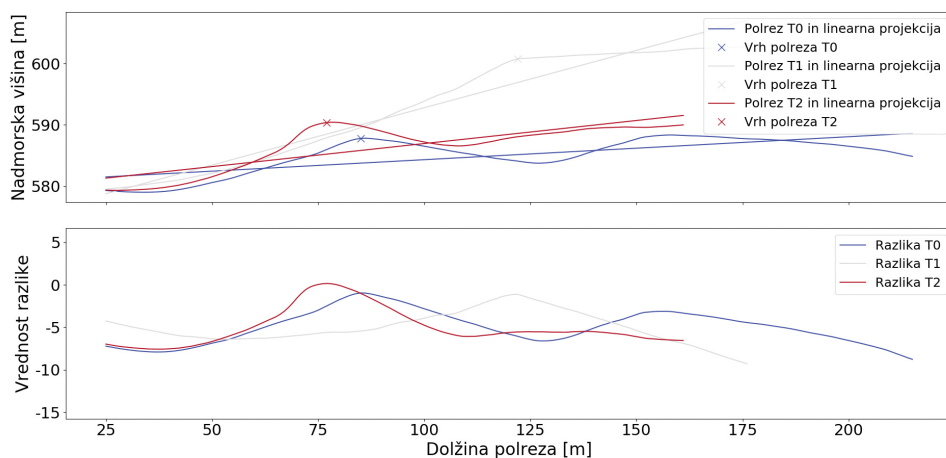
Slika 3: Vzorčna kotanja, uporabljena za razvoj metode s polrezi ter konveksno ovojnico geometrije.



Določitev mesta pregiba pobočja v kotanjo poteka z iskanjem vrha funkcije polreza. Vsak polrez kotanje je definiran s centroidom poligona kotanje in vsakim ogliščem poligona kotanje. Zaradi predpostavke, da je dejanski rob kotanje izven poligona hidrološko modelirane kotanje, je vsak polrez podaljšan za faktor lastne dolžine v smeri lastnega azimuta. Ob daljici polreza poizvemo nadmorske višine vhodnega DMV na vsako enoto njegove ločljivosti ter rezultate izrišemo na grafu. Iz slike je razvidno, da polrezi v smeri naraščanja nadmorskih višin pobočja, na katerem je kotanja, nimajo vrha, torej jim ne

moremo določiti točke pregiba pobočja v kotanjo (slika 4). Zato nadmorske višine ob polrezu transformiramo s pomočjo premice linearne regresije. Po metodi najmanjših kvadratov izračunamo koeficient in konstanto premice, ki najbolje opisuje vse višine ob polrezu. Linearne napovedi višin ob polrezu odštejemo od dejanskih višin polreza ter pobočju odstranimo trend. Ostane le še krivulja, ki opisuje del polreza pod premico linearne regresije (dno kotanje) in del krivulje nad isto premico (pregib pobočja). S tem pregibe v pobočjih, ki v izvornem polrezu nimajo vrha, spremenimo v konveksne vrhove s pozitivnimi vrednostmi. Na transformiranih podatkih poiščemo vrhove vzpetin, prvi zaznan vrh določimo kot točko pregiba pobočja v kotanjo. Pri tem nas v prvi vrsti zanimajo izraziti vrhovi funkcije. Kljub transformaciji podatkov nekateri polrezi ne izkazujejo izrazitih vrhov, zato vpeljemo parameter prominence. Krivuljo polreza zato ponavljajoče obdelujemo z vsakokrat za polovico manjšim parametrom, dokler ne določimo vrha oziroma dokler vrednost parametra ni tako blizu ničle, da nima več pomena. V tem primeru polrez nima vrha ter je izpuščen iz obdelave.

Slika 4: Prikaz nadmorskih višin ob vzorčnih polrezih izbrane kotanje s pripadajočimi linearnimi projekcijami ter vrhovi polrezov (zgoraj) in razlike med višinami polreza ter njihovimi projekcijami oziroma polrez z odstranjenim trendom (spodaj).



Analiza je zaključena z izračunom koordinate vrha transformirane funkcije polreza. Koordinato dodamo na seznam koordinat v prilagojeni geometriji, zaključimo obroč ter odpravimo morebitne večje anomalije v prilagojenem obodu s ponovnim izračunom konveksne ovojnice geometrije. Prilagojen obod zapišemo v nov vektorski sloj poligonov.

Slika 3 prikazuje kotanjo, ki smo jo uporabili pri razvoju metode, in konveksno ovojnico ter vzorčne polreze. Nadmorske višine ob polrezih so prikazane na sliki 4. Vzorčni polrezi prikazujejo tri značilne oblike. Polrez T0 poteka skozi najnižjo točko

oboda ter po prehodu seka sosednjo kotanjo. Krivulja polreza ima torej dva vrhova, izbran je prvi, ki bi bil zaznan tudi, če bi vrhove iskali na netransformiranih podatkih. Polrez T1 je primer polreza brez vrha. Vrh tega polreza bi lahko določili, če bi dolžino polreza bistveno podaljšali do pregiba pobočja. Polrez T2 je tipičen polrez z enim vrhom, ki pa leži na višji nadmorski višini, kot je višina T0. Graf (slika 4) prikazuje polreze z odstranjenim trendom in izrazite vrhove, ki se ob tem pojavijo, ter vizualizira njuno transformacijo podatkov pri obdelavi polrezov tipa T1.

Prilagojene obode kotanj smo vizualno primerjali z obodi hidrološko modeliranih kotanj in kvantitativno primerjavo lastnosti dolžine oboda, površine poligona ter njegove podolgovatosti. Rezultati analize so predstavljeni v naslednjem poglavju.

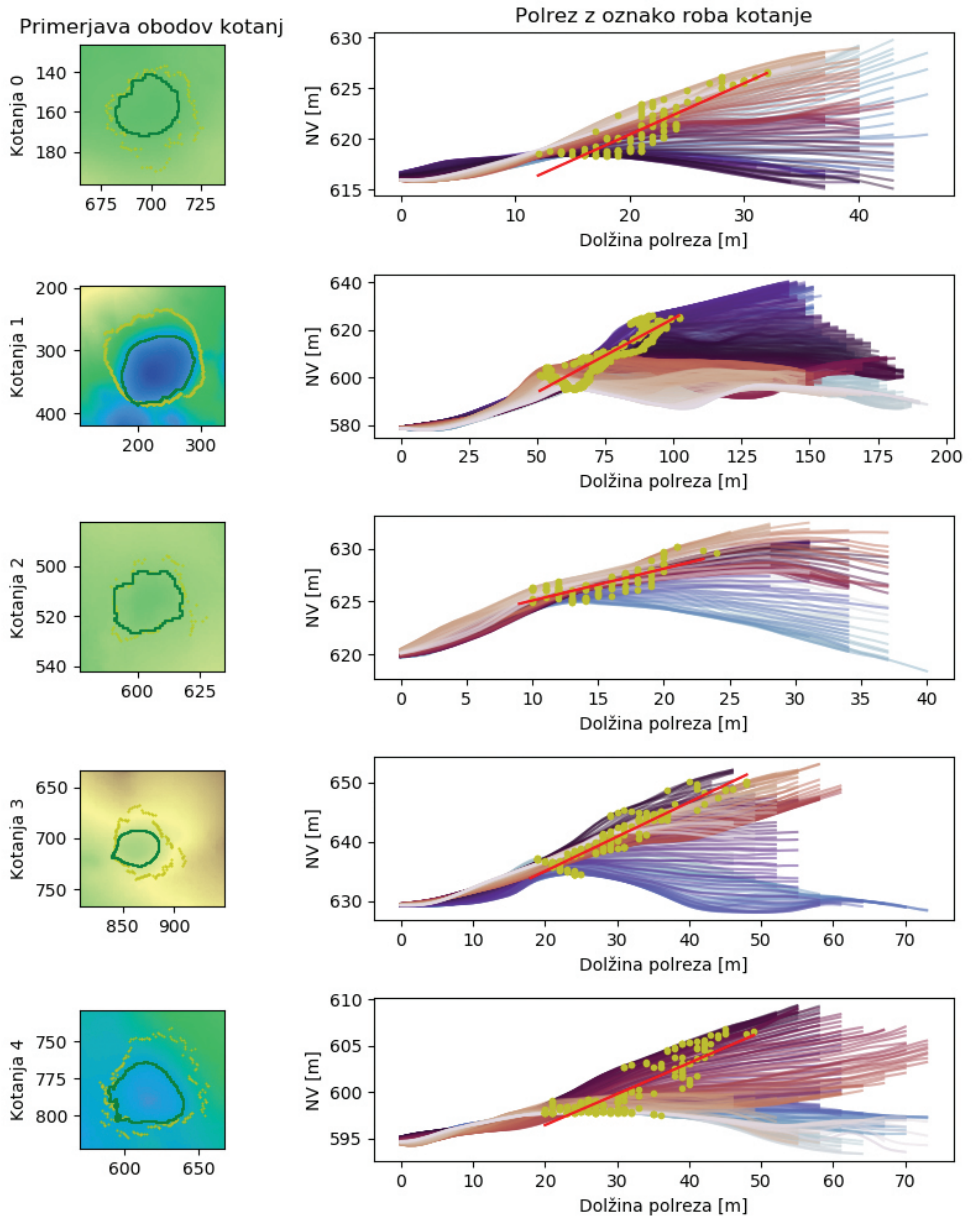
4 REZULTATI

Na obravnavanem območju smo uporabili razvito metodo ter omejili pet kotanj prvega reda. Najprej smo kotanje omejili z uporabo hidrološkega modeliranja ter izdelali sloj izhodiščnih kotanj za nadaljnjo analizo. Vse izbrane kotanje ležijo na bolj ali manj strmih pobočjih ter imajo izrazito nevodoravne obode. Obodi so poleg tega še vertikalno razčlenjeni.

Pri izbranih kotanjah se pojavljajo očitne razlike v obsegu omejene površine glede na uporabljano metodo. Obodi hidrološko modeliranih kotanj sledijo plastnici, ki jo določa nadmorska višina najnižje točke oboda kotanje. Obodi kotanj, omejenih z novo razvito metodo, sledijo pregibom v pobočju ob polrezih, ki jih določajo središče konveksne ovojnice kotanje in njena zgoščena oglišča. Obodi, ki smo jih zaznali z analizo polrezov, praviloma obsegajo večjo površino, najnižja točka oboda pa se dobro ujema z najnižjo točko oboda hidrološko modeliranih kotanj. Kotanje polrezov so bolj razširjene v smeri naraščanja nadmorskih višin. V teh smereh večinoma ne moremo zaznati točk obodov zgolj z analizo polrezov samih. Omenjenim polrezom moramo odstraniti trend, da pregibe pretvorimo v vrhove.

Točke oboda kotanje 0 so ob polrezih razporejene na razdaljah med 12 m in 33 m, kotanje 1 med 50 m in 102 m, med 9 m in 24 m pri kotanji 2 ter med 19 m in 49 m pri kotanji 3. Razpon razdalj točk oboda od središča za kotanjo 4 je med 20 in 50 m. Povprečne oddaljenosti točk oboda od središča je za kotanjo 0 pri hidrološkem modeliranju 14,5 m, modeliranju s polrezi 20,8 m. Razlika znaša 6,3 m. Za kotanjo 1 so te vrednosti enake 55 m, 73,5 m in 18,6 m, za kotanjo 2 12,4 m, 14,5 m in 2,1 m. Povprečne oddaljenosti točk oboda od središča je za kotanjo 3 pri hidrološkem modeliranju 19,4 m, modeliranju s polrezi 28,7 m. Razlika znaša 9,3 m in za kotanjo 4 21,7 m, 30,1 m ter 8,4 m. Razmerja med dolžinami znašajo 1,43, 1,33, 1,16, 1,47 in 1,38. Višinski razpon oglišč oboda hidrološko modeliranih kotanj je vedno enak 0, saj oglišča ležijo na plastnici. Višinski razpon pri modeliranju s polrezi znaša za kotanjo 0 8,24 m (med 618,4 m in 626,6 m), kotanjo 1 31,04 m (med 595,2 m in 626,2 m), kotanjo 2 5,3 m (med 625 m

Slika 5: Primerjava hidrološko modeliranih obodov izbranih kotanj z vrhovi obodov, izračunanih z analizo polrezov (levo), in vsi polrezi izbranih kotanj z izračunanimi vrhovi (desno).



in 630,2 m), kotanjo 3 15,6 m (med 634,6 m in 650,2 m) in kotanjo 4 9,3 m (med 597,5 m in 606,9 m). Nakloni obodov kotanj znašajo 26,75°, 31,77°, 16,79°, 30,20° in 18,51°. Koeficienti naklonov premice med razdaljo od središča in nadmorsko višino oboda razkrijejo tudi, da obstaja pozitivna povezava med spremenljivkama. Bolj oddaljena kot je točka na obodu od središča, večjo nadmorsko višino ima.

Kotanje 0, 2 in 4 (slika 5) so navadne vrtače. Prva in druga imata tipično lego v pobočju, kotanja 4 pa ima lego na nizkem grebenu oziroma ga prekinja in deli na dva dela. Pobočji, na katerih ležita prvi dve vrtači, imata blag naklon, zato oboda, modelirana s polrezi, po podolgovatosti in ekscentričnosti ne odstopata bistveno od inicialnih obodov. Enako velja za kotanjo 4, kljub temu da ima obod privzdignjen na dveh straneh.

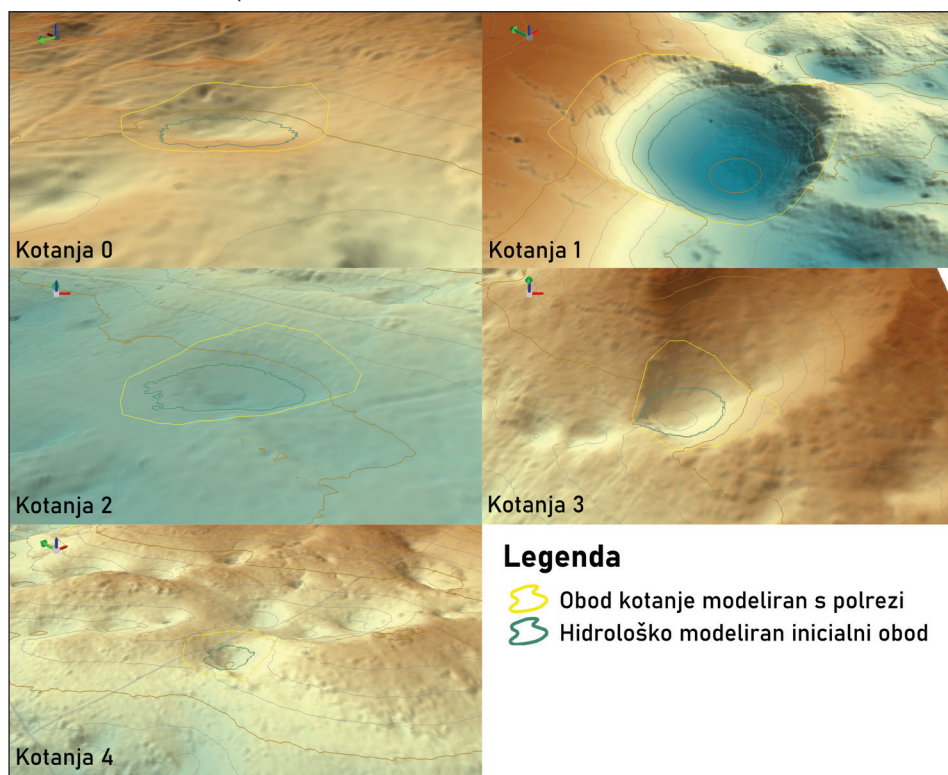
Pri kotanji 3 (slika 5) gre za zelo netipično vrtačo, ki leži v jarku podobni strukturi, ki je najverjetneje nastala na območju bolj pretirte kamine. Obod, modeliran s polrezi, je zato bistveno bolj podolgovat kot obod hidrološko modelirane vrtače, vendar ne v pričakovani smeri. Obod je razpotegnjen pravokotno na potek jarka. Od najnižje točke poteka navzgor po pregibu oziroma grebenu jarka, dokler polrez seka greben. Ko oddaljenost grebena preseže dolžino polreza, se smer poteka oboda obrne proti središčnici jarka, kjer se obod sklene. Nadmorska višina je na tej točki bistveno nižja od višine na točkah obrata na grebenu.

Kotanja 1 se po morfometričnih in morfogenetskih lastnostih razlikuje od ostalih izbranih kotanj. Gre za udornico, ki prav tako kot ostale kotanje leži v pobočju. Poleg tega, da ima pobočje, v katerem leži, večji naklon od ostalih, ima tudi zelo vertikalno razčlenjen oziroma nazobčan obod. Kljub temu z razvito metodo obod zelo dobro zaznamo, saj je pregib med pobočjem in kotanjo zelo izrazit. Slednji obod je po pričakovanih razpotegnjen po pobočju navzgor ter zajema večjo površino od hidrološko modeliranega. Preglednica 1 prikazuje primerjane lastnosti geometrij, izdelanih po obeh obravnavanih metodah. Dimenzije kotanj, omejenih z metodo polrezov, v vseh primerih presegajo dimenzije svojih inicialnih kotanj. Spremeni se razmerje med dolžinama daljše in krajše osi. Zaradi premajhnega vzorca o zakonitostih te spremembe ne moremo govoriti. Enako velja za spremembo orientacije, ki je povezana s prejšnjim parametrom.

Preglednica 1: Primerjava lastnosti geometrij obodov kotanj, modeliranih z analizo polreza (PAK), in hidrološko modeliranih kotanj (HMK).

ID	Širina [m]		Dolžina [m]		Orientacija [°]		Površina [m ²]		Obseg [m]	
	PAK	HMK	PAK	HMK	PAK	HMK	PAK	HMK	PAK	HMK
0	46,83	29,40	56,40	33,62	4,70	59,60	1946,80	763,50	161,54	99,16
1	149,98	99,23	177,69	129,19	117,90	40,00	19579,96	9836,50	506,43	359,24
2	34,09	24,60	42,26	29,41	113,60	54,70	1092,48	566,00	124,32	86,94
3	58,84	35,00	81,23	49,34	125,00	72,30	3673,99	1262,50	226,50	131,20
4	67,12	41,00	82,28	52,63	25,30	104,30	4184,20	1624,00	238,49	148,64

Slika 6: 3R prikazi izbranih kotanj s primerjavo hidrološko modeliranih obodov in obodov, modeliranih z analizo polrezov.



Spremembe morfometričnih lastnosti kotanj ob uporabi drugačne metode omejevanja so pričakovane. Ob predpostavki, ki jo potrjujejo grafični prikazi v tem poglavju, da je metoda omejevanja z analizo polrezov natančnejša, pa to bistveno spremeni pogled na kotanje. To smo natančneje opredelili in ovrednotili v naslednjem poglavju.

5 RAZPRAVA

Primerjava rezultatov zaznavanja oboda izbranih kotanj kaže izrazite razlike v morfometričnih lastnostih teh kotanj. Z vizualno in grafično razlago rezultatov lahko potrdimo, da je novo razvita metoda omejevanja kotanj boljša od metode, ki uporablja samo hidrološko modeliranje. Slednja pa je vseeno nujna, saj z njo zaznamo inicialne obode. Novo razvita metoda rezultate prejšnje zgolj popravi in nadgradi. Razlike morfometričnih lastnosti smo kljub majhnemu vzorcu strnili v preglednici 1. Rezultati kažejo na to,

da se ob uporabi nove metode morfometrične lastnosti kotanj bistveno spremenijo. To vodi k zaključku, da bomo morali rezultate nekaterih prejšnjih raziskav ponovno ovrednotiti ter spremeniti podatke o morfometriji samodejno prepoznanih kraških kotanj.

Rezultate osnovne metode zaznavanja kotanj (3.1 Hidrološko modeliranje oboda kotanj) smo v začetku ocenili kot neustrezne. S to metodo omejimo zgolj del kotanje, ki ima nadmorske višine nižje od najnižje točke oboda. Uporaba teh obodov kotanj za inicialne obode za analizo polrezov se je izkazala za uspešno, vendar smo med analizo ugotovili še dodatne pomanjkljivosti, ki se odražajo v:

- nazobčanih robovih, ki sledijo robovom rastrskih celic,
- vbočeni geometriji, ki po analizi povzroči nastanek zank v obodu rezultata,
- daljših ravnih odsekih brez oglišč, zaradi česar na teh odsekih ne dobimo dovolj oglišč prilagojenega oboda in s tem manjšo natančnost rezultata.

Navedene pomanjkljivosti oziroma izvore napak v rezultatih odstranimo z izračunom konveksne ovojnice in zgotovitvijo oglišč geometrije. S tem odstranimo vbočeno geometrijo ter zagotovimo dovolj točk za definicije polrezov tudi na daljših ravnih odsekih.

Odstranitev linearnega trenda pobočja pretvori pregibe v pobočju v vrhove, ki jih je sorazmerno lahko določiti. Pojavnost polrezov brez vrhov je zelo majhna in nima bistvenega vpliva na rezultat. V kolikor bi pomanjkanje rešitve vplivalo na kvaliteto rezultata, lahko polreze podaljšamo ter s tem povečamo možnost določitve rezultata.

Rezultat analize polrezov so točke, kjer se funkcija polreza oz. linearno transformiranega polreza kotanje obrne navzdol. Ob vsakem polrezu je takih točk lahko več. Z opisano metodo določimo samo prvo tako točko, na katero naletimo v smeri od središča kotanje navzven. S tem se izognemo zaznavanju točk oboda kotanj višjega reda. Hkrati je to lahko vir napake, saj prvi vrh na funkciji ni nujno pravi in ne leži na dejanskem obodu. V zelo natančnih podatkih o nadmorskih višinah, kot je tudi DMV, izdelan iz lidarskega oblaka točk, ki smo ga uporabili, so vidni tudi antropogeni elementi površja, ki vplivajo na rezultat. Tak primer so na primer suhozidne ograje v vrtačah. Ob zelo izraziti ograji v vrtači lahko metoda zazna vrh funkcije na vrhu zida in postavi točko oboda na to mesto. Anomalije te vrste večinoma odpravimo z glajenjem funkcije polreza s filtrom povprečja. Za primere, ko ta pristop ne zadostuje, geometriji oboda izračunamo še konveksno ovojnico. Ta zagotovi, da je obod kotanje napet med skrajnimi zaznanimi točkami. S tem se nekoliko oddaljimo od resničnega oboda kotanje vendar odstranimo velike anomalije v njegovem poteku.

Določanje prvega vrha funkcije polreza kot edine in pravilne točke oboda kotanje ima za posledico to, da na ta način lahko omejimo samo kotanje prvega reda. To so kotanje, ki ne vsebujejo drugih, manjših kotanj, lahko pa so same gnezdene v večjih kotanjah. Pri nekaterih raziskavah in analizah je lahko zaželeno zaznavanje tudi kotanj višjih redov. Z opisano metodo je mogoče tudi to. Zaznavo obodov kotanj višjih redov dosežemo tako, da v postopku analize polrezov kot inicialne uporabimo poligone kotanj višjih redov v kombinaciji z DMV, ki ima primerno zapolnjene kotanje nižjih redov.

Glede na rezultate omejenega števila poskusov lahko zaključimo, da uporaba

opisane metode da zadovoljive rezultate. Dovoljujemo izjeme v obliki robnih primerov, ki bodo obravnavani v nadaljnjem razvoju.

6 SKLEP

Prispevek obravnava problematiko zaznavanja kotanj v vrednostih rastrskih prostorskih podatkov. Osredotočili smo se na kotanje na DMV, ki ustrezajo definiciji kraških kotanj – vrtač in udornic. V obeh primerih gre za zaprte konkavne oblike na kraškem površju. Morfometrična analiza oblike teh kotanj se uporablja pri interpretaciji razvoja kraškega površja. Zaradi velike gostote pojava na kraškem površju obstajajo potrebe po razvoju samodejne računalniške metode, s katero bi na DMV prepoznali obode kotanj na večji površini. Tovrstni pristopi so bili razviti in opisani v več delih, vendar z njimi ne dobimo dovolj natančnih rezultatov. Pristopi v veliki meri ne upoštevajo variabilnosti v nadmorskih višinah obodov posameznih kotanj. Pristopi kot obod kotanje obravnavajo najvišjo sklenjeno plastnico ali plastnico, ki povezuje točke z nadmorsko višino najnižje točke oboda. Oba pristopa delujeta samo delno, saj podcenita površino kotanj, ki se nahajajo na pobočjih. Zaznavanje s povprečevanjem DMV s konvolucijskimi filtri različnih oblik je močno odvisno od homogenosti obravnavanih oblik območja in izbire primernih parametrov. Kljub temu, da pristop bolje obravnava kotanje na pobočjih, rezultat tudi ob optimalnih parametrih vselej podceni površino kotanje.

Omenjene pomanjkljivosti pri zaznavanju kotanj na pobočjih in razčlenjenih obodov kotanj so nas spodbudile k razvoju nove metode, ki kotanje obravnava na do sedaj edinstven način. Podlaga za naše delo je bila objava Šušteršiča (1984), ki je ugotavljal zakonitosti oblik pobočij vrtač s pomočjo polrezov. S primerjavo polrezov, ki jih definirajo središče kotanje in posamezne točke na obodu, smo prišli do zaključka, da lahko posamezen polrez obravnavamo na podoben način, kot poteka obravnava podatkov časovnih vrst. Na funkciji višin ob polrezu poiščemo vrhove funkcije ter koordinate te točke zapišemo v poligon oboda kotanj. Vsak polrez ne izkazuje nujno roba kotanje kot vrh funkcije, temveč zgolj kot pregib s spremembo naklona. Zato polrez razdelimo na dva pojava: trend in anomalijo. Trend je v našem primeru povprečen naklon pobočja ali linearna funkcija oddaljenosti od središča kotanje in nadmorske višine. Anomalija je del funkcije, ki predstavlja kotanjo. Razlika funkcije višin polreza in njene linearne projekcije pretvori pregibe v vrhove ter tako omogoči določitev roba kotanje.

Pristop smo preverili na petih različnih kraških kotanjah Podgrajskega podolja. Rezultati analize so v večini primerov zadovoljivi in metodo ocenjujemo kot primereno za novo opredelitev morfometrije kraških kotanj.

Literatura in viri

- Bauer, C., 2015. Analysis of dolines using multiple methods applied to airborne laser scanning data. *Geomorphology*, 250, str. 78–88. DOI: 10.1016/j.geomorph.2015.08.015.
- Doctor, D. H., Young, J. A., 2013. An evaluation of automated GIS tools for delineating karst sinkholes and closed depressions from 1-meter lidar-derived digital elevation data. 13th Sinkhole Conference, NCKRI Symposium 2, NCKRI, str. 449–458. DOI: 10.5038/9780979542275.1156.
- Ford, D. C., Williams, P. W., 2007. Karst hydrogeology and geomorphology. Chichester: John Wiley & Sons. DOI: 10.1002/9781118684986.
- Gabrovšek, F., Stepišnik, U., 2011. On the formation of collapse dolines: A modelling perspective. *Geomorphology*, 134, 1–2, str. 23–31. DOI: 10.1016/j.geomorph.2011.06.007.
- Grlj, A., Grigillo, D., 2014. Uporaba digitalnega modela višin in satelitskega posnetka RapidEye za zaznavanje kraških kotanj in brezstropih jam Podgorskega krasa. *Dela*, 42, str. 129–147. DOI: 10.4312/dela.42.129-147.
- Guimarães, R. F., de Carvalho Júnior, O. A., de Souza Martins, E., Ferreira de Carvalho, A. P., Trancoso Gomes, R. A., 2005. Detection of karst depression by raster image in the Bambui Group, Brazil. V: Ehlers, M., Michel, U. (ur.). *SPIE Proceedings*, 5983: Remote sensing for environmental monitoring, GIS applications, and geology V. DOI: 10.1117/12.627741.
- Krevs, M., 1992. Iskanje lokalnih reliefnih ekstremov na DMR. *Geografski vestnik*, 64, str. 205–218.
- Liang, F., Du, Y., 2013. An automated method to extract typical karst landform entities from contour lines on topographic maps. *Geomorphometry*, 2013, str. 71–74.
- Lidar ARSO. 2014. URL:http://gis.arso.gov.si/evode/profile.aspx?id=atlas_voda_Lidar@Arso (citirano 24. 6. 2020).
- Mihevc, R., 2014. Kraške vrtače Dinarskega krasa. Diplomsko delo. Ljubljana: Univerza v Ljubljani, Fakulteta za matematiko in fiziko, Oddelek za fiziko.
- Novljan, Ž., 2019. Vrtače na pobočjih. Magistrsko delo. Ljubljana: Univerza v Ljubljani, Filozofska fakulteta, Oddelek za geografijo.
- Obu, J., 2011. Prepoznavanje kraških kotanj na podlagi digitalnega modela višin. Diplomsko delo. Ljubljana: Univerza v Ljubljani, Filozofska fakulteta, Oddelek za geografijo.
- Podobnikar, T., Možina, P., 2008. Analiza oblik površja z uporabo lokalnega okna. V: Perko, D. (ur.). *Geografski informacijski sistemi v Sloveniji 2007–2008*. Ljubljana: Založba ZRC, str. 29–39. DOI: 10.3986/9789612545420.
- Rahimi, M., Alexander, E. C., 2013. Locating sinkholes in lidar coverage of a glaciofluvial karst, Winona county, MN. V: Land, L., Doctor, H. D., Stephenson, J. B. (ur.). *Sinkholes and the engineering and environmental impacts of karst*. Carlsbad: National Cave and Karst Research Institute, str. 469–480.

- Sauro, U., 2012. Closed depressions in karst areas. V: Culver, W. B., White, D. C. (ur.). *Encyclopedia of caves* (Second edition). Amsterdam: Academic Press, str. 140–155. DOI: 10.1016 / B978-0-12-383832-2.00133-X.
- Stepišnik, U., 2015. The problem of dissolution doline definition. *Dela*, 43, str. 129–147. DOI: 10.4312/dela.43.2.29-40.
- Stepišnik, U., 2017. *Dinarski kras: plitvi kras Zgornje Pivke*. Ljubljana: Znanstvena založba Filozofske fakultete.
- Sweeting, M. M., 1972. *Karst landforms*. London: Macmillan.
- Šušteršič, F., 1984. Metoda morfometrije in računalniške obdelave vrtač. *Acta Carsologica*, 13, str. 79–98.
- Šušteršič, F., 1986. Zaprte kraške globeli, problematika interpretacije in kartografskega prikaza. *Acta Carsologica*, 14/15, str. 89–98.
- Telbisz, T., Latos, T., Deak, M., Szekely, B., Koma, S., Standovar, T., 2016. The advantage of lidar digital terrain models in doline morphometry compared to topographic map based datasets - Aggtelek karst (Hungary) as an example. *Acta Carsologica*, 45, 1, str. 5–18.
- Vrvišar, B., 2016. *Geološka karta kraškega ozemlja nad jamo Medvedjak na Matarskem podolju*. Diplomsko delo. Ljubljana: Univerza v Ljubljani, Filozofska fakulteta, Oddelek za geografijo.
- Waltham, A. C., Fookes, P. G., 2003. Engineering classification of karst ground conditions. *Quarterly Journal of Engineering Geology and Hydrogeology*, 36, str. 101–118.
- Waltham, T., Bell, F., Culshaw, M., 2010. *Sinkholes and subsidence : Karst and cavernous rocks in engineering and construction*. Chichester: Springer, Praxis. DOI: 10.1007/b138363.

KARST DEPRESSION DELINEATION USING HALF-SECTION ANALYSIS

Summary

The article addresses the issue of depression delineation in raster spatial data values. We focused on the depressions on the DEM (Digital Elevation Model), which meet the definition of karst depressions – sinkholes and dolines. In both cases, they are closed concave forms on the karst surface. Morphometric analysis of the shape of these basins is used in the interpretation of the development of the karst surface. Due to the high density of the phenomenon on the karst surface, there is a need to develop an automatic computer method that would identify the perimeter of the depressions on larger study areas. Such approaches have been developed and described in several publications, but we do not obtain sufficiently accurate results with them. Approaches

largely fail to consider the variability in the altitudes of the circumferences of individual depressions. Some approaches consider the highest closed contour, some the contour that connects the points with the altitude of the lowest circumferential point as the depression border. Both approaches work only in part as they underestimate the surface area of the depressions that are located on the slopes. Detection by averaging DMV with convolutional filters of different shapes strongly depends on the homogeneity of the depressions of the study area and the choice of suitable parameters. Despite the fact that the approach better treats depressions on slopes, the result always underestimates the surface of the depression even with optimal parameters.

These shortcomings in the detection of depressions on the slopes and the depressions with vertically variable perimeter have prompted us to develop a new method that treats depressions in a hitherto unique way. The basis for our work was the publication of Šušteršič (1984), who determined the laws of the shapes of sinkhole slopes with the help of half-sections. By comparing the half-sections defined by the center of the depression and the individual points on the circumference, we came to the conclusion that an individual half-section can be treated in a similar way as the processing of time series data. We aim to detect the peak vertices of the function of the heights along the half-section, and write the coordinates of this point in the polygon representing the perimeter of the depression. Each half-section does not necessarily exhibit the edge of the depression as the apex of the function but merely as a fold with a change in its inclination. Therefore, the half-section is divided into two phenomena: trend and anomaly. The trend in our case is the average slope inclination or a linear function of the distance from the center of the depression and altitude. The anomaly is part of the function that represents the depression. The differences in the function of the heights of the half-cut and its linear projection convert the folds into apexes and thus make it possible to determine the edge of the depression.

We tested the approach on five different karst depressions of the Podgorski Kras. The results of the analysis are in most cases satisfactory and the method is assessed as suitable for a new definition of the morphometry of karst depressions.

(Translated by the author)



KRAŠKA POLJA V SLOVENIJI

Izvirni znanstveni članek
COBISS 1.01
DOI: 10.4321/dela.53.23-43

Izvleček

Kraška polja so kotanje v krasu, ki so zelo pogoste zlasti na Dinarskem krasu. Kljub številnim skupnim značilnostim se pojavljajo v zelo različnih kraških okoljih in delujejo na različne načine. V raziskavi je predstavljena nova tipizacija kraških polj, ki poenostavlja dosedanje tipizacije. Polja opredeljuje glede na geomorfološko okolje, v katerem se pojavljajo, kot ojezerjena, prelivna, pritočna in predledeniška. V raziskavi smo na osnovi nove tipizacije opredelili vseh 35 kraških polj v Sloveniji.

Ključne besede: geomorfologija, kras, kraško polje, tipizacija, Slovenija

KARST POLJES IN SLOVENIA

Abstract

Poljes are very common karst depressions especially in the Dinaric Karst. Despite their many common characteristics, they occur in very different karst environments and function in various ways. The research presents a new typification of poljes, which simplifies the previous ones. It defines the poljes according to the geomorphological environment in which they occur as inundated, overflow, inflow and pre-glacial poljes. In the research, we defined all 35 karst poljes in Slovenia on the basis of the new typification.

Keywords: geomorphology, karst, polje, typification, Slovenia

.....
: * Oddelek za geografijo, Filozofska fakulteta Univerze v Ljubljani, Aškerčeva 2, SI-1000
: Ljubljana, Slovenija
: e-pošta: uros.stepisnik@ff.uni-lj.si

1 UVOD

Kraška polja so največje kraške kotanje. Prve objave o kraških poljih iz 19. stoletja jih opisujejo kot kraške kotanje brez površinskega odtoka, za katere se je uporabljal nemški termin *die Wanne* (slov. kad) (Gams, 1978). Šele ob koncu 19. stoletja se v mednarodni literaturi za njih prične uporabljati termin *polje*, ki izhaja iz slovanskih jezikov (Mojsisovicz, 1880). V tem času so nastale tudi prve definicije kraških polj, ki so jih opredeljevale kot velike kraške kotanje z uravnanim dnom in kraškim odtokom. Daljša os njihovih dnov naj bi bila orientirana v smeri lokalne geološke strukture in prekrita s terciarnimi sedimenti. Morfogenezu polj so takrat interpretirali kot zadnjo fazo razvoja kraških kotanj, kjer vrtače prerastejo v uvale, uvale pa v kraška polja (Cvijić, 1895; Cvijić, 1900).

Sodobne interpretacije kraških polj (Gams, 1974; Gams, 1978; Gams, 2003; Ford, Williams, 2007) so predhodnim precej podobne in jih opredeljujejo kot kotanje, ki imajo značilna obsežna in relativno uravnana dna, ki jih sklenjeno vzdolž celotnega roba obdajajo višja pobočja. Dna polj navadno prekrivajo fluvialne ali jezerske naplavine. Za kraška polja je značilna površinska hidrologija v obliki vodotokov in občasnega ojezerjevanja, izjemoma so ojezerjena tudi stalno. V vseh kraških poljih deluje kraška hidrologija, kar pomeni, da je odtok iz polj podzemni – skozi kraški vodonosnik (Gams, 1978). V primeru, da površinska hidrologija v dneh polj več ne deluje, jih opredeljujemo kot suha ali reliktna kraška polja. V primeru, da voda iz teh kraških kotanj odteka površinsko, jih ne moremo opredeljevati s terminom kraška polja, ampak kvečjemu kot kraške kotline (Stepišnik, 2020). Dimenzije polj so v literaturi različno opredeljene (Cvijić, 1895; Cvijić, 1900; Gams, 1978; White, 1988; Ford, Williams, 2007). Cvijić (1895), ki je prvi kraška polja opredelil po morfometričnih kriterijih, je za kriterij minimalne širine njihovih dnov določil vsaj en kilometer. Gams (1978) je v definiciji kraških polj, ki je danes sprejeta tudi v mednarodni literaturi (Jennings, 1985; White, 1988; Ford, Williams, 2007), opredelil minimalni kriterij širine 400 metrov. V kasnejših publikacijah je morfometrični kriterij najmanjše širine polj znižal na 400 metrov, saj se je v praksi izkazalo, da veliko število manjših kraških polj v Sloveniji ne presega širine pol kilometra (Gams, 2003). Te dimenzije jasno razlikujejo polja od ostalih kraških kotanj manjših dimenzij, ne glede na njihov nastanek ali hidrološko delovanje. Površine kraških polj lahko obsegajo do 405 kvadratnih kilometrov, kot jih meri največje Livanjsko polje v Hercegovini.

Tipizacij kraških polj je veliko. Tipizacijo polj, ki se danes uporablja tudi v mednarodni literaturi (Bögli, 1980; Jennings, 1985; Jennings, 1997; Nicod, 2003; Bonacci, 2004; Gunn, 2004; Williams, 2004), je podal Gams (1978), ki je tipiziral polja glede na njihove morfogenetske in hidrološke značilnosti. Njegova tipizacija je bolj ali manj dosledno sprejeta tudi v mednarodni krasoslovni literaturi (Jennings, 1985; White, 1988; Ford, Williams, 2007; Sauro, 2012). Glede na njihovo hidrološko funkcijo, torej na način pritekanja in odtekanja vode, je kraška polja razdelil na pritočno-ponorniška, prelivna,

izvirno-ponorniška polja zajezenega krasa, raztočno-ponorniška in suha polja. Pritočno-ponorniška polja imajo površinske pritoke iz nekraških območij, ki na kraškem polju poniknejo. Prelivna polja imenuje tudi izvirno-ponorniška in imajo kraške izvire na eni in ponore na drugi strani ter neprepustne ali slabo prepustne kamnine na dnu polja. Izvirno-ponorniška polja zajezenega krasa imenuje tudi polja v epifreatični coni. Ta imajo dno v bližini gladine podzemne vode, tako da so dna polj ob višjih vodostajih poplavljeni. Raztočno-ponorniška polja v dneh gradijo neprepustne ali slabo prepustne kamnine; tako se vode iz njih raztekajo na robne kraške kamnine in v njih ponikajo. Suha polja je opredelil kot polja brez stalnih ali občasnih vodnih tokov. Le ob izrednih dogodkih so dna polj še vedno lahko hidrološko aktivna (Gams, 1978).

Po nastanku oziroma morfogenetskih značilnostih je Gams (1978) razlikoval robna, periferina in pretočna polja, polja v gladini podzemne vode in piedmontska gorska polja. Robna polja so nastala na stiku vododržnih in kraških kamnin. Površinske vode v dnu polja odlagajo material z nekraškega območja v obliki vršaja, nato pa ponirajo v dnu ali na robu polj. Dna perifernih polj gradijo neprepustne kamnine, zato se vodotoki iz njih raztekajo na robove, kjer ponirajo v kras. Ta polja so pravzaprav bolj ali manj enotna uravnava povezanih slepih dolin. Pretočna polja so nastala na močnejših prelomnih conah. Tektonsko deformirane kamnine delujejo kot bariere podzemnim vodam. Ta območja vodotoki prečkajo površinsko, zato se na površju oblikujejo uravnana dna kraških polj. Polja v višini piezometričnega nivoja so večje sklenjene površine, ki so se uravnale predvsem z robno korozijo, ker je del površja segal v nivo poplavnih vod. Gladina podzemne vode na območju polj je morala biti stabilna daljše obdobje, da je imela bočna korozija na voljo dovolj časa za oblikovanje uravnave. Nastanek piedmontskih gorskih polj je podoben robnim poljem, le da so uravnave v teh kotanjah oblikovali prodonosni vodotoki iz poledenelih ali periglacialnih območij. Prod se je v dneh polj odložil v obliki vršaja, hkrati pa je na pobočja kotanj delovala bočna korozija nenasičene snežnice (Gams, 1978).

Gamsova (1978) klasifikacija kraških polj implicira povezavo med morfogenetskimi značilnostmi in recentno hidrološko funkcijo. Skoraj pri vseh tipih polj se tako hidrološka funkcija polj navezuje na morfogenetske značilnosti: robna polja hidrološko delujejo kot pritočno-ponorniška, pretočna polja kot prelivna, polja v gladini podzemne vode kot izvirno ponorniška polja zajezenega krasa in periferina polja kot raztočno-ponorniška polja. Hidrološka funkcija se tako navezuje na procese nastanka polj in obratno. Le piedmontskemu gorskemu tipu polj Gams (1978) ne opredeli hidrološke funkcije.

Gamsova tipizacija kraških polj (Gams, 1978) je v rabi že skoraj 50 let. Poleg tega, da deli polja na osnovi dveh kriterijev, ki se med seboj skoraj popolnoma prekrivata, in je kot taka nekoliko eklektična, tudi interpretacija njihovega nastanka ni popolnoma skladna s sodobnim morfogenetskim in morfodinamičnim razumevanjem krasa. Kot taka je le v omejenem obsegu uporabna v praksi, kar ima za posledico pogosto nedoslednost interpretacije kraških polj v poljudni in strokovni literaturi. Kljub temu,

da so določeni tipi polj vezani na zelo specifične procese na kraškem površju ali v podzemlju, ki so vezani le na določena geomorfološka okolja, jih ta tipizacija ne predvideva oziroma ne upošteva (Gams, 1978).

Slika 1: Cerkniško polje ob visokem vodostaju (foto: U. Stepišnik, 2020).



Namen članka je podati novo tipizacijo kraških polj, ki ne sledi izključno klasični morfogenetski in hidrološki interpretaciji (Cvijić, 1900; Gams, 1963; Gams, 1978; Ford, Williams, 2007), ampak temelji na moderni morfodinamični interpretaciji tipov krasa, v katerih so polja oblikovana. Cilji članka so (a) podati morfodinamično delitev specifičnih kraških okolij, kjer se pojavljajo kraška polja, (b) izdelati novo sistematično tipizacijo kraških polj glede na podano morfodinamično tipizacijo kraških okolij, v katerih so polja oblikovana, in (c) na osnovi nove tipizacije sistematizirati kraška polja Slovenije.

2 MORFODINAMIČNA TIPIZACIJA KRAŠKIH POLJ

Tipe krasa lahko opredelimo na osnovi prevladujočih geomorfoloških procesov na površju, kar opredeljujemo kot morfodinamično tipizacijo krasa. Morfodinamična oziroma geomorfodinamična tipizacija izhaja iz geomorfološkega analitskega pristopa (Pavlopoulos, Evelpidou, Vassilopoulos, 2009), ki temelji na interpretaciji površinskih oblik na osnovi analize recentnih geomorfnih procesov in njihove dinamike.

Najosnovnejše in hkrati tudi najbolj tipično delovanje krasa je vezano na tri osnovne procese: vertikalni odtok padavinskih vod, kemično denudacijo, ki je prevladujoč proces odnašanja kamninske mase na površju in v podzemlju, ter zanemarljivo akumulacijo raztopljenega materiala (Šušteršič, 1986). V primeru, da je gladina podzemne vode v krasu dovolj globoko, da niti ob visokih vodah ne seže na površje, imenujemo tovrstno kraško okolje globoki kras. Za tovrstno morfodinamiko kraškega okolja so značilne različne geomorfne oblike, ki so v tlorisu ovalnih oblik kot najrazličnejše kraške kotanje in kopaste vzpetine. V tovrstnih kraških okoljih ni kraških polj, četudi delujejo najbolj tipično kraško (Stepišnik, 2020). Kljub temu v okolju globokega krasa najdemo kraška polja, ki so nastala v drugačnih morfodinamičnih kraških okoljih. Tovrstna polja lahko v reliefu identificiramo kot obsežne kraške kotanje z uravnanim dnom. Ta niso hidrološko aktivna oziroma lahko površinska hidrologija v njih omejeno deluje le ob izjemnih vremenskih dogodkih. Njihova dna so navadno razčlenjena z vrtačami in brez naplavin oziroma se te pojavljajo le v posameznih zaplatah. V živoskalnih dneh so ponekod ohranjene tudi struge nekdanjih vodotokov. Zaradi odsotnosti procesov, ki so v preteklosti taka polja oblikovali, jih imenujemo reliktna polja.

2.1 Polja plitvega krasa

S plitvim krasom označujemo geomorfna okolja, v katerih dna kraških kotanj segajo do gladine podzemne vode. Z vidika hidrogeološke dinamike je plitvi kras vezan na majhno globino vadozne cone, oziroma je ta na območjih globljih kraških kotanj povsem odsotna. V okoljih plitvega krasa torej delujejo vsi tipični kraški procesi razen vertikalnega odtekanja padavinske vode na območjih globljih kotanj. Dna teh kotanj so neposredno v epifreatični oziroma freatični coni, zato so občasno ali stalno ojezerjena.

Okolja plitvega krasa so prisotna na območjih, kjer je kraški vodonosnik iz strani zajezen tako, da je gladina podzemne vode v bližini površja. Na to vpliva predvsem topografska lega nekraških kamnin ali sedimentnih bazenov na iztočnih straneh kraških vodonosnikov. Na gladino podzemne vode vpliva tudi gladina morja. Območja plitvega krasa so pogosta v reliefnih znižanjih vzdolž tektonsko deformiranih con, ki jih imenujemo podolja. Nastanejo zaradi zniževanja površja ob tektonskih ekstenzijah ali zaradi pospešene dinamike denudacije vzdolž tektonsko deformiranih con. V podoljih je, poleg nižje topografske lege, zaradi tektonsko deformirane kamnine, ki deluje kot slabo prepustna bariera, kraški vodonosnik lokalno zajezen, zato so vzdolž podolij pogosta območja plitvega krasa. V kraških kotanjah plitvega krasa ne delujejo vsi tipični kraški procesi, saj je vertikalni odtok padavinskih vod onemogočen, s tem pa tudi kemična denudacija, ki bi zniževala površje v vertikalni smeri. Navadno se iz kraških vod odlaga netopen oziroma slabo topen drobnozrnat sediment, ki dna prekrije z naplavino.

Najpreprostejše hidrološko delovanje je značilno za kraška polja, ki jih literatura po načinu nastanka opredeljuje kot polja v piezometrični gladini oziroma po hidrološki funkciji kot izvirno-ponorniška polja zajezenega krasa (Gams, 1978; Gams, 2003). To so

kraške kotanje ustreznih dimenzij, ki segajo do gladine podzemne vode, zato so občasno ali stalno ojezerjene. Poimenovanje tega tipa polj, ki ga je uvedel Gams (1978), ni najprimernejše, saj je piezometer naprava za merjenje tlaka v tekočinah, ki se uporablja za določevanje gladine podzemne vode. V nadaljevanju bomo za ta tip polj dosledno uporabljali ustrežnejši termin *ojezerjena kraška polja*, ki opisuje njihove morfodinamične značilnosti.

Ta polja so lahko stalno ali občasno ojezerjena. Dna stalno ojezerjenih kraških polj segajo do freatične cone kraškega vodonosnika. Ta tip polj je v Dinarskem krasu vezan predvsem na bližino morske obale, kjer je zaradi holocenskega dviga morske gladine in posledičnega dviga gladine podzemne vode v okoliškem krasu trajno poplavlilo večje kraške kotanje. Tako je najrazličnejšim tipom večjih kraških kotanj ojezerilo dna, zato jih zaradi sedanjih hidroloških značilnosti tipiziramo kot stalno ojezerjena kraška polja. V Sloveniji teh polj ni, zato na tem mestu navajamo nekaj tovrstnih primerov, ki so locirani na Dinarskem krasu vzdolž Jadranske obale, kjer se jih zaradi stalne ojezerjenosti označuje s hidronimi, kot so Doberdobsko jezero na Krasu, Vransko jezero v Dalmaciji ali Vransko jezero na Cresu.

Bolj pogosta so *občasno ojezerjena kraška polja*. To so kraške kotanje ustreznih dimenzij, katerih dna segajo v epifreatično cono in so občasno poplavljeni. Območja kotanj teh polj ne ležijo na območjih večjega hidravličnega gradienta, ki bi povzročil, da se vode preko dnov polj pretakajo od izvirnih k ponornim delom. V dna občasno ojezerjenih kraških polj priteka voda pretežno iz estavel, v katere ob spustu gladine tudi odteče. Kljub temu, da nekatere kotanje nimajo dvojne hidrološke funkcije, temveč ločeno delujejo kot izviri ter ponikve, večjih površinskih tokov med izvirnimi in ponornimi območji v poljih tega tipa načeloma ni.

Slika 2: Kotanja Petelinjskega jezera je tipično občasno ojezerjeno kraško polje (foto: U. Stepišnik, 2020).



Drug tip polj plitvega krasa imenujemo prelivna kraška polja, ki podobno kot občasno ojezerjena polja segajo v epifreatično hidrogeološko kraško cono. Razlikujejo se v tem, da imajo prelivna kraška polja v dneh površinski vodotok oziroma reko, ki prevaja vodo od izvirnega proti ponornemu delu polja. Prav zato jih je pretekla literatura tipizirala kot izvirno-ponorniška polja oziroma prelivna polja (Gams, 1978; Gams, 2003). Ta tip polj je prostorsko vezan na tektonsko deformirana območja ali območja tektonskih ekstenzij, vzdolž katerih so nastali znižani deli reliefa oziroma podolja. Hidrološko bariero na območju polja lahko tvorijo tudi nekraške kamnine. Če je hidravlični gradient prečen na cono hidrološke bariere, ob kateri je oblikovano polje, se površinske vode preko njega prelivajo od izvirnega k ponornim delom. Ob visokih gladinah podzemnih vod pa so dna teh polj občasno ojezerjena. Prelivna kraška polja veljajo za najbolj tipična kraška polja predvsem zaradi jasno izraženih obodov in pestrosti kraških oblik, ki se v njih pojavljajo. Na pritočni strani vodotoki najpogosteje izvirajo v izvirnih zatrepih in zatrepnih dolinah, reke pa preko polj zaradi drobnozrnatih sedimentov in majhnega hidravličnega gradienta navadno meandrirajo. Za odtočne dele teh kraških polj so značilne ponikve in ponori, ki se navadno nahajajo pod strmimi pobočji. Med zelo tipične primere prelivnega polja uvrščamo tudi največje kraško polje na svetu, Livanjsko polje.

Slika 3: Planinsko polje je eno od največjih prelivnih kraških polj v Sloveniji (foto: U. Stepišnik, 2020).



2.2 Fluviokraška polja

Morfodinamično kraško okolje, kjer je zaradi intenzivnega mehanskega preperevanja matične kamnine in debelejšje plasti preperine zavrt vertikalni odtok padavinskih vod, označujemo s terminom fluviookras. Zaradi zavrtega odtekanja padavinskih vod skozi preperino v kras pride do oblikovanja lokalnih površinskih vodotokov, ki preoblikujejo površje. Pojavljanje fluviokraških okolij je litološko pogojeno, saj je odvisno predvsem od odpornosti kamnine na mehansko preperevanje. Najpogostejše je fluviookras vezan na zakrasele kamnine, ki na površju intenzivno mehansko preperevajo. To so običajno tankoplastoviti apnenci, lapornati apnenci in dolomiti (Roglić, 1958). Tudi površje na tektonsko deformiranih kamninah pogosto deluje fluviokraško (Gostinčar, 2016; Stepišnik, 2020).

Na uravnanih površjih padavinske vode kljub preperini vertikalno odteka v kraški vodonosnik, torej delujejo vsi kraški procesi nemoteno. Ta okolja načeloma nimajo golih skalnih površin, saj jih v celoti pokriva preperina, zato jih imenujemo pokriti kras (Gams, Kunaver, Radinja, 1973). Na pobočjih pokritega krasa padavinska voda odteka v obliki površinskih vodotokov. Ti erodirajo preperino ter oblikujejo linearne vdolbine vzdolž pobočij oziroma t. i. erozijske jarke. Ob njihovem izteku se na uravnanih površjih odlaga naplavina v obliki vršajev. Površinski tokovi ob izteku vršajev skozi naplavino v ponikvah odteka v podzemlje.

Večje kotanje, ki jih zapolnjujejo naplavine s fluviokraških pobočij, opredeljujemo kot kraška polja. Tip polj, ki je značilen za ta kraška okolja, literatura po hidrološki funkciji opredeljuje kot pritočno-ponorniška polja, po nastanku pa kot *robna polja* (Gams, 1978; Gams, 2003). To poimenovanje ni najustreznejše, saj je za kraška polja bistveno, da vode z njih odteka v podzemlje. Poleg tega je poimenovanje robno polje zamenljivo tudi s perifernim poljem, saj imata beseda rob in periferija podoben pomen. Ker ta polja opredeljuje površinski pritok voda iz fluviokraških okolij, ta polja imenujemo *pritočna kraška polja*. Podobno kot pri ostalih kraških poljih to poimenovanje prav tako implicira njihovo osnovno morfodinamiko.

Ta tip polj naj bi bil značilen za stik nekraških in kraških kamnin, a je iz primerov navedenih v literaturi razvidno, da vode nanje vedno pritekajo iz fluviokraških območij in nikoli iz nekarbonatnih okolij, na primer iz flišnih kamnin (Gams, 1978; Gams, 2003). Tudi največje zaprte kotanje na stiku nezakraselih flišnih kamnin in kraških območij, kot je na primer Vremska dolina pri Divači ali slepa dolina Temenice pri Ponikvah, vedno opredeljujemo kot slepe doline in ne kot kraška polja, kljub temu da izpolnjujejo vse morfografske in hidrološke kriterije kraških polj (Gams, 1978; Gams, 2003). Torej je dosedanja opredelitev pritočnih kraških polj preveč ohlapna (Gams, Kunaver, Radinja, 1973; Gams, 1978); opredeliti jih moramo kot polja na stiku fluviokraških in kraških okolij, kjer vode površinsko pritekajo na polja in na polju odteka v kraški vodonosnik.

Manjša pritočna kraška polja delujejo enostavno, saj se nanje stekajo le vode iz erozijskih jarkov na pobočjih polj. Navadno je v njihovi okolici več erozijskih jarkov

in dolgov, od koder so površinske vode v dna polj nasule naplavino v obliki vršajev. Skupine vršajev tako tvorijo uravnavo v dnu kraškega polja. Na površju so navadno sledovi nekdanjih ali občasnih rečnih strug, ki se iztečejo v ponikvah. Na ponornih delih polj so pogoste tudi sufozijske vrtače (Gostinčar, 2011). Ker ta polja ležijo nad gladino podzemne vode v krasu, so suha; le ob intenzivnejših vremenskih dogodkih nanje pritekajo vodotoki. Navadno so tako majhna, da njihove dimenzije bistveno ne presegajo morfometričnih kriterijev za kraška polja.

Slika 4: Strmica je eno od manjših pritočnih kraških polj. Leži ob vznožju erozijskih jarkov pod Hrušico (foto: U. Stepišnik, 2020).



Večja pritočna polja so morfološko in hidrološko bolj kompleksna. Površinski tokovi, ki imajo porečje v fluviokraškem zaledju, pritekajo na ta kraška polja in odtekajo v podzemlje. To niso razpršeni manjši občasni vodotoki kot v primeru enostavnih robnih polj, pač pa v dolinah nanje pritekajo večji, pogosto stalni vodotoki. Ob visokih vodostajih so najnižji deli polj ob odtočnem delu tudi ojezerjeni. Ta polja dosegajo veliko večje dimenzije, saj lahko njihove širine dosegajo tudi nekaj kilometrov.

2.3 Glaciokraška polja

Kraška območja, ki so bila v preteklosti poledenela, imenujemo ledeniški kras oziroma pogosteje s tujko glaciokras (Smart, 2004). Glaciokras je rezultat delovanja polledenitve na kraški geomorfni sistem (Kunaver, 1983; Smart, 2004; Ford, Williams, 2007; Žebre, Stepišnik, Kodelja, 2013; Adamson, Woodward, Hughes, 2014; Žebre,

Stepišnik, 2014a; Žebre, Stepišnik, 2014b; Žebre, Stepišnik, 2015). Ledeniško površje se morfološko jasno loči na dva dela – na erozijsko in akumulacijsko območje. V zgornjem delu ledenikov prevladuje akumulacija ledu in posledično intenzivna ledeniška erozija, tj. trganje in brušenje matične kamnine, medtem ko v spodnjem delu prevladujeta ablacija oziroma taljenje ledu in akumulacija ledeniškega materiala.

Kljub temu, da je večina vodotokov pod ledeniki odtekala v kraški vodonosnik, se je del teh vod, zlasti v ablacijskem delu, kjer so bile izdatne količine ledenikih akumulacij, stekal pod ledeniki in ni vtekal v kras. Ledeniške akumulacije so delovale kot neprepustna podlaga, ki je preprečevala odtok vod v kraški vodonosnik. Zato so površinske vode, kot predledeniški tokovi, iztekale iz čela ledenika. Ti tokovi so preko kraškega površja odlagali fluvioglacialni material v obliki vršajev. Vodni tokovi so skozi fluvioglacialne nanose ob izteku vršajev odtekali v kraški vodonosnik. V primerih, ko je bilo površje pred ledeniki dovolj strmo, vode niso odlagale materiala, temveč so v pobočja abrazijsko vrezala globoke in strme, ozkim soteskam podobne rečne struge, ki jih imenujemo korita. Predledeniški vršaji so se v teh primerih odložili preko bolj uravnanih kraških območij v nižjih topografskih legah pod koriti.

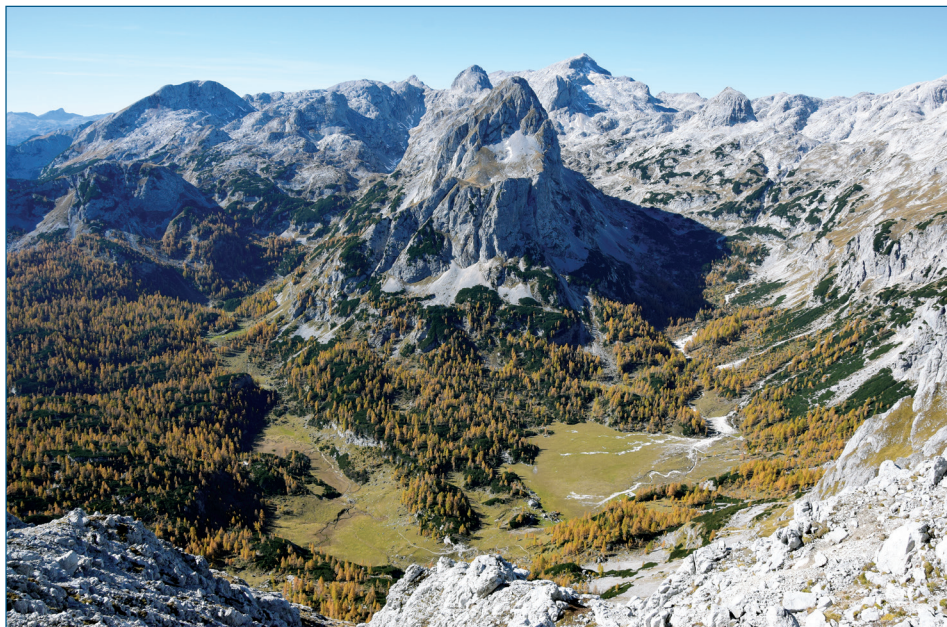
V primeru, da predledeniški vršaji zapolnjujejo večje kraške kotanje z ustreznimi dimenzijami, jih imenujemo *predledeniška kraška polja*. V večini primerov so to suha kraška polja, saj se je pritekanje vodnih tokov na ta polja ob koncu pleistocena z umiki ledenikov končalo. Na poljih so pogosto ohranjene rečne struge nekdanjih predledeniških tokov (Stepišnik, 2015). Ta polja v celoti ležijo v vadozni coni krasa, zato navadno nimajo recentne hidrološke funkcije. Občasne ojezeritve nižjih delov teh polj so rezultat izdatnih padavin, tudi lokalnih pritokov, ki zaradi slabo prepustnih predledeniških nanosov ne morejo sproti odtekati v podzemlje, zato voda zastaja na površju.

Starejša literatura ta polja opredeljuje kot piedmontska polja (Gams, 1978) (it: *pie-de di monte* = vznožje gore) oziroma piedmontska gorska polja (Gams, 1978; Gams, 2003), kar ni najprimernejši termin, saj ne ležijo pod gorami, ampak navadno v visokogorju, pred iztoki nekdanjih ledenikov. Tipični primeri tovrstnih kraških polj so v goratih delih Dinarskega krasa, ki ležijo v bližini nekdanjih poledenitev, kot so Krasno polje na Velebitu (Stepišnik, 2015) ter Grahovo, Dragaljsko, Njogoško in Cetinjsko polje v Črni Gori (Adamson, Woodward, Hughes, 2014; Žebre, Stepišnik, 2014a; Žebre, Stepišnik, 2014b; Žebre, Stepišnik, 2015).

2.4 Polja kontaktnega krasa

Termin kontaktni kras opredeljuje geomorfna okolja, ki ležijo na aktivnem hidrološkem stiku med fluvialnim in kraškim geomorfnim sistemom. Glede na hidrološko pozicijo ločimo dva osnovna tipa kontaktnega krasa: ponorni in izvirni kontaktni kras (Mihevc, 1991). Ponorni kontaktni kras je okolje, kjer vode iz nekraškega fluvialnega geomorfnega sistema vtekajo v kraškega. Drugi tip kontaktnega krasa je izvirni

Slika 5: Velo polje pod Triglavom je eno najmanjših kraških polj Slovenije. Uvrščamo ga v predledeniški tip polj (foto: U. Stepišnik, 2020).



kontaktni kras, ki se oblikuje na območjih iztekanja vode iz kraškega vodonosnika na površje, v fluvialni geomorfni sistem. Na ponornem kontaktnem krasu alogeni tokovi iz nezakraselih kamnin, kjer deluje fluvialni geomorfni sistem, tečejo na kras. Poleg velikih količin vode s seboj prenašajo tudi izdatne količine sedimenta, ki se delno akumulira ob kontaktu, delno pa se nadaljuje s transportom v kraški vodonosnik. Na površju ob kontaktu se oblikujejo značilne geomorfne oblike, kot so vršaji kontaktne-ga krasa, ponorne doline, ponorni zatrepi in slepe doline.

Kot največjo reliefno obliko, vezano na ponorni kontaktni kras, je Gams (1978) opredelil poseben tip kraških polj. Po njihovi hidrološki funkciji jih je opredelil kot raztočno-ponorniška kraška polja. Za njih naj bi bilo značilno, da imajo v dnu večjo debelino neprepustnih sedimentov, od koder se vode centrifugalno raztekajo proti robu, kjer na stiku z zakraselimi kamninami odtekajo v podzemlje. Na tem stiku naj bi bile slepe doline in njim podobne kotanje (Gams, 1978). Po nastanku je tovrstna polja opredelil tudi kot periferna-obrobna polja (Gams, 2003). Ta polja naj bi sestavljala povezana dna slepih dolin. Kot primere tovrstnih polj navaja Postojnsko, Kočevsko, Kupreško in Glamočko polje.

Ni popolnoma jasno, zakaj je ta tip kraških polj zašel v krasoslovno literaturo. Takšnih sklenjenih območij nezakraselih kamnin ne smemo opredeljevati kot kraška polja. Kraška polja so namreč po osnovni definiciji reliefne kotanje v krasu, ki imajo

sklenjen obod višji od dna. Uravnano dno mora imeti širino vsaj pol kilometra, uravnava pa mora biti vezana na recentne ali pretekle površinske hidrološke procese. Vode iz kraških polj morajo odtekati v kras. Postojnsko polje, kot najbolj tipični primer raztočno-ponorniškega oziroma periferno-obrobnega polja (Gams, 1978; Gams, 2003), nima teh lastnosti. Deli osrednjega dela polja so višji od oboda, dno ni ravno, pač pa je povečini razčlenjeno s slemenasto-dolinastim fluvialnim reliefom. Tudi dna slepih dolin na robu Postojnskega polja niso povezana v uravnava. Postojnske kotline torej ne moremo opredeliti kot kraško polje oziroma jo je celo zmotno imenovati Postojnsko kraško polje. Podobno velja za Kočevsko polje, kot primer kombiniranega prelivnega ter pritočnega kraškega polja. Izjema je le porečje Rudniškega potoka, ki pa pravzaprav sploh ne obsega dela dna Kočevskega polja, temveč leži višje nad njegovim severnim obodom. Povirje ima na zaplati laporjev in peščenjakov miocensko-pliocenske starosti ter odteka na sever v ponorni jamski sistem Željnskih jam. Enako velja tudi za tipičen primer raztočno-ponorniškega polja iz osrednjega dela Dinarskega krasa: Kupreško in Glamočko polje. Kupreško polje je tipično pritočno kraško polje (Stepišnik, 2014), medtem ko je Glamočko polje kombinirano pritočno in prelivno polje.

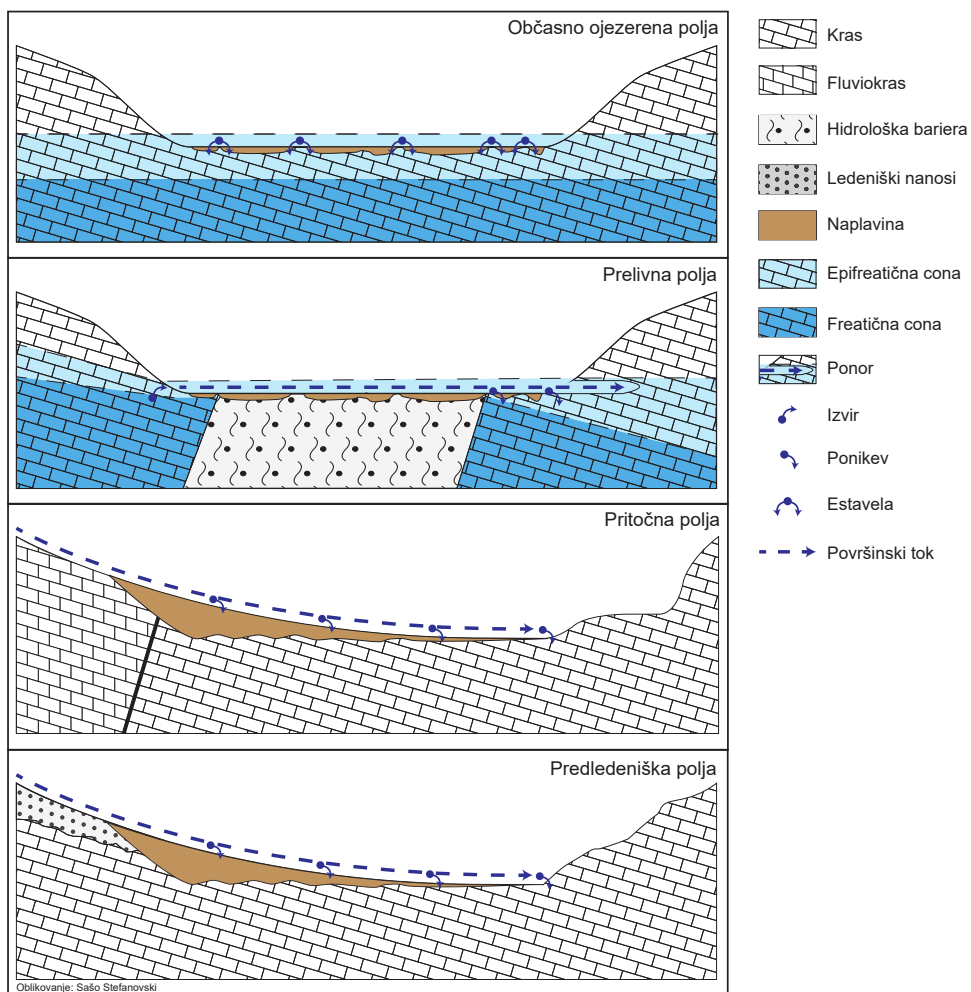
Če povzamemo: literatura (Gams, 1978; Gams, 2003) kot največje oblike ponorne kontaktne krasi opredeljuje raztočno-ponorniška polja. Teoretično so ta jasno morfografsko, morfometrično in morfodinamično opredeljena. Kljub številnim navedenim primerom polj tega tipa nobeno ne ustreza definiciji kraškega polja. Potemtakem je raba termina raztočno-ponorniško in tudi periferno-obrobno polje neutemeljena; večje kotanje na ponornem kontaktnem krasu torej niso kraška polja.

3 KRAŠKA POLJA V SLOVENIJI

Na osnovi morfodinamične funkcije kraških okolij smo izdelali celostno tipizacijo kraških polj Slovenije. Osnovne morfometrične kriterije smo povzeli po Gamsu (2003), kar pomeni, da so polja vse zaprte kraške kotanje, ki imajo sklenjena pobočja, ki so višja od dnov polj. Dna morajo biti relativno uravnana, njihova širina pa mora dosegati minimalne dimenzije okoli 400 metrov.

Skupno število vseh polj v Sloveniji je 35. Njihova povprečna površina je 4,5 km². Največje je Cerkniško polje, ki obsega površino okoli 36,5 km² in ima širino okoli 5 km, najmanjše polje pa je Velo polje pod Triglavom, ki ima površino 0,07 km², a ima premer le 340 m. Kljub temu, da to polje zaradi premajhne širine ne dosega minimalnih morfometričnih kriterijev za kraška polja, smo ga vseeno vključili v našo tipizacijo. Razlog je v tem, da to polje predstavlja prvi opisan primer piedmontskega gorskega polja (Gams, 1963). Vsa ostala polja, ki so vključena v tipizacijo, pa dosegajo vse morfometrične kriterije kraških polj (Gams, 2003).

Slika 6: Tipi kraških polj.



Oblikovanje: Sašo Stefanovski

Preglednica 1: Kraška polja v Sloveniji.

	Ime	Površina [km ²]	Tip polja
1	Cerkniško polje	36,58	Občasno ojezerjeno, prelivno, pritočno
2	Dobropolje	10,27	Občasno ojezerjeno, prelivno, pritočno
3	Ribniško polje	21,21	Prelivno, pritočno
4	Radensko polje	8,70	Prelivno, pritočno
5	Kočevsko polje	15,05	Prelivno, pritočno
6	Bloško polje	5,78	Pritočno
7	Logaško polje	4,83	Pritočno
8	Koritniško polje	4,23	Pritočno
9	Goteniško polje	1,79	Pritočno
10	Babno polje	1,62	Pritočno
11	Rakitniško polje	1,14	Pritočno
12	Vrbovsko polje	1,05	Pritočno
13	Dobsko polje	0,91	Pritočno
14	Hotenjsko polje	0,76	Pritočno
15	Zadlog	4,23	Pritočno
16	Rakovsko-unško polje	1,77	Pritočno
17	Črnovrško polje	1,52	Pritočno
18	Žalnsko polje	0,79	Pritočno
19	Koprivniško polje	0,68	Pritočno
20	Strmica	0,63	Pritočno
21	Bločiško polje	0,32	Pritočno
22	Ponikve na Rogu	0,29	Pritočno
23	Loško polje	14,46	Prelivno
24	Lučki dol	1,42	Prelivno
25	Mirnopeško polje	1,35	Prelivno
26	Travnik	0,83	Prelivno
27	Podpeško polje	0,33	Prelivno
28	Ponikve pri Preserjah	0,20	Prelivno
29	Planinsko polje	9,51	Prelivno
30	Globodol	2,48	Občasno ojezerjeno
31	Palško polje	0,89	Občasno ojezerjeno
32	Retje	0,53	Občasno ojezerjeno
33	Petelinjsko polje	0,43	Občasno ojezerjeno
34	Gomance	2,14	Predledeniško
35	Velo polje	0,07	Predledeniško

Natančne dimenzije kraških polj je v določenih primerih težko natančno opredeliti. Kljub natančnim morfometričnim podatkom o reliefu in terenskim pregledom so robovi nekaterih kraških polj težko določljivi. Robovi namreč pogosto iz uravnanih ali reliefno nekoliko razčlenjenih površij, kjer jih prekriva naplavina, prehajajo v okoliško kraško površje brez izrazitih pregibov. To velja zlasti za kraška polja v fluviokraških okoljih, ki imajo pogosto na odtočnih delih svoje reliktno dele, kjer so nekdanja dna polj že zakrasela in so najpogostejše razčlenjena z vrtačami. Prav tako je pri tovrstnih poljih in pri tistih v glaciokraških okoljih težko zamejiti pritočne dele, saj dna polj zvezno prehajajo v rečne doline oziroma na območja ledeniških ali predledeniških nanosov. Prav zato so navedene dimenzije polj, ki jih navajamo v tej raziskavi, v nekaterih primerih nekoliko arbitrarne.

Polja so tipizirana na osnovi morfodinamičnih značilnosti kraških okolij, v katerih so oblikovana; torej po načinu delovanja polj in okoliškega površja. Večina kraških kotanj, v katerih so oblikovana polja, je oblikovanih pretežno v homogenem morfodinamičnem okolju, tako da jih uvrščamo v en sam tip. V nekaterih večjih kraških poljih součinkuje več tipov kraških okolij. Zaradi pestrosti delovanja tovrstna polja označujemo kot mešana kraška polja.

Mešano morfodinamično delovanje je značilno za največja polja v Sloveniji. Med najbolj pestra uvrščamo Cerknisko polje in Dobropolje. Na območju obeh polj je prisotno delovanje, ki je značilno za občasno ojezerjena, prelivna in pritočna polja. Na obeh poljih imamo območja, ki so občasno ojezerjena zaradi dviga nivoja podzemne vode v krasu. Prav tako so v dneh prisotni površinski vodotoki, ki se pretakajo od izvirnih k ponornim delom, ter površinski vodotoki, ki pritekajo na polja iz fluviokraških območij. Slednji proces je na Dobropolju prisoten le ob izjemno visokih vodostajih reke Rašice.

Nekoliko manj, a kljub vsemu pestro geomorfološko okolje je značilno tudi za Ribniško, Kočevsko in Radensko polje. Ta polja prav tako tipiziramo kot mešana, saj obsegajo okolja fluviokrasi in plitvega krasa, delujejo pa kot prelivna in kot pritočna polja.

Večina kraških polj ne leži v mešanih geomorfoloških okoljih, tako da je njihova tipizacija preprostejša. Med polja plitvega krasa uvrščamo ojezerjeni in prelivni tip polj. V Sloveniji so ta polja le občasno ojezerjena. Sloveniji najbližje stalno ojezerjeno polje je Doberdobsko polje, ki leži na italijanski strani Krasa. Največje občasno ojezerjeno polje je Globodol. Manjša polja tega tipa so še Retje pri Loškem potoku ter kotanji Petelinjskega in Palškega jezera na Zgornji Pivki. Vsa ta polja ležijo v območju nihanja podzemne vode; občasne ojezeritve se napajajo in odtekajo skozi številne estavele v njihovih dneh.

Prelivna polja delujejo podobno kot občasno ojezerjena polja, le da se ob višjih vodostajih vzdolž polj oblikuje hidravlični gradient, zaradi česar se vode preko dnov pretakajo od izvirnih do ponornih delov. Kljub temu, da ta polja veljajo za najbolj tipična kraška polja (Gams, 1978), njihov delež v Sloveniji obsega le petino – 7 polj. Največje polje tega tipa v Sloveniji je Loško polje, čeprav za najbolj tipičen primer literatura navaja predvsem Planinsko polje (Gams, 2003; Mihevc, 2010). V ta tip polj sodijo tudi Mirnopeško polje in Lučki dol ter manjša polja, kot so Podpeško polje,

Ponikve pri Preserjah ter Travniki pri Loškem potoku. Dna teh polj so lahko občasno popolnoma ojezerjena, le Loško polje ima ojezerjeno le ponorno območje.

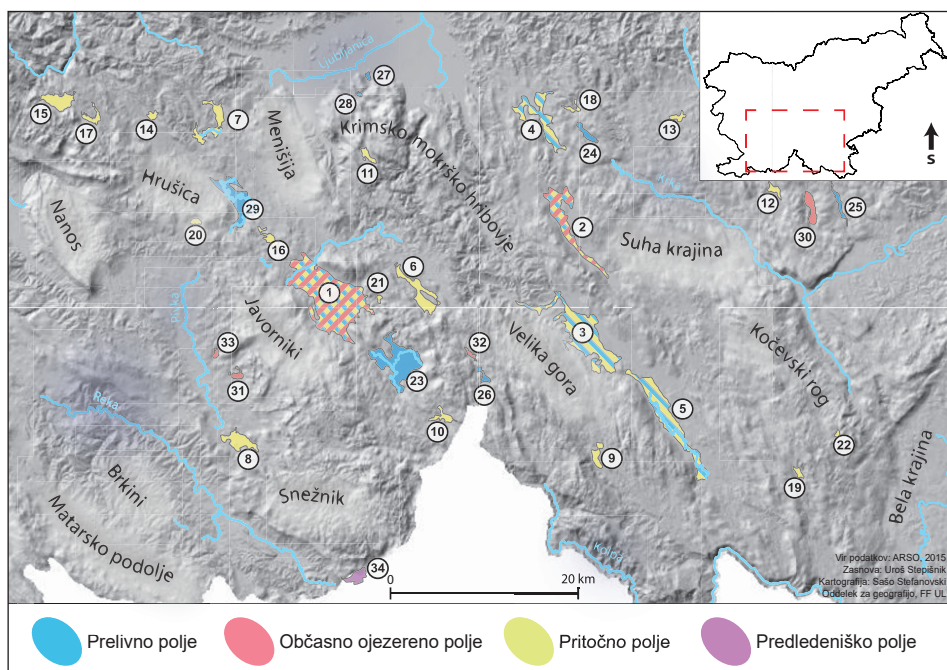
Največ kraških polj v Sloveniji, kar 17, je pritočnega tipa. Navadno so oblikovana na litološkem stiku med dolomiti in apnenci, torej med fluviokraškim in kraškim geomorfnim okoljem. Obseg dnov teh polj je z morfografskega vidika težko določljiv, saj njihova dna zvezno prehajajo v dna dolin na pritočnih delih polj. Hkrati se tudi njihovi ponorni deli na zaključujejo z reliefno jasno izraženimi pobočji, ampak prehajajo v reliktna dna polj. Reliktne deli predstavljajo živoskalne uravnave, razčlenjene z vrtačami. Ta prehod je lahko zvezen ali pa izražen z reliefnim pregibom, ki spominja na živoskalno ježo. Kljub temu, da literatura tovrstne uravnave interpretira kot tektonsko pogojene (Gams, 1973; Gams, 1974), so najverjetneje rezultat zmanjševanja dinamike dotoka fluviokraških naplavin v dna polj. Robovi polj tako postopoma migrirajo v smeri pritočnega dela. Vsekakor bodo za potrditev te hipoteze potrebne prihodnje raziskave.

Najpreprostejše oblike pritočnih polj imajo na pritočni strani le erozijske jarke ter dolke, od koder se je fluviokraška naplavina transportirala v dna polj. Dna teh kraških polj tvorijo skupine manjših vršajev. V dneh, ki so izjemoma ojezerjena le ob izrednih vremenskih dogodkih, so pogoste ponikve. Tovrstna pritočna polja na odtočni strani navadno nimajo reliktnih delov polj. Največje med njimi je Zadloško polje, ostala pa so Rakovško-unško polje, Črnovrško polje, Žalnsko polje, Koprivniško polje, Strmica, Bločiško polje in Ponikve na Rogu.

Druga vrsta pritočnih polj ima bolj kompleksne hidrološke značilnosti, saj se ne napajajo le z lokalnimi vodotoki, ampak nanje pritekajo večji vodotoki iz fluviokraškega zaledja. Večja pritočna polja pa so morfološko in hidrološko bolj kompleksna. Površinski tokovi, ki imajo porečje v fluviokraškem zaledju, skupaj s sedimenti pritekajo na polja. Vode navadno v nižjih delih polj odtekajo v podzemlje skozi ponikve ali požiralnike. Ob izjemnih vremenskih dogodkih so nižji, odtočni deli polj ojezerjeni. Vsa polja tega tipa se za ponornim delom nadaljujejo v reliktna dela polj, razen Bloškega, Babnega in Rakitniškega polja, ki zaradi strmih pobočij nad ponornimi deli reliktnih uravnav nekdanjih dnov polj nimajo. Poleg omenjenih uvrščamo v ta tip tudi Logaško, Koritniško, Goteniško, Vrbovsko, Dobsko in Hotenjsko polje.

Predledeniški polji v Sloveniji sta Velo polje pod Triglavom in Gomance, ki imajo le severni rob na ozemlju Slovenije, večji del polja pa se nahaja na Hrvaškem. Obe sta nastali zaradi nanosov predledeniških tokov v kraške kotanje. Dele Gomance zapolnjujejo tudi ledeniški nanosi (Žebre in sod., 2016). Obe polji sta suhi, brez recentne hidrološke funkcije.

Slika 7: Karta kraških polj na slovenskem Dinarskem krasu. Številke kraških polj na karti so enake kot v preglednici 1 (Velo polje – številka 35 – v Julijskih Alpah ni označeno na karti).



4 SKLEP

Nova tipizacija kraških polj, predstavljena v tem članku, povzema dosedanje tipizacije v eno samo. Ta sintetizira vse značilnosti kraških polj, ki so bile do sedaj ločene na posamezne tipizacije, ki so vključevale morfogogenetske in hidrodinamične (Gams, 1978; Gams, 2003) značilnosti. Nova tipizacija ne opredeljuje območja polj, ampak jih opredeljuje na osnovi širših geomorfoloških okolij, v katerih se nahajajo. Pri podrobni analizi polj Slovenije se je namreč izkazalo, da so njihove geomorfološke in hidrološke značilnosti odvisne od geomorfoloških značilnosti širše okolice. Nova tipizacija ne vključuje polj kontaktnega krasa, ki jih literatura opredeljuje kot raztočno-ponorniška kraška polja oziroma periferna-obrobna polja (Gams, 1978; Gams, 2003).

V kraških okoljih z nemotenim delovanjem osnovnih kraških procesov, ki jih opredeljujemo s prevladujočim procesom raztapljanja in vertikalnim odtokom raztopine v kraški vodonosnik (Šušteršič, 1986), se kraška polja ne oblikujejo. Pojavljajo se le v okoljih, kjer je delovanje krasa moteno. Motnje, ki pogojujejo nastanek in delovanje polj, so vezane na specifične hidrogeološke značilnosti kraškega vodonosnika ali pa na delovanje površinskih geomorfnih procesov, ki povzročajo mehansko premeščanje mase po kraškem površju.

Tovrstna tipizacija predvideva tri geomorfna okolja krasa, za katera so značilni štiri tipi kraških polj. Najpreprostejša tipa polj sta vezana na lokalno odsotnost vadozne hidrogeološke cone krasa, kjer je onemogočen vertikalni odtok padavinskih vod, kar hkrati povzroča stalno ali občasno ojezerjenost kraških kotanj; torej na okolja plitvega krasa. V primeru preprostega ojezerjevanja, brez lateralnega pretakanja površinskih vod na območju dnov, govorimo o ojezerjenem tipu polj. Kadar se v dneh polj zaradi hidravličnega gradienta pretakajo oziroma prelivajo vode od izvirnih k ponornim delom, jih opredeljujemo kot prelivni tip.

Druga dva tipa polj pa sta vezana na mehanski transport materiala po kraškem površju; v obeh primerih gre za fluvialni način transporta. Polja, v katera se odlaga naplavina iz fluviokraških okolij, opredeljujemo kot pritočna polja, polja z naplavino iz glaciokraških okolij pa kot predledeniška.

Z novo tipizacijo smo sistematizirali vsa kraška polja slovenskega krasa. Zaradi različnih vrst kraških okolij smo nekatera uvrstili v več tipov. Tovrstnih polj je 5 in povečini vključujejo največja polja Slovenije. Najbolj raznovrstna sta Cerčniško polje in Dobrepolje, ki ju hkrati uvrščamo med občasno ojezerjena, prelivna in pritočna polja. Ostala polja delujejo pretežno v homogenih kraških okoljih. Največ je pritočnih kraških polj, ki so značilna za aktivne hidrološke stike, kjer vodotoki na kras pritekajo iz fluviokraških območij. Manjši delež polj je značilnih za okolja plitvega krasa, med katerimi prevladujejo prelivna polja. V Sloveniji so najbolj redka glaciokraška polja, kamor zaradi majhnih dimenzij pogojno uvrščamo le Velo polje pod Triglavom. Gomance na Snežniku so prav tako predledeniško polje, a le manjši delež dna sega na slovensko ozemlje.

Literatura in viri

- Adamson, K. R., Woodward, J. C., Hughes, P. D., 2014. Glaciers and rivers: Pleistocene uncoupling in a Mediterranean mountain karst. *Quaternary Science Reviews*, 94, 0, str. 28–43. DOI: 10.1016/j.quascirev.2014.04.016.
- Bögli, A., 1980. *Karst hidrology and physical speleology*. Berlin, Heidelberg, New York: Springer-Verlag.
- Bonacci, O., 2004. Poljes. V: Gunn, J. (ur.). *Encyclopedia of caves and karst science*. New York: Fitzroy Dearborn, str. 599–600.
- Cvijić, J., 1895. *Karst: geografska monografija*. Beograd: Srpska akademija nauka i umetnosti.
- Cvijić, J., 1900. Karsna polja zapadne Bosne i Hercegovine (Die Karstpoljen in Westbosnien und in Herzegowina). *Glas Srpske kraljevske akademije nauka*, 59, 1, str. 59–182.
- Ford, D., Williams, P. D., 2007. *Karst hydrogeology and geomorphology*. Chichester: Wiley.
- Gams, I., 1963. Velo polje in problemi pospešene korozije. *Geografski vestnik*, 35, 1, str. 55–64.

- Gams, I., 1973. Die zweiphasige quartärzeitliche Flächenbildung in den Poljen und Blindtälern des nordwestlichen Dinarischen Karstes. V: Semmel, A. (ur.). Neue Ergebnisse der Karstforschung in den Tropen und im Mittelmeerraum : Vorträge des Frankfurter Karstsymposiums 1971. Weisbaden: Franz Steiner Verlag, str. 143–149.
- Gams, I., 1974. Kras : zgodovinski, naravoslovni in geografski oris. Ljubljana: Slovenska matica.
- Gams, I., 1978. The polje: the problem of definition: with special regard to the Dinaric karst. *Zeitschrift für Geomorphologie*, 22, 2, str. 170–181.
- Gams, I., 2003. Kras v Sloveniji v prostoru in času. Ljubljana: Založba ZRC.
- Gams, I., Kunaver, J., Radinja, D., 1973. Slovenska kraška terminologija. Ljubljana: Katedra za fizično geografijo, Univerza v Ljubljani.
- Gostinčar, P., 2011. Kontaktni kras v Kočevskem Rogu in Kočevski Mali gori. *Dela*, 35, str. 27–43. DOI: 10.4312/dela.35.27-44.
- Gostinčar, P., 2016. Geomorphological characteristics of karst on contact between limestone and dolomite in Slovenia. PhD thesis. Ljubljana: Univerza v Novi Gorici.
- Gunn, J. (ur.), 2004. *Encyclopedia of Caves and Karst Science*. New York, London: Fitzroy Dearborn.
- Jennings, J. N., 1985. *Karst geomorphology*. Oxford: Basil Blackwell.
- Jennings, J. N., 1997. *Cave and karst terminology*. Australian Speleological Federation.
- Kunaver, J., 1983. Geomorphology of the Kanin Mountains with special regard to the glaciokarst. *Geografski zbornik*, 12, 1, str. 201–343.
- Mihevc, A., 1991. Morfološke značilnosti ponornega kontaktnega krasa: izbrani primeri s slovenskega krasa. Magistrsko delo. Ljubljana: Univerza v Ljubljani, Filozofska fakulteta.
- Mihevc, A., 2010. *Geomorphology*. V: Mihevc, A., Prelovšek, M., Zupan Hajna, N. (ur.). *Introduction to Dinaric karst*. Postojna: IZRK ZRC SAZU, str. 30–43.
- Mojsisovicz, E., 1880. Zur Geologie der Karst Erscheinungen. *Jahrbuch der Geologische Reichsanstalt*, 30, 3, str. 1–30.
- Nicod, J., 2003. Les karsts dinariques: paysages et problemes : Slovénie, Croatie, Bosnie-Herzégovine, Monténégro. Ljubljana: Slovenian Academy of Science and Arts.
- Pavlopoulos, K., Evelpidou, N., Vassilopoulos, A., 2009. *Mapping geomorphological environments*. Berlin, Heidelberg: Springer.
- Roglić, J., 1958. Odnos riječne erozije i krškog procesa. V: kongres geografa FNR Jugoslavije, str. 103–134.
- Sauro, U., 2012. Closed depressions in karst areas. V: Culver, W. B., White, D. C. (ur.). *Encyclopedia of Caves (Second Edition)*. Amsterdam: Academic Press, str. 140–155.
- Smart, C. C., 2004. Glacierized and glaciated karst. V: Gunn, J. (ur.). *Encyclopedia of caves and karst science*. New York: Fitzroy Dearborn, str. 804–809.
- Stepišnik, U., 2014. Japage: the collapse dolines in Kupres Polje, Bosnia and Herzegovina. *Dela*, 42, 1, str. 5–20. DOI: 10.4312/dela.42.1.5-20.

- Stepišnik, U., 2015. Krasno polje on Velebit Mountain: morphographic and morphogenetic characteristics *Hrvatski geografski glasnik*, 77, 2, str. 85–99. DOI: 10.21861/HGG.2015.77.02.05.
- Stepišnik, U., 2020. Fizična geografija krasa (v tisku). Ljubljana: Znanstvena založba Filozofske fakultete.
- Šušteršič, F., 1986. Model čistega krasa in nasledki v interpretaciji površja. *Acta Carsologica*, 21, 1, str. 97–116.
- White, W. B., 1988. *Geomorphology and hydrology of karst terrains*. Oxford: Oxford university press.
- Williams, P. D., 2004. Karst. V: Goudie, A. S. (ur.). *Encyclopedia of geomorphology*. London: Routledge, str. 568–594.
- Žebre, M., Stepišnik, U., 2014a. Glaciokarst geomorphology of the Northern Dinaric Alps: Snežnik (Slovenia) and Gorski Kotar (Croatia). *Journal of Maps*, 12, 5, str. 873–881. DOI: 10.1080/17445647.2015.1095133.
- Žebre, M., Stepišnik, U., 2014b. Reconstruction of Late Pleistocene glaciers on Mount Lovćen, Montenegro. *Quaternary International*, 353, str. 225–235. DOI: 10.1016/j.quaint.2014.05.006.
- Žebre, M., Stepišnik, U., 2015. Glaciokarst landforms and processes of the southern Dinaric Alps. *Earth Surface Processes and Landforms*, 40, 11, str. 1493–1505. DOI: 10.1002/esp.3731.
- Žebre, M., Stepišnik, U., Colucci, R. R., Forte, E., Monegato, G., 2016. Evolution of a karst polje influenced by glaciation : the Gomance piedmont polje (northern Dinaric Alps). str. 143–154. DOI: 10.1016/j.geomorph.2016.01.005.
- Žebre, M., Stepišnik, U., Kodelja, B., 2013. Sledovi pleistocenske poledenitve na Trnovskem gozdu. *Dela*, 39, str. 157–170. DOI: 10.4312/dela.39.157-170.

KARST POLJES IN SLOVENIA

Summary

The article presents a new typification of poljes in karst, which combines the multiple classifications used in contemporary karstologic literature into single one. The presented typification synthesizes morphogenetic and hydrodynamic characteristics of poljes (Gams, 1978; Gams, 2003). It defines them on the basis of the broader geomorphological environments in which they are positioned.

Poljes do not develop in karst environments where solely simple karst processes are operating that are defined by the predominant chemical weathering and the vertical outflow of dissolution into the karst aquifer (Šušteršič, 1986). Poljes are located only within environments where the functioning of the karst is somehow interrupted. Disturbances that condition the formation and functioning of poljes are related to the

specific hydrogeological characteristics of the karst aquifer or functioning of surface runoff that is causing mechanical transport of sediment over the karst surface.

This type of typification envisages three geomorphic environments of karst (shallow karst, fluviokarst and glaciokarst), which are characterized by four types of poljes: inundated, overflow, inflow and preglacial type. The first two types are the simplest and are related to the shallow karst environments. Local absence of the vadose hydrogeological zone within these karst environments causes permanent or intermittent formation of lakes within karst depressions. Poljes of the inundated type are closed depressions where lake forms without any significant lateral inflow or outflow of surface streams. If the poljes have streams that emerge on one side of polje and flow to the other side where they submerge into subsurface we define them as overflow type of poljes. The formation and functioning of the other two types of poljes are related to the mechanical inflow of material by surface streams from the hinterland into karst depressions. In case of inflow from fluviokarst environments inflow type of poljes develop. If poljes are formed by deposition of streams emerging from glaciers they are defined as proglacial type of poljes.

As part of the research, we typified all 35 poljes of the Slovenian karst. Due to the different types of karst environments, we have classified some poljes into several types. The largest 5 poljes of Slovenia are classified within multiple types. The most diverse are Cerknjsko polje and Dobropolje, which are simultaneously classified as inundated, overflow and inflow types. Other poljes are positioned generally in homogeneous karst environments. Most of the poljes are of inflow type. A smaller number of poljes are within shallow karst environments, among which overflow type predominates. Proglacial type of poljes is typical for glaciokarst environments. These poljes are the rarest in Slovenia. Two of them are located in postglacial environments of the Julian Alps and the Snežnik Mountain.

(Translated by the author)

SPREMEMBE VOLILNIH ENOT ZA IZVEDBO VOLITEV V DRŽAVNI ZBOR RS

Izvirni znanstveni članek
COBISS 1.01
DOI: 10.4321/dela.53.45-69

Izvleček

Leta 2018 sprejeta odločba Ustavnega sodišča o neustavnosti trenutne ureditve volilnih okrajev je znova oživila razpravo o reformi državnozbornskega volilnega sistema. V središču razprave je vprašanje preoblikovanja oziroma odprave volilnih okrajev. Drugi pomembni prostorski element volilnega sistema – ureditev volilnih enot – pa ni deležen večje pozornosti, saj ni bila predmet ustavne presoje. V članku želimo preveriti, v kolikšni meri obstoječa ureditev še izpolnjuje zakonska merila. V nadaljevanju so predstavljeni trije alternativni predlogi ureditve volilnih enot, njihove ključne značilnosti ter glavne prednosti in pomanjkljivosti.

Ključne besede: volilna geografija, volitve, volilni sistemi, volilne enote, Slovenija, Državni zbor Republike Slovenije

CHANGES OF ELECTORAL UNITS FOR THE CONDUCT OF ELECTIONS TO THE NATIONAL ASSEMBLY OF THE REPUBLIC OF SLOVENIA

Abstract

The decision of the Constitutional Court, adopted in 2018, on the unconstitutionality of the current arrangement of electoral districts (*volilni okraji*) has revived the debate on a reform of the National Assembly electoral system. The main question of the reform is whether the electoral counties should be newly divided or abandoned. Not much

⋮ * Oddelek za geografijo, Filozofska fakulteta Univerze v Ljubljani, Aškerčeva 2, SI-1000
⋮ Ljubljana
⋮ e-pošta: bostjan.rogelj@ff.uni-lj.si

attention is paid to the second important spatial element of the electoral system – the arrangement of the electoral units (*volilne enote*) – since it was not the subject of a constitutional review. The study examined to what extent the current arrangement of the electoral units meets the legal criteria. Finally, three alternative proposals for the arrangement of the electoral units are presented. The key features of the proposals and their main advantages and disadvantages are presented as well.

Key words: electoral geography, elections, electoral systems, electoral units, Slovenia, National Assembly of the Republic of Slovenia

1 UVOD

Ureditev volilnih enot in volilnih okrajev v volilnem sistemu za volitve poslancev v Državni zbor Republike Slovenije (v nadaljevanju državnozborski volilni sistem) je vse od uveljavitve deležna številnih kritik (glej Gaber, 1996; Pogorelec, 1998; 2000; Ribičič, 1999; Rogelj, 2011; 2012). O primernosti ureditve je večkrat presojalo tudi Ustavno sodišče RS. V odločbi, izdani novembra 2018, je presodilo, da je 4. člen Zakona o določitvi volilnih enot za volitve poslancev v Državni zbor (v nadaljevanju ZDVEDZ) v neskladju z Ustavo (Ustavno sodišče RS, 2018). Po mnenju ustavnih sodnikov volilni okraji ne ustrezajo več nobenemu merilu iz 20. člena Zakona o volitvah v Državni zbor (v nadaljevanju ZVDZ). Problematične so tako velike razlike v velikosti volilnih okrajev kot dejstvo, da niso spoštovane niti meje sedanjih občin niti merilo geografske zaokroženosti. Ustavno sodišče je naložilo Državnemu zboru, da v dveh letih odpravi ugotovljeno protiustavnost (Ustavno sodišče, 2018).

Na pobudo predsednika republike so marca 2019 stekla pogajanja o morebitnih spremembah volilne zakonodaje. V okviru pogajanj sta se oblikovala dva predloga odprave neustavnega stanja (RTVSLO, 2019). Prvi predvideva temeljitejšo spremembo volilnega sistema z uvedbo relativnega prednostnega glasu in odpravo volilnih okrajev. Drugi predvideva le preoblikovanje meja volilnih okrajev. Prvi zahteva spremembo ZVDZ, za kar je potrebna dvotretjinska večina v Državnem zboru. Drugi zahteva le spremembo ZDVEDZ, za kar zadostuje že navadna večina.

Oba predloga sprememb volilne zakonodaje ne predvidevata bistvenih sprememb v ureditvi volilnih enot, ki so drugi pomemben prostorski element državnozborskega volilnega sistema. To ni presenetljivo, saj le-ta ni bila predmet presoje Ustavnega sodišča. Na splošno velja, da je bila ureditev volilnih enot v preteklosti deležna bistveno manj kritik kot ureditev volilnih okrajev. Z izjemo predloga dvokrožnega večinskega volilnega sistema nobena predlagana reforma državnozborskega volilnega sistema ni predvidevala korenitejših sprememb ureditve volilnih enot.

V članku želimo preveriti, ali je obstoječa ureditev volilnih enot res neproblematična. Članek je sestavljen iz petih delov. Uvodnemu delu sledi teoretično-metodološki del, v katerem je predstavljena vloga volilnih enot v volilnih sistemih. Tretji del je posvečen analizi obstoječe ureditve, predvsem ali ta še izpolnjuje zakonsko določena merila. V četrtem delu so predstavljeni trije alternativni predlogi ureditve volilnih enot. V sklepu je podana ocena smiselnosti reforme obstoječe ureditve volilnih enot v okviru obeh predlogov sprememb volilne zakonodaje.

2 VLOGA VOLILNIH ENOT V VOLILNIH SISTEMIH

Volilne enote so prostorske enote, v katerih se zbirajo volilni glasovi in delijo mandati v predstavniškem telesu. Skupaj z volilno formulo, strukturo glasovnice in volilnim pragom so ključni element volilnega sistema. Delitev ozemlja, na katerem potekajo volitve na volilne enote, je nujno potrebna le v volilnih sistemih, temelječih na večinski volilni formuli. V volilne sisteme, zasnovane na proporcionalni formuli, je navadno vključena zaradi želje po večji geografski reprezentativnosti (s terminom geografska reprezentativnost označujemo enakomerno prostorsko porazdelitev mandatorov po ozemlju, na katerem potekajo volitve), zagotavljanju tesnejše povezanosti med poslanci in volivci ter lažje organizacije volitev (Rogelj, 2012).

Z oblikovanjem volilnih enot se mandati prostorsko razpršijo po celotnem območju volitev, s čimer se posameznim območjem zagotovi zastopanost v predstavniškem telesu. Če celotno ozemlje tvori ena ali manjše število zelo velikih volilnih enot, obstaja nevarnost, da bo večina izvoljenih predstavnikov prišla iz političnih, gospodarskih in prebivalstvenih središč, politično in gospodarsko manj pomembna ter redkeje poseljena območja pa v predstavniškem telesu ne bodo zastopana (Farrell, 2001). Nalogo velja, da se z manjšanjem velikosti volilnih enot (s terminom velikost volilne enote označujemo število mandatov, ki se volijo v volilni enoti) povečuje geografska reprezentativnost predstavniškega telesa.

Zagotavljanje tesnejše povezanosti med poslanci in volivci je drugi pomemben razlog za razdelitev ozemlja na volilne enote. V manjših enotah ima volivec boljši pregled nad kandidati, kar mu omogoča, da ne glasuje le za liste, temveč tudi za posamezne kandidate (v obliki preferenčnega glasovanja ali panaširanja¹). Tako manjše volilne enote zagotavljajo višjo stopnjo personifikacije volilnega sistema (termin personifikacija označuje

1 Preferenčno glasovanje oz. prednostni glas omogoča volivcu, da znotraj liste/stranke glasuje za posameznega kandidata. Glasovanje za kandidata je lahko obvezno ali pa opsijsko. V prvem primeru govorimo o absolutnem, v drugem o relativnem preferenčnem glasovanju. V primeru uporabe relativnega preferenčnega glasovanja se navadno določi prag (število oziroma delež dobljenih glasov znotraj stranke/liste), ki ga mora kandidat doseči, da se preferenčni glasovi upoštevajo pri končni delitvi mandatov (Krašovec, 2007; ACE Project, 2020b). Panaširanje je oblika preferenčnega glasovanja, pri katerem ima volivec več glasov, pri čemer lahko vse glasove podeli kandidatom ene strankarske liste ali pa glasove razdeli med kandidate različnih strankarskih list (ACE Project, 2020b).

vpliv volivca na izbiro kandidata). V velikih volilnih enotah je glasovanje o kandidatih nepregledno ter tehnično in organizacijsko bolj zapleteno. Zato je tudi redkeje omogočeno, kadar pa je, manj vpliva na volilne rezultate (Krašovec, 2007). Manjše volilne enote poleg tega vzpostavljajo tesnejše vezi med poslanci in volivci. Poslanci čutijo večjo odgovornost do volivcev, zato pogosto delujejo kot zastopniki določenega območja oz. regije. Podobno velja za volivce. Manjše volilne enote dajejo volivcem občutek tesnejše povezanosti in lažje dostopnosti poslancev (glej Strøm idr., 2006).

Velikost volilnih enot je eden ključnih dejavnikov, ki vplivajo na stopnjo proporcionalnosti delitve mandatov. Z vidika zagotavljanja čim višje stopnje proporcionalnosti je oblikovanje volilnih enot celo nezaželeno. Velikost volilnih enot ustvarja t. i. dejanski volilni prag (ang. *effective threshold*; v slovenščini se uporabljata tudi izraza naravni oziroma neformalni volilni prag). Le-ta je najvišji v enomandatnih oz. uninominalnih volilnih enotah, z naraščanjem velikosti volilnih enot pa se znižuje, kar povečuje proporcionalnost delitve mandatov. Najvišjo stopnjo proporcionalnosti dosežemo, če je celotno ozemlje, na katerem potekajo volitve, ena volilna enota (Lijphart, 1994).

V volilnih sistemih z večnivojsko delitvijo mandatov (sem spada tudi državnozbornski volilni sistem) velikost volilne enote pomembno vpliva na delež mandatov, ki se jih razdeli na nižjih oziroma višjih ravneh delitve mandatov. V manjših volilnih enotah se zaradi visokega dejanskega volilnega praga razdeli bistveno manj mandatov kot v večjih. Posledično se večji delež mandatov razdeli na višjih ravneh delitve mandatov (navadno na nacionalni ravni). V preglednici 1 je prikazana višina dejanskega volilnega praga pri uporabi Droopovega količnika za delitev mandatov v volilnih enotah (sistem, ki je uporabljen pri državnozbornskih volitvah). Medtem ko je treba za pridobitev mandata v 5-mandatnih volilnih enotah zbrati 16,7 % glasov, v 10-mandatnih enotah zadostuje že 9,1 % glasov.

Preglednica 1: Višine dejanskega volilnega praga pri uporabi Droopovega količnika za delitev mandatov v volilnih enotah.

Velikost volilne enote	Dejanski volilni prag	Velikost volilne enote	Dejanski volilni prag	Velikost volilne enote	Dejanski volilni prag	Velikost volilne enote	Dejanski volilni prag
1	50,0	6	14,3	11	8,3	16	5,9
2	33,3	7	12,5	12	7,7	17	5,6
3	25,0	8	11,1	13	7,1	18	5,3
4	20,0	9	10,0	14	6,7	19	5,0
5	16,7	10	9,1	15	6,3	20	4,8

Volilne enote pomembno vplivajo tudi na naravo strankarskega tekmovanja. Dejanski volilni prag lahko močno zaostri pogoje za pridobitev mandata (Monroe, Rose, 2002). Z vidika enakopravnosti in nepristranskosti volilne tekme je najbolje, da je

ozemlje razdeljeno na enako velike volilne enote. V nasprotnem primeru se lahko zgodi, da imajo posamezne stranke zaradi specifične prostorske porazdelitve volilne podpore določeno prednost pri pridobivanju mandatov.

Volilne enote pomembno vplivajo tudi na spoštovanje načela enake volilne pravice. Skladno z njim mora imeti glas vsakega volivca enak vpliv na volilne rezultate. Volilne enote morajo biti oblikovane tako, da v vseh en mandat voli približno enako število volivcev. V svetu ni enotnega standarda glede dovoljenega odstopanja. V ZDA so na ravni zveznih držav razlike v povprečju manjše od 0,6 % (Webster, 2013). Vrhovno sodišče je v odločbi Karcher proti Daggett leta 1983 odločilo, da so tudi razlike, manjše od 1 %, neustavne, če je mogoče oblikovati ureditev z manjšimi odstopanji (Handley in sod., 2006). Beneška komisija priporoča največ desetodstotno, v res izjemnih primerih pa petnajstodstotno odstopanje v velikosti volilnih enot (Beneška komisija, 2002; 2013). Nekatere države dovoljujejo tudi bistveno večja odstopanja. Volilna formula pri tem ne igra bistvene vloge. V Veliki Britaniji, kjer je volilni sistem zasnovan po večinski volilni formuli, je največja volilna enota petkrat večja od najmanjše (na volitvah leta 2019 je volilna enota Na h-Eileanan an Iar štela 21.106 volivcev, volilna enota Otok Wight pa 113.021 volivcev (Uberoi in sod., 2020)). V Severni Makedoniji, ki ima volilni sistem zasnovan po proporcionalni volilni formuli, pa je dovoljeno le 5-odstotno odstopanje (IFES, 2019).

Večja odstopanja se navadno dovoljujejo, kadar se prostorski obseg volilnih enot prilagaja obstoječi upravno-administrativni delitvi ozemlja (na primer mejam regij, pokrajin, zveznih dežel, provinc ...). V tem primeru je prostorski obseg volilnih enot določen vnaprej, zakonodajalec pa mora določiti sistem, po katerem se mandati razdelijo po posameznih volilnih enotah. Tako ima vsaka upravno-administrativna enota zagotovljeno točno določeno število predstavnikov v predstavniškem telesu (Rogelj, 2012).

Manjša odstopanja so značilna za sisteme, pri katerih je velikost volilnih enot fiksno določena, njihov prostorski obseg pa se temu prilagaja. V tem primeru prostorski obseg volilnih enot le delno sledi upravno-administrativni delitvi ozemlja, navadno so večje enote razdeljene na več volilnih enot, manjše pa združene v eno volilno enoto. Katera merila morajo oblikovalci upoštevati pri določitvi prostorskega obsega volilnih enot, po navadi določa zakonodaja. Poleg števila prebivalcev/volivcev se najpogosteje uporabljajo različna geografska merila (geografska dostopnost, homogenost, funkcijska povezanost ...) (Handley in sod., 2006). Zakonodaja navadno določa tudi, kdaj je treba volilne enote preoblikovati in kdo vodi oziroma nadzira celoten postopek.

3 VOLILNE ENOTE V DRŽAVNOZBORSKEM VOLILNEM SISTEMU

Ureditev volilnih enot pri volitvah v Državni zbor RS urejata dva zakona. ZVDZ (2017) določa njihovo število, velikost in merila za oblikovanje. Dvajseti člen zakona določa, da se za potrebe volitev poslancev državnega zbora oblikuje osem volilnih

enot, da se v vsaki volilni enoti voli enajst poslancev ter da se volilne enote oblikujejo v skladu z načelom, da se en poslanec voli na približno enako število prebivalcev. Omenjeni člen hkrati določa, da je pri oblikovanju volilnih enot in volilnih okrajev treba upoštevati geografsko zaokroženost ter skupne kulturne in druge značilnosti teh. Prostorski obseg posameznih volilnih enot določa ZDVEDZ (2005). Prostorski obseg je določen na podlagi upravno-administrativne delitve Slovenije na občine iz leta 1992.

Ureditev volilnih enot v državnozbornem volilnem sistemu je zasnovana na treh merilih, od katerih je le eno natančno specificirano. Prvo merilo je velikost volilnih enot. Zakon jasno določa, da mora biti država razdeljena na osem enako velikih volilnih enot (v vsaki se voli enajst mandatov). Enaka volilna pravica je drugo merilo. En mandat naj bi volilo približno enako število prebivalcev, pri čemer pa ni nikjer določeno, kakšna odstopanja so še dovoljena. Še bolj nedorečeno je tretje merilo – geografska zaokroženost in skupne kulturne in druge značilnosti.

Volilne enote so bile oblikovane leta 1992. Od takrat so nastale pomembne spremembe v prostorski razporeditvi prebivalcev, upravno-administrativni ureditvi in prostorskem razvoju Slovenije. Posledično se postavlja vprašanje, v kolikšni meri obstoječa ureditev volilnih enot še izpolnjuje zakonsko določena merila.

Ali ureditev volilnih enot še zagotavlja spoštovanje načela enake volilne pravice? Na to vprašanje je težko dati jasen odgovor. Zakonodajca ne kvantificira termina »približno« v drugem odstavku 20. člena ZVDZ, ki pravi: »Volilne enote se oblikujejo v skladu z načelom, da se en poslanec voli na približno enako število prebivalcev.« Že prej smo omenili, da glede višine dovoljenih odstopanj ni notnih mednarodnih standardov. Hrvaška in Severna Makedonija, ki imata podobno ureditev volilnih enot kot Slovenija, dovoljujeta največ 5-odstotna odstopanja (IFES, 2019; Zakon o izborima zastupnika ..., 2019). Podobno stališče ima Ustavno sodišče RS. Le-to je v več odločbah presodilo, da so do 5-odstotni odkloni od velikosti idealne volilne enote pravno sprejemljivi in da zaradi njih ni kršeno načelo enake volilne pravice (Ustavno sodišče RS, 1992; 2003).

Danes največja volilna enota (VE 4) za 6,1 % odstopa od povprečja, najmanjša pa za 4,9 % (glej preglednico 2 in sliko 2). Zgodovinsko gledano trenutna odstopanja niso problematična, saj so podobna tistim iz leta 1992 (glej preglednico 2). Bolj problematičen je trend spreminjanja števila volivcev. Medtem ko so se do leta 2011 razlike postopoma zmanjševale (glej Rogelj, 2012), se v zadnjem času znova povečujejo. Z vidika zagotavljanja načela enake volilne pravice sta najbolj problematična hitra rast prebivalstva v dveh osrednjeslovenskih volilnih enotah (VE 3 in VE 4) in nenehno upadanje prebivalstva v treh vzhodnoslovenskih volilnih enotah (VE 5, VE 7 in VE 8). Ob nadaljevanju trenutnih trendov lahko pričakujemo, da bo do leta 2025 razlika med največjo in najmanjšo volilno enoto približno 15-odstotna.

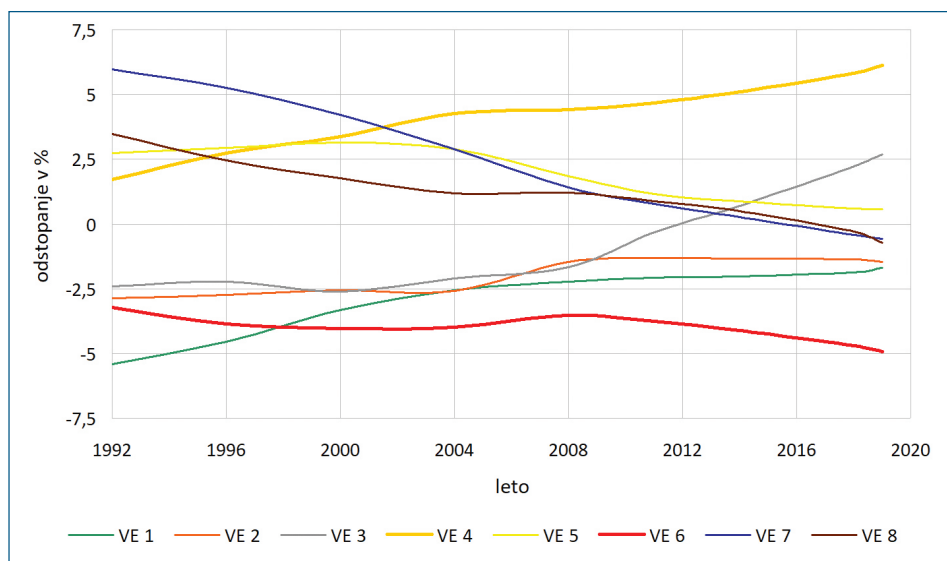
Še teže je dati jasen odgovor na vprašanje, v kolikšni meri so obstoječe volilne enote geografsko zaokrožene in v kolikšni meri ureditev volilnih enot upošteva skupne kulturne in druge značilnosti. Usklajenost meja volilnih enot z mejami občin je ena od mogočih ocen geografske zaokroženosti volilnih enot. Občine in krajevne skupnosti

Preglednica 2: Število volivcev po volilnih enotah v letih 1992 in 2019.

Volilna enota	Sedež volilne enote	Število volivcev 1992	Odstopanje od povprečja (v %) 1992	Število volivcev 2019	Odstopanje od povprečja (v %) 2019
VE 1	Kranj	176.319	-5,4	209.353	-1,7
VE 2	Postojna	181.077	-2,9	209.836	-1,5
VE 3	Ljubljana – Center	181.955	-2,4	218.659	+2,7
VE 4	Ljubljana – Bežigrad	189.635	+1,7	225.951	+6,1
VE 5	Celje	191.514	+2,7	214.138	+0,6
VE 6	Novo mesto	180.415	-3,2	202.434	-4,9
VE 7	Maribor	197.539	+6,0	211.726	-0,6
VE 8	Ptuj	192.920	+3,5	211.367	-0,7
Povprečno št. volivcev v VE		186.422	-	212.933	-

Vir podatkov: DVK, 2019; MNZ, 2019.

Slika 1: Odstopanje števila volivcev v volilni enoti od povprečnega števila volivcev v obdobju 1992–2019.



Vir podatkov: DVK, 2019; MNZ, 2019.

so bile leta 1992 uporabljene kot osnovni gradnik pri oblikovanju volilnih enot in volilnih okrajev. S poznejšimi reformami lokalne samouprave se je upravno-administrativna razdelitev Slovenije močno spremenila. Kljub temu so meje volilnih enot v večji meri še vedno usklajene z občinskimi mejami (slika 2). Le štiri občine so razdeljene na dve volilni enoti, in sicer: Ljubljana, Pesnica, Trbovlje in Šentrupert. Medtem ko je delitev prve posledica njene velikosti in razdeljenosti na več občin leta 1992, je delitev preostalih treh posledica reform lokalne samouprave v obdobju 1994–2014.

Stopnjo geografske zaokroženosti volilnih enot lahko ocenimo tudi na regionalni ravni. Ker nimamo institucionaliziranih regij, lahko stopnjo geografske zaokroženosti ocenjujemo na podlagi različnih predlogov regionalizacij in sektorskih teritorialnih členitev države. Za slednje je značilna precejšnja neenotnost, saj je v preteklosti vsaka sektorska politika oblikovala svojo teritorialno členitev države (Nared in sod., 2019). Kljub temu lahko na podlagi slike 3 razberemo, katere meje so pomembne regionalne ločnice v prostoru. Če te primerjamo z mejami volilnih enot, ugotovimo, da pogosto odstopajo od ustaljenih regionalnih delitev. V nadaljevanju so predstavljene najbolj izrazite anomalije.

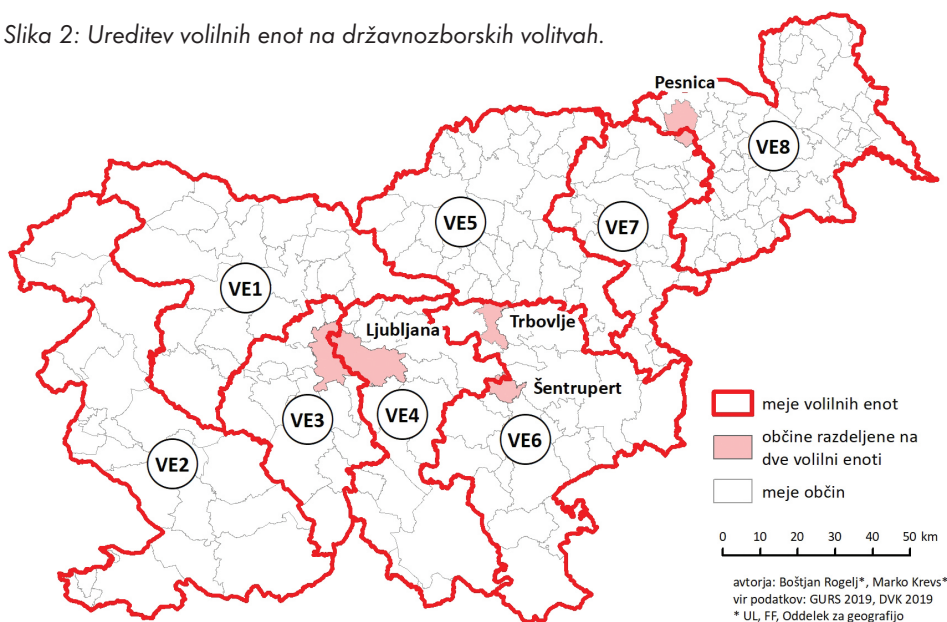
Največja anomalija je delitev Osrednjeslovenske regije. Medtem ko sama delitev ni sporna, saj je regija prevelika, da bi tvorila eno samo volilno enoto, je zelo problematična delitev na vzhodni in zahodni del. Z vidika današnje ureditve lokalne samouprave bi bilo bolj smiselno izločiti območje Mestne občine Ljubljana kot samostojno volilno enoto, preostale občine pa bi sestavljale svojo volilno enoto.

Uvrstitev občin Idrija, Cerkno, Kamnik in Komenda v VE 1 s sedežem v Kranju je druga velika anomalija. Medtem, ko prvi dve večina sektorskih delitev uvršča v Goriško oziroma Severnoprimorsko regijo, se drugi dve običajno uvrščata v Osrednjeslovensko regijo.

Tretja anomalija je uvrstitev Zasavja in Laškega v VE 6 s sedežem v Novem mestu. Zasavje sektorske členitve izločajo kot samostojno regijo ali pa ga uvrščajo v Osrednjeslovensko oziroma Savinjsko regijo. Občina Laško pa je praktično v vseh sektorskih členitvah del Savinjske regije.

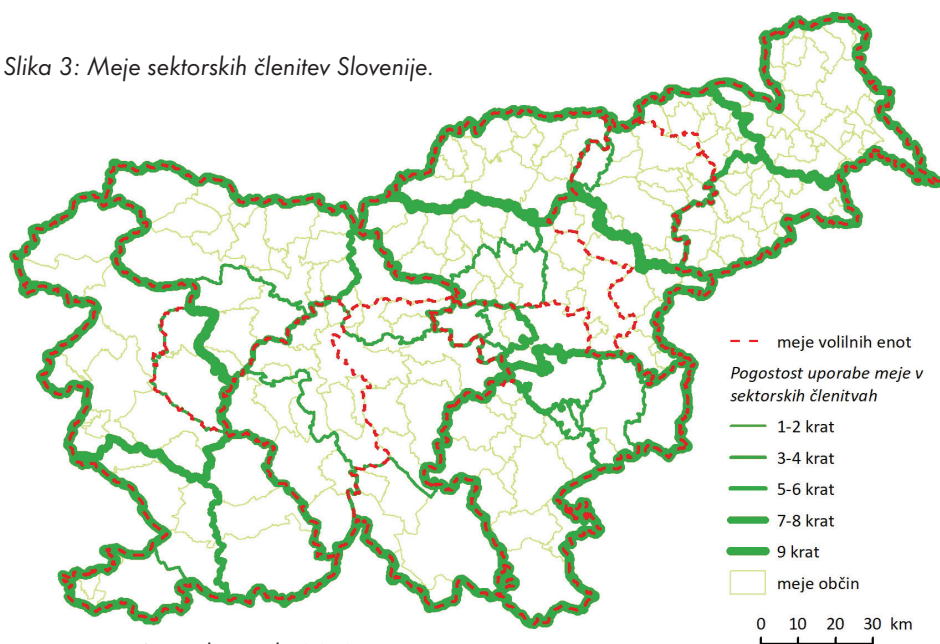
Še bolj nenavadna je uvrstitev območja upravne enote Šmarje pri Jelšah (občine Bistrica ob Sotli, Kozje, Podčetrtek, Rogaška Slatina, Rogatec in Šmarje pri Jelšah) v VE 7 s sedežem v Mariboru. Omenjene občine so v vseh delitvah del Savinjske regije, zaradi česar bi morale biti uvrščene v VE 5 s sedežem v Celju. Enako velja za občine Slovenske Konjice, Zreče in Vitanje, ki funkcijsko prav tako spadajo v Savinjsko regijo, uvrščene pa so v VE 7. Nasprotno velja za koroške občine (Črna na Koroškem, Dravograd, Mežica, Mislinja, Muta, Podvelka, Prevalje, Radlje ob Dravi, Ravne na Koroškem, Ribnica na Pohorju, Slovenj Gradec in Vuzenica). Te so v primeru oblikovanja manjšega števila regij navadno priključene Podravske regiji, zato namesto v VE 5 spadajo v VE 7. Problematična je tudi razmejitev med VE 7 in VE 8, saj so nekatere občine v neposrednem zaledju Maribora (Šentilj in Pesnica) uvrščene v VE 8 s sedežem na Ptuj.

Slika 2: Ureditev volilnih enot na državnozborskih volitvah.



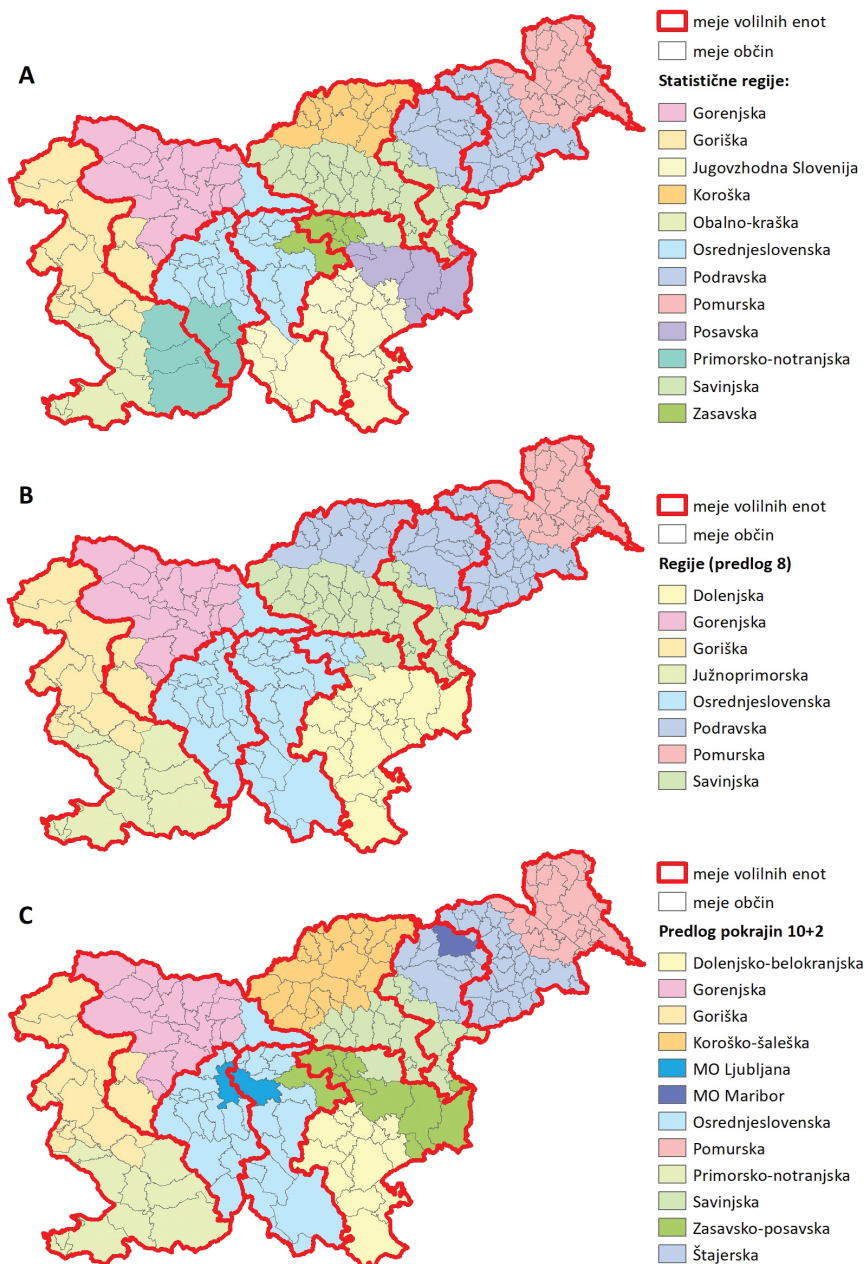
Vir podatkov: GURS, 2019.

Slika 3: Meje sektorskih členitev Slovenije.



Prirejeno po: Nared in sod., 2019.

Slika 4: Primerjava ureditve volilnih enot z delitvijo Slovenije na statistične regije (A) ter dvema predlaganima regionalizacijama Slovenije (B, C).



avtor: Boštjan Rogelj*
vir podatkov: GURS 2019, Plut 2004, Drobne 2019
* UL, FF, Oddelek za geografijo

0 10 20 30 40 km

Podobne anomalije zasledimo, če ureditev volilnih enot primerjamo z različnimi regionalizacijami Slovenije (slika 5). V Sloveniji je bilo v zadnjih petindvajsetih letih narejenih več regionalizacij, ki se med seboj razlikujejo po številu, velikosti in prostorskem obsegu regij/pokrajin. Ureditev volilnih enot le delno sledi mejam predlaganih regij/pokrajin, in to ne glede na izbrano členitev. Številna odstopanja najdemo tako pri primerjavi s členitvijo na manjše število večjih regij/pokrajin kot pri primerjavi z večjim številom manjših regij/pokrajin (Rogelj, 2012, str. 118–120).

Zaradi aktualnosti je še posebno zanimiva primerjava ureditve volilnih enot z zadnjim predlogom delitve države na deset pokrajin in dve mestni občini (Drobne, 2019). Tudi ta opozarja na večino prej omenjenih anomalij (slika 6), hkrati pa prinaša dve pomembni spremembi. Prva je oblikovanje Koroško-šaleške regije, ki naj bi odražala čedalje večjo funkcionalno navezanost koroških občin na Velenje oziroma Celje. S tem postane umestitev koroških občin v VE 5 bolj smiselna oziroma upravičena. Druga izjema je Zasavje, ki v omenjeni regionalizaciji skupaj s posavskimi občinami in Litijo tvori Zasavsko-posavsko pokrajino. S tem postane umestitev Zasavja v VE 6 bolj utemeljena.

Iz zapisanega je razvidno, da obstoječa ureditev volilnih enot le delno izpolnjuje merila iz 2. in 20. člena ZVDZ ter 2. člena ZDVEDZ. Za ureditev je značilna relativno visoka stopnja spoštovanja načela enake volilne pravice, saj so razlike v številu prebivalcev/volivcev med volilnimi enotami relativno majhne, problematično je le povečevanje teh razlik v zadnjem obdobju. Z vidika geografske zaokroženosti je večina meja volilnih enot še vedno usklajena z občinskimi mejami, problematična ostaja delitev Mestne občine Ljubljana na dva dela. Ureditev volilnih enot v številnih primerih odstopa od ustaljenih regionalnih delitev Slovenije. Večje anomalije se kažejo tako rekoč v vseh volilnih enotah.

4 PREDLOGI SPREMENB VOLILNIH ENOT V DRŽAVNOZBORSKEM VOLILNEM SISTEMU

V nadaljevanju so predstavljeni trije predlogi morebitnih sprememb volilnih enot. Vsak je zasnovan na drugih izhodiščih, posledično ima vsak svoje prednosti in pomanjkljivosti.

Prvi predlog temelji na enakih izhodiščih kot obstoječa ureditev. Državo deli na osem 11-mandatnih volilnih enot, v katerih je približno enako število volivcev. Zahteva po geografski zaokroženosti volilnih enot je v tem predlogu podrejena načelu enake volilne pravice. Prostorski obseg volilnih enot se tako prilagaja zahtevi, da je v vseh volilnih enotah približno enako število volivcev.

Drugi predlog je zasnovan na popolnoma drugačnih izhodiščih. Predlog predvideva oblikovanje pokrajinske ravni lokalne samouprave in usklajitev meja volilnih enot z mejami pokrajin. Temelji na predlogu *Teritorialne členitve Slovenije na deset pokrajin s posebnim statusom Mestne občine Ljubljana in Mestne občine Maribor*, ki ga je leta

2019 pripravila skupina strokovnjakov (Državni svet, 2019). Namenjen je predvsem predstavitvi ključnih prednosti in pomanjkljivosti ureditve, ki temelji na velikostno zelo heterogenih volilnih enotah. Pri tem predlogu je prostorski obseg volilnih enot določen vnaprej, njihova velikost (število mandatov) pa se določi na podlagi števila prebivalcev ali volivcev s pomočjo enostavne (Harejeve) kvote in sistema največjega ostanka².

Tretji predlog je nekakšen kompromis oziroma vmesna varianta med prvim in drugim predlogom. Predlog ne določa nespremenljive velikosti volilnih enot, temveč jo omejuje. Predvideva oblikovanje osmih različno velikih volilnih enot, v katerih se voli najmanj devet in največ dvanajst mandatov. Z omejitvijo velikosti se zmanjšuje negativen vpliv zelo majhnih/velikih volilnih enot, povečujeta pa se prilagodljivost pri določitvi njihovega prostorskega obsega in stopnja spoštovanja načela enake volilne pravice. Hkrati se močno zmanjšajo razlike v naravi strankarskega tekmovanja med posameznimi volilnimi enotami. Velikost volilnih enot se določi po enakem načelu kot pri drugem predlogu (Harejeva kvota in sistem največjega ostanka). Prostorski obseg volilnih enot temelji na predlogih regionalizacije Slovenije na osem oziroma štirinajst regij (Plut, 2004).

4.1 Predlog osmih enako velikih in geografsko zaokroženih volilnih enot

Prvi predlog (slika 5) ohranja osem enajstmandatnih volilnih enot. Z odpravo nekaterih najbolj problematičnih anomalij obstoječe ureditve izboljšuje geografsko zaokroženost volilnih enot. Nova razmejitev poskuša čim bolj slediti obstoječim regionalizacijam in sektorskim členitvam države, hkrati pa bistveno ne povečuje razlik v številu volivcev med posameznimi volilnimi enotami.

Predlog predvideva večje spremembe v šestih volilnih enotah. Iz VE 1 se izločita občini Cerkno in Idrija, vanjo pa se vključita občini Medvode in Vodice. Razlogi za izločitev prvih dveh so bili že navedeni. Vključitev zadnjih dveh je nujna zaradi zagotavljanja enakega števila volivcev v vseh volilnih enotah. Njuna vključitev v »Gorenjski« volilni okraj ni neproblematična, saj sta obe občini funkcijsko bolj navezani na Ljubljano oziroma na Osrednjeslovensko regijo kot na Kranj in Gorenjsko regijo. Na drugi strani pa velja, da je med prebivalci relativno močno prisotna »gorenjska« identiteta oziroma identifikacija z Gorenjsko (Polič, 2002).

VE 2 se razširi na občini Cerkno in Idrija, ki tako funkcionalno kot identitetno spadata v Primorsko oz. Goriško regijo. Sprememba zmanjšuje stopnjo spoštovanja načela enake volilne pravice, saj se število volivcev v volilni enoti nevarno približa 5-odstotnemu odstopanju.

Največje spremembe so predvidene v VE 3 in VE 4, kjer se na območju Mestne

2 Enostavna oziroma Harejeva kvota je količnik, ki ga dobimo, če število prebivalcev oziroma volivcev na celotnem ozemlju, kjer potekajo volitve, delimo s številom vseh mandatov. Število mandatov v posamezni volilni enoti je enako količniku med številom prebivalcev oziroma volivcev v enoti in »enostavno kvoto«. Nerazdeljeni mandati se razdelijo med volilne enote po metodi največjega ostanka.

občine Ljubljana oblikuje nova VE 4, preostale občine brez Medvod in Vodice pa tvorijo novo VE 3. Omenjena sprememba bi odpravila največjo anomalijo obstoječe ureditve ter v celoti uskladila meje volilnih enot z občinskimi mejami.

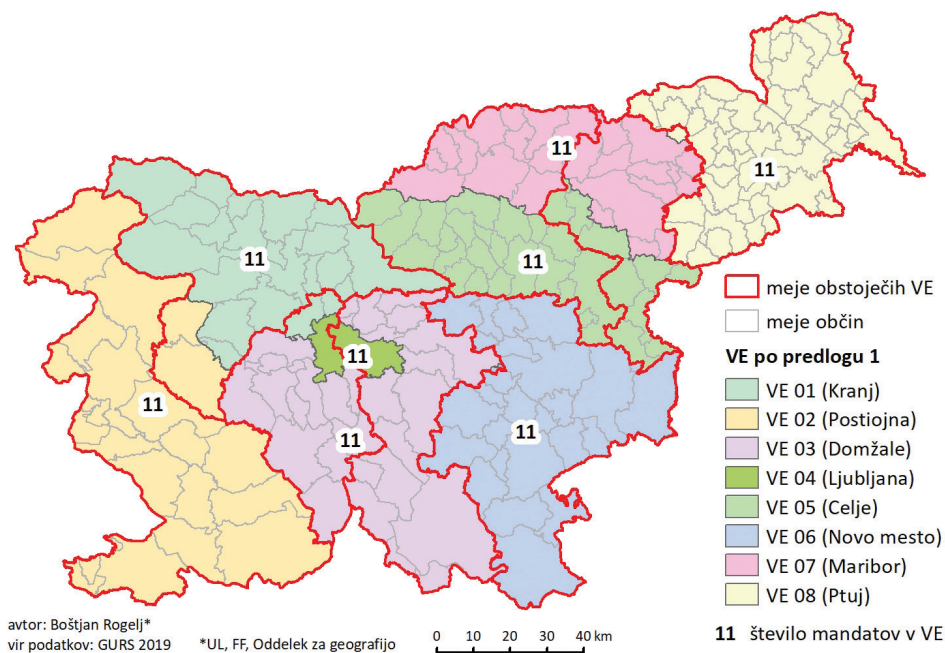
Večjih sprememb je deležna razmejitev med VE 5 in VE 7. Občine iz Koroške statistične regije se iz prve prestavijo v drugo, občine Bistrica ob Sotli, Kozje, Podčetrtek, Rogaška Slatina, Rogatec in Šmarje pri Jelšah ter Slovenske Konjice, Zreče in Vitanje pa postanejo del VE 5. S tem bi se prostorski obseg VE 5 v večji meri uskladil z obsegom Savinjske statistične regije (izjemi bi bili le občini Laško in Bistrica ob Sotli). VE 7 postane bolj geografsko zaokrožena, saj obsega Koroško in del Podravske statistične regije. Na drugi strani bi sprememba močno ogrozila načelo enake volilne pravice (preglednica 3). Omenjen problem bi lahko rešili s prestavitvijo ene večje občine iz VE 7 v VE 5, vendar bi s tem povzročili nove anomalije, ki jih predlog odpravlja.

VE 6 s sedežem v Novem mestu in VE 8 s sedežem na Ptujju sta deležni le manjših kozmetičnih popravkov. V obeh primerih so meje volilnih enot usklajene z mejami občin. Tako občini Trbovlje in Šentrupert v celoti postaneta del VE 6, občina Pesnica pa del VE 8.

Glavna prednost prvega predloga je, da je oblikovan skladno z 20. členom ZVDZ. Za njegovo uveljavitev bi bilo treba spremeniti le ZDVEDZ. V primerjavi z obstoječo ureditvijo ponuja geografsko bolj zaokrožene volilne enote, saj odpravlja večino najbolj problematičnih rešitev sedanje ureditve.

Glavna slabost predloga so velike razlike v številu volivcev med posameznimi volilnimi enotami, zaradi česar se zmanjšuje spoštovanje načela enake volilne pravice. Po predlogu bi dve volilni enoti presegli 5-odstotni prag odstopanja, dve pa bi se temu pragu močno približali (glej preglednico 3). Problem bi lahko delno rešili, če bi zmanjšali geografsko zaokroženost nekaterih enot, pri čemer se poraja dvom o smiselnosti spreminjanja obstoječe ureditve. Drugi problem je, da predlog ne odpravlja vseh anomalij sedanje ureditve, zaradi česar volilne enote niso geografsko zaokrožene. Problematične ostajajo vključitev nekaterih občin (Kamnik, Komenda, Medvode in Vodice) iz Osrednjeslovenske regije v VE 1, vključitev občine Laško v VE 6 ter vključitev občin Kungota, Pesnica in Šentilj v VE 8.

Slika 5: Prvi predlog ureditve z osmimi enako velikimi in geografsko bolj zaokroženimi volilnimi enotami.



Preglednica 3: Prvi predlog: število mandatov in število volivcev po volilnih enotah.

Ime VE	Število mandatov	Število volivcev	Odstopanje (v %)
VE 01 (Kranj)	11	212.674	-0,12
VE 02 (Postojna)	11	223.456	4,94
VE 03 (Domžale)	11	206.652	-2,95
VE 04 (Ljubljana)	11	220.954	3,77
VE 05 (Celje)	11	200.552	-5,81
VE 06 (Novo mesto)	11	202.511	-4,89
VE 07 (Maribor)	11	224.003	5,20
VE 08 (Ptuj)	11	212.662	-0,13
skupaj	88	1.703.464	–

Vir podatkov: MNZ, 2019.

4.2 Predlog dvanajstih različno velikih volilnih enot

Drugi predlog predvideva ustanovitev dvanajstih velikostno zelo različnih volilnih enot, ki sovpadajo s členitvijo Slovenije na deset pokrajin in dve mestni občini s posebnim statusom, ki jo je leta 2019 pripravila strokovna skupina (Državni svet, 2019). Večina predlaganih volilnih enot je relativno majhnih, zato se v njih praviloma voli manj kot deset mandatov (slika 6).

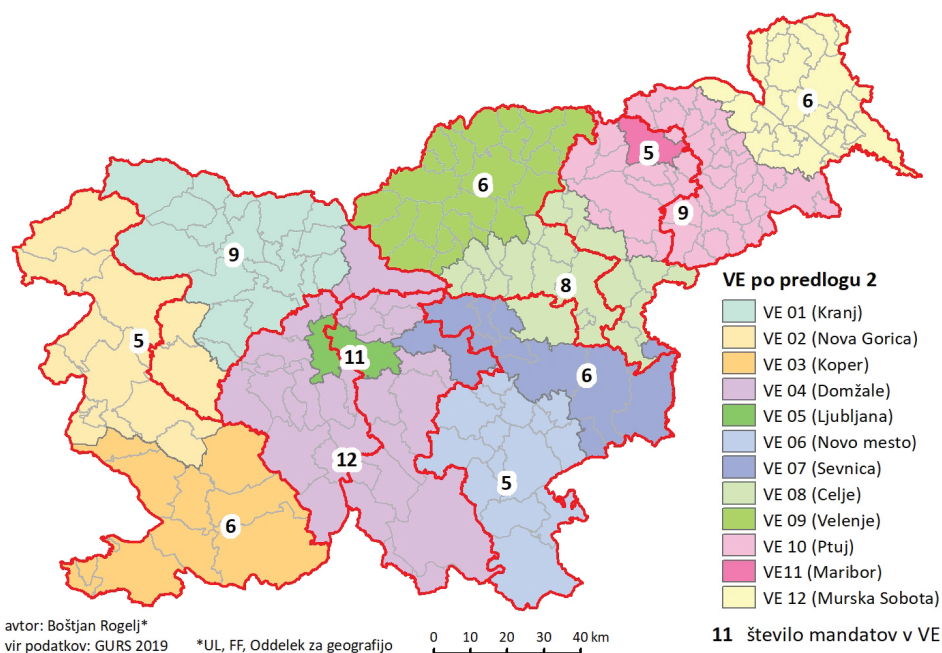
Po predlogu je VE 1 omejena na Gorenjsko statistično regijo. Iz nje se izločita občini Cerkno in Idrija, ki postaneta del VE 2, ter Kamnik in Komenda, ki bi se premaknili v VE 3. Območje obstoječe volilne enote 2 se razdeli na dve volilni enoti (VE 2 in VE 3). Tudi po tem predlogu se na območju Mestne občine Ljubljana oblikuje samostojna volilna enota (VE 5), preostale osrednjeslovenske občine pa tvorijo VE 4 (izjema je občina Litija, ki postane del VE 7). Obstoječi volilni enoti 5 in 6 se razdelita na dva dela. Enako kot Ljubljana bi tudi Mestna občina Maribor tvorila svojo volilno enoto (VE 11), meje VE 10 in VE 12 pa bi se uskladile z mejami Podravske (brez MO Maribor) in Pomurske statistične regije.

Uskladitev meja pokrajin in volilnih enot ter oblikovanje relativno majhnih volilnih enot povečujeta geografsko reprezentativnost volilnega sistema in omogočata tesnejšo povezanost poslancev in volivcev. Majhne geografsko zaokrožene volilne enote odpravljajo potrebo po delitvi volilnih enot na volilne okraje, saj tudi manjšim regijam zagotavljajo zastopanost v Državnem zboru in hkrati omogočajo lažjo izvedbo preferenčnega glasovanja, saj imajo volivci boljši pregled nad kandidati. Poznavanje kandidatov hkrati zmanjša verjetnost, da bi večina poslancev prišla iz večjih središč oziroma da bi bili izvoljeni le medijsko prepoznavni kandidati.

Največji problem drugega predloga je kršenje načela enake volilne pravice. Ker je več manjših volilnih enot, prihaja do večjih odstopanj pri številu volivcev, ki voli jo en mandat. Iz preglednice 4 je razvidno, da v posameznih primerih odstopanja lahko presežejo 10 %. Pri tem velja opozoriti, da že manjše spremembe v prostorski razporeditvi volivcev lahko pomembno vplivajo na razdelitev mandatov po volilnih enotah. Oblikovanje pravičnega in preglednega sistema delitve mandatov igra pri tem predlogu ključno vlogo.

Velikostno zelo heterogene volilne enote bi pomembno vplivale na naravo strankarskega tekmovanja. Predvsem bi vplivale na znotrajstrankarsko tekmovanje za mandate. Ob uveljavitvi drugega predloga in ohranitvi obstoječega sistema delitve mandatov lahko pričakujemo, da se bo zaradi višjega dejanskega volilnega praga (preglednica 1) zmanjšal delež mandatov, ki so razdeljeni pri delitvi na ravni volilnih enot. Tako bo v Državni zbor prišlo več poslancev, ki bodo mandat pridobili na nacionalni ravni. Ker pri delitvi na nacionalni ravni uspešnost posameznega kandidata v okviru stranke ni več odločilna, se bo povečal delež izvoljenih poslancev, ki na lastni listi/v stranki ne bodo imeli visoke podpore (glej Rogelj, 2011). Zaradi dvonivojske delitve mandatov in prostorske razpršenosti majhnih volilnih enot ni pričakovati, da bi uređitev v večji meri vplivala na medstrankarsko delitev mandatov.

Slika 6: Drugi predlog ureditve z dvanajstimi različno velikimi volilnimi enotami.



Preglednica 4: Drugi predlog: število mandатов in število volivcev po volilnih enotah.

Ime VE	Število mandатов	Število volivcev	Odstopanje (v %)
VE 01 (Kranj)	9	167.776	3,84
VE 02 (Postojna)	5	99.898	-3,11
VE 03 (Koper)	6	123.558	-6,00
VE 04 (Domžale)	12	239.011	-2,81
VE 05 (Ljubljana)	11	220.954	-3,63
VE 06 (Novo mesto)	5	92.324	4,84
VE 07 (Sevnica)	6	112.652	3,10
VE 08 (Celje)	8	161.208	-3,94
VE 09 (Velenje)	6	109.851	5,73
VE 10 (Ptuj)	9	180.997	-3,74
VE 11 (Maribor)	5	89.740	7,86
VE 12 (Murska Sobota)	6	105.495	10,10
skupaj	88	1.703.464	–

Vir podatkov: MNZ, 2019.

4.3 Predlog osmih različno velikih in geografsko zaokroženih volilnih enot

Tretji predlog je kompromis med prvim in drugim predlogom. Namesto osmih enako velikih predvideva oblikovanje osmih različno velikih volilnih enot. Različna velikost omogoča oblikovanje geografsko bolj zaokroženih volilnih enot, ki v večji meri sledijo sektorskim členitvam in predlaganim regionalizacijam Slovenije. Tako oblikovane volilne enote ohranjajo visoko stopnjo spoštovanja načela enake volilne pravice ter zmanjšujejo negativen vpliv velikih razlik v velikosti volilnih enot.

Predlog predvideva spremembe vseh obstoječih volilnih enot. Enako kot pri drugem predlogu bi bila VE 1 omejena na Gorenjsko statistično regijo, v njej pa bi se volilo le devet mandatov. Tako bi iz nje izločili občini Cerkno in Idrija, ki bi postali del VE 2, ter Kamnik in Komendo, ki bi se premaknili v VE 3.

Tudi po tem predlogu bi se na območju Mestne občine Ljubljana oblikovala samostojna volilna enota. Večina občin iz obstoječe VE 3 in VE 4 skupaj z občinama Kamnik in Komenda tvorijo novo VE 3, v kateri se voli dvanajst mandatov. Izjema sta občini Litija in Šmartno pri Litiji, ki se priključita k VE 6 s sedežem v Novem mestu. Litija je leta 2015 postala del Zasavske statistične regije in posledično se razvojno in funkcionalno čedalje bolj povezuje z drugimi občinami v regiji. V Zasavsko-posavsko pokrajino jo uvršča tudi zadnji predlog oblikovanja pokrajin v Sloveniji (Drobne, 2019). Šmartno pri Litiji še vedno spada v Osrednjeslovensko statistično regijo, vendar pa je funkcionalno tako tesno povezano z občino Litija, da bi bila njuna uvrstitev v dve različni volilni enoti problematična.

VE 5 obsega celotno Savinjsko statistično regijo vključno z občino Laško. Z njeno vključitvijo se odpravi problem premajhnega števila volivcev, ki je bil omenjen pri prvem predlogu. Izločitev Laškega in priključitev Litije in Šmartnega pri Litiji sta ključni spremembi v VE 6. Enako kot v prvem predlogu se zaradi uskladitve meje volilnih enot z mejami občin Trbovlje in Šentrupert v celoti premakneta v VE 6.

VE 7 je podobno urejena kot v prvem predlogu. Obsega celotno Koroško in del Podravske statistične regije. V nasprotju s prvim predlogom obsega tudi občine Kungota, Pesnica in Šentilj. Zaradi večjega števila volivcev se v njej voli dvanajst mandatov. Nasprotno velja za VE 8, ki se zaradi premika omenjenih občin zmanjša, zato se v njej voli le deset mandatov. Meja med VE 7 in VE 8 sledi meji med Zgornjepodravsko in Spodnjepodravsko regijo, kot jo predvideva Plutova delitev države na štirinajst regij (Plut, 2004).

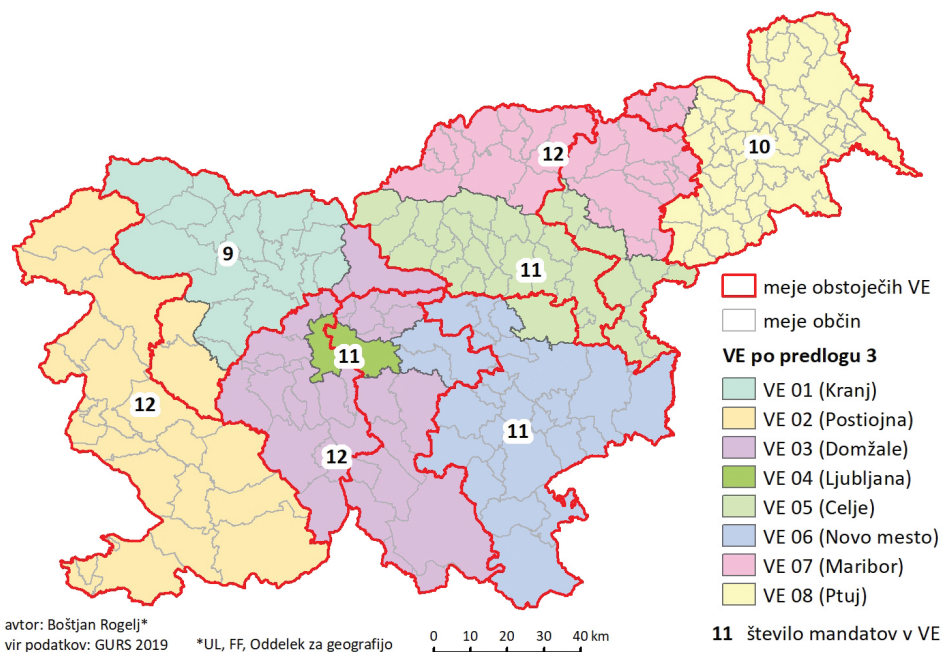
Velika geografska zaokroženost volilnih enot je glavna prednost tretjega predloga. Omenjeni predlog odpravlja vse anomalije obstoječe ureditve in z izjemo delitve Podravja sledi ustaljenim regionalnim delitvam in sektorskim členitvam države. Druga prednost predloga je visoka stopnja spoštovanja načela enake volilne pravice. Iz preglednice 5 je razvidno, da so odstopanja zelo majhna. Omejitev velikosti najmanjših volilnih enot in prilagajanje velikosti številu volivcev močno zmanjšuje verjetnost velikih odstopanj.

Pomembno je tudi, da so relativno velike volilne enote manj izpostavljene spremembam v prostorski razporeditvi prebivalstva. Posledično lahko pričakujemo, da bo velikost volilnih enot bolj konstantna in redkeje izpostavljena reviziji. Kljub temu tudi ta predlog zahteva oblikovanje pravičnega in preglednega sistema delitve mandatov med volilnimi enotami.

Med pomanjkljivostmi predloga velja opozoriti na razlike v naravi strankarskega tekmovanja, ki so značilne za ureditve z različno velikimi volilnimi enotami. Pri tem je treba poudariti, da razlike zaradi dvonivojske delitve mandatov in majhnih razlik v velikosti volilnih enot ne bi močnejše vplivale na delitev mandatov med strankami, v manjši meri bi verjetno vplivale na znotrajstrankarsko delitev mandatov.

Verjetno je največji problem tega predloga dejstvo, da bi bilo za njegovo sprejetje treba spremeniti ZVDZ, za kar pa je potrebna dvotretjinska večina (66 glasov) poslanskih glasov v Državnem zboru.

Slika 7: Tretji predlog ureditve z osmimi različno velikimi in geografsko zaokroženimi volilnimi enotami.



Preglednica 5: Tretji predlog: število mandatov in število volivcev po volilnih enota.

Ime VE	Število mandatov	Število volivcev	Odstopanje (v %)
VE 01 (Kranj)	9	167.776	3,84
VE 02 (Postojna)	12	223.456	3,95
VE 03 (Domžale)	12	234.550	-0,96
VE 04 (Ljubljana)	11	220.954	-3,63
VE 05 (Celje)	11	211.898	0,49
VE 06 (Novo mesto)	11	208.165	2,29
VE 07 (Maribor)	12	241.873	-3,96
VE 08 (Ptuj)	10	194.792	-0,62
skupaj	88	1.703.464	–

Vir podatkov: MNZ, 2019.

5 SKLEP

Odločba Ustavnega sodišča U-I-32/15-56 iz novembra 2018 je znova oživila razpravo o reformi državnoborskega volilnega sistema. V njej sta se oblikovala dva predloga sprememb volilnega sistema. Prvi predvideva uvedbo relativnega prednostnega glasu in odpravo volilnih okrajev. Drugi predvideva preoblikovanje meja volilnih okrajev. Za oba je značilno, da ne predvidevata bistvenih sprememb v ureditvi volilnih enot.

Analiza obstoječe ureditve volilnih enot je pokazala, da ta le delno izpolnjuje merila iz 2. in 20. člena ZVDZ ter 2. člena ZDVEDZ. Problematične so čedalje večje razlike v številu prebivalcev/volivcev med volilnimi enotami, delitev Mestne občine Ljubljana in treh drugih občin na več volilnih enot ter neusklajenost meja volilnih enot z uveljavljenimi regionalnimi in sektorskimi členitvami države. Zadnja je še posebej problematična, saj volivcem in poslancem otežuje, da bi se identificirali z volilno enoto, v kateri glasujejo/so izvoljeni. Čeprav v volilnih enotah poteka primarna delitev mandatov, se volivci in poslanci le redko identificirajo z njimi. Pogosteje se identificirajo z volilnimi okraji, čeprav v njih ne poteka medstrankarska delitev mandatov. Vzroke za to lahko iščemo v specifični ureditvi personifikacije z glasovanjem po volilnih okrajih (Gaber, 1996; Pogorelec, 1998; Ribičič, 1996), delno pa v dejstvu, da je za volilne okraje značilna visoka stopnja geografske zaokroženosti (Rogelj, 2012).

V članku predstavljeni predlogi alternativne ureditve volilnih enot dokazujejo, da je mogoče oblikovati geografsko veliko bolj zaokrožene volilne enote, ki hkrati ohranjajo relativno visoko stopnjo spoštovanja načela enake volilne pravice (izjema je drugi predlog).

Na koncu velja predstavljene predloge alternativne ureditve volilnih enot umestiti v trenutno razpravo o reformi državnoborskega volilnega sistema. Omenjeno je bilo, da sta se v dosednji razpravi oblikovala dva predloga. Prvi predvideva preoblikovanje

meja volilnih okrajev. Drugi predvideva odpravo volilnih okrajev in uvedbo relativnega prednostnega glasu. V času pisanja članka noben predlog nima zagotovljene zadostne podpore v Državnem zboru.

Prvi predlog ne predvideva temeljitejših sprememb volilnega sistema, zato je tudi večja reforma ureditve volilnih enot manj smiselna in težje izvedljiva. Med tremi predlogi ureditve volilnih enot le prvi ne zahteva korenitejših sprememb volilnega sistema (za njegovo uveljavitev ni treba posegati v ZVDZ, dovolj bi bila sprememba ZDVEDZ). Zato bi bilo pri preoblikovanju volilnih okrajev smiselno razmisliti o tem predlogu. Prvi predlog enako kot obstoječi sistem predvideva osem enako velikih volilnih enot. Te bi bile geografsko bolj zaokrožene, kot so obstoječe, hkrati pa bi se bolj razlikovale po številu volivcev. Za prvi predlog je značilno, da povečuje geografsko zaokroženost volilnih enot na račun stopnje spoštovanja načela enake volilne pravice. Zato bi bila uveljavitev drugačne ureditve volilnih enot odvisna od tega, kateremu merilu iz 20. člena ZVDZ daje zakonodajalec večjo težo.

Uvedba relativnega preferenčnega glasovanja in odprava volilnih okrajev bi odprla vrata za temeljitejšo reformo ureditve volilnih enot. Med drugim bi omogočila spremembo 2. člena ZVDZ, ki določa, da je država razdeljena na osem enako velikih volilnih enot. Oblikovanje velikostno heterogenih volilnih enot predvidevata drugi in tretji predstavljeni predlog. Uveljavitev drugega predloga je smiselna le ob ustanovitvi pokrajin. Pokrajine bi upravičile velike razlike v velikosti volilnih enot ter dale majhnim volilnim enotam potrebno legitimnost. Ob odsotnosti pokrajinske ravni oblasti bi bilo oblikovanje majhnih volilnih enot dvomljivo. Nizka stopnja spoštovanja načela enake volilne pravice in drugi problemi majhnih volilnih enot ne odtehtajo tega, da je v njih lažje izvesti preferenčno glasovanje in da ima le-to navadno večji vpliv na volilne rezultate. Glede na zgodovino sprejemanja pokrajinske ravni lokalne samouprave v Sloveniji in različne poglede na predlagano regionalizacijo je malo verjetno, da bodo v bližnji prihodnosti ustanovljene pokrajine.

Bolj realno in smiselno bi bilo sprejeti tretji predlog. Uskladitev volilnih enot z ustaljenimi regionalnimi delitvami Slovenije bi bila v volilnem sistemu, zasnovanem na preferenčnem glasovanju, še pomembnejša kot v obstoječem sistemu, saj bi pripomogla k tesnejši povezanosti med volivci in poslanci. Volivci bi poslance lažje dojeli kot predstavnike »njihove« regije oz. pokrajine. Z oblikovanjem ločene »ljubljske« volilne enote in ohranitvijo relativno velikih volilnih enot predlog preprečuje, da bi večina izvoljenih kandidatov prihajala iz večjih regionalnih središč. Tretji predlog predvideva zelo majhne razlike v velikosti volilnih enot, zato se narava strankarskega tekmovanja in delež poslancev, izvoljenih na ravni volilnih enot, ne bi bistveno spremenila.

Za konec velja opozoriti, da bi bilo treba v primeru kakršnekoli spremembe ureditve volilnih enot v ZVDZ in ZDVEDZ vključiti jasnejša merila glede njihovega oblikovanja. Nujno bi bilo določiti dovoljena odstopanja v številu volivcev med posameznimi volilnimi enotami ter natančneje opredeliti merila, na podlagi katerih se ocenjuje geografska zaokroženost volilnih enot. S tem bi se izognili različnim interpretacijam

zakonodaje, ki smo jim priča v trenutni razpravi o reformi volilnega sistema. Prav tako bi bilo treba natančno določiti, kdaj oziroma v katerih primerih je treba ureditev volilnih enot spremeniti. Če bi se uveljavila rešitev, ki predvideva različno velikost volilnih enot, bi bilo treba določiti jasen in pravičen način delitve mandatov med volilne enote, saj je to predpogoj za pravične in poštene volitve.

Reforma ureditve volilnih enot ni nujno potrebna, je pa smiselna, še zlasti če bi bilo uveljavljeno preferenčno glasovanje.

Literatura in viri

- ACE Project, 2020a. Equal population redistricting. URL: <http://aceproject.org/ace-en/topics/bd/bdb/bdb05/bdb05a> (citirano 9. 6. 2020).
- ACE Project, 2020b. Electoral system and ballot type implications for the count. URL: <https://aceproject.org/ace-en/topics/vc/vca/default> (citirano 9. 6. 2020).
- Beneška komisija, 2002. Code of good practice in electoral matters: guidelines and explanatory report (Opinion no. 190/2002). Strasbourg.
- Beneška komisija, 2013. Electoral law (CDL-EL 2013/006). Strasbourg.
- Drobne, S., 2019. Funkcionalne regije kot podlaga za ustanovitev pokrajin v Sloveniji. Ljubljana. URL: <http://www.pokrajine.si/wp-content/uploads/2019/10/DROBNE-2019-10-05-FR-kot-podlaga-za-ustanovitev-pokrajin-v-Sloveniji-1.pdf> (citirano 9. 6. 2020).
- Državni svet, 2019. Ustanovitev pokrajin v Sloveniji. <http://www.pokrajine.si/> (citirano 9. 6. 2020).
- Farrell, D. M., 2001. Electoral systems: a comparative introduction. New York: Palgrave.
- Gaber, S., 1996. Volilni sistemi: zbornik. Ljubljana: Krtina.
- Handley, L., Jeremy, G., Schrott, P., Boneo, H., Johnston, R., Maley, M., McRobie, A., Pattie, C., Rossiter, D., Watson, P., 2006. Delimitation equity project: Resource guide. Arlington: International Foundation for Electoral Systems (IFES).
- IFES, 2019. Electoral code of the Republic of North Macedonia: Consolidated version (translated and edited by IFES). URL: https://www.ifes.org/sites/default/files/electoral_code_of_the_republic_of_north_macedonia_february_2019_english.pdf (citirano 19. 6. 2020).
- Krašovec, A., 2007. Volilne študije. Ljubljana: Fakulteta za družbene vede.
- Lijphart, A., 1994. Electoral systems and party systems: a study of twenty-seven democracies, 1945–1990. Oxford: Oxford University Press.
- Nared, J., Hudoklin, J., Kavaš, D., Zavodnik Lamovšek, A., 2019. Povezovanje prostorskega in razvojnega načrtovanja na regionalni ravni v Sloveniji. Ljubljana: Založba ZRC SAZU.
- Plut, D., 2004. Načela, kriteriji in regionalizacija Slovenije z vidika členitve na pokrajine. V: Vlaj, S. (ur.). Pokrajina: druga raven lokalne samouprave. Ljubljana: Inštitut za lokalno samoupravo pri Fakulteti za upravo, str. 21–35.

- Pogorelec, J., 1998. Sistem volitev v Državni zbor: nekaj predlogov za njegovo izboljšanje. *Pravna praksa*, 17, 14/15, str. 29–38.
- Pogorelec, J., 2000. Večinski volilni sistem – trda šola demokracije. *Pravna praksa*, 19, 7, str. 17–26.
- Polič, M., 2002. Spoznavni zemljevid Slovenije. Ljubljana: Znanstveni inštitut Filozofske fakultete.
- Ribičič, C., 1996. Osebnost kandidatov in sorazmerna zastopanost strank. V: Gaber, S. (ur.). *Volilni sistemi*. Ljubljana: Krtina, str. 283–303.
- Ribičič, C., 1999. Volilni sistem iz žabje perspektive. *Teorija in praksa*, 36, 3, str. 458–471.
- Rogelj, B., 2011. *Političnogeografska analiza volilnega sistema volitev v Državni zbor Republike Slovenije : doktorska disertacija*. Ljubljana: Univerza. Univerza v Ljubljani.
- Rogelj, B., 2012. Ureditev volilnih enot v državnozbornem volilnem sistemu. *Dela*, 37, str. 107–128.
- RTVSLO, 2019. Posvet pri Pahorju: Poprava volilnih okrajev ali njihova ukinitvev in uvedba preferenčnega glasu? URL: <https://www.rtvsl.si/slovenija/posvet-pri-pahorju-poprava-volilnih-okrajev-ali-njihova-ukinitvev-in-uvedba-preferencnega-glasu/483334> (citirano 19. 10. 2020).
- Strøm, K., Müller, W. C., Bergman, T. (ur.), 2006. *Delegation and accountability in parliamentary democracies*. Oxford: Oxford University Press.
- Uberoi, E., Baker, C., Cracknell, R., Allen, G., Roberts, N., Barton, C., Sturge, G., Danechi, S., Harker, R., Bolton, P., McInnes, R., Watson, C., Dempsey, N., Audickas, L., 2020. *General Election 2019: full results and analysis*. Briefing Paper CBP 8749. London: House of Commons Library.
- Ustavno sodišče RS, 1992. Odločba U-I-128/92. Ljubljana.
- Ustavno sodišče RS, 2003. Odločba U-I-226/00. Ljubljana.
- Ustavno sodišče RS, 2018. Odločba U-I-32/15–56. Ljubljana.
- Webster, G. R., 2013. Reflections on current criteria to evaluate redistricting plans. *Political Geography*, 32, 1, str. 3–14. DOI: 10.1016/j.polgeo.2012.10.004.
- Zakon o določitvi volilnih enot za volitve poslancev v državni zbor [ZDVEDZ]. 2005. Uradni list RS, 24/05.
- Zakon o izborima zastupnika u Hrvatski državni Sabor. 2019. *Narodne novine*. URL: <https://zakon.hr/z/355/Zakon-o-izborima-zastupnika-u-Hrvatski-sabor> (citirano 20. 6. 2020).
- Zakon o volitvah v državni zbor [ZVDZ]. 2017. Uradni list RS, 23/17.

CHANGES OF ELECTORAL UNITS FOR THE CONDUCT OF ELECTIONS TO THE NATIONAL ASSEMBLY OF THE REPUBLIC OF SLOVENIA

Summary

Decision U-I-32/15-56 of the Constitutional Court of November 2018 revived the debate in Slovenia on reforming the National Assembly electoral system. The decision laid out two proposals for changing the electoral system. The first envisages the introduction of a ranked-choice voting system and the abolition of electoral districts. The second envisages the redrawing of electoral districts. Neither of the proposals envisage significant changes in the organization of electoral units. In this article, we want to check whether the existing arrangement of electoral units is in fact unproblematic.

Electoral units are spatial units in which electoral votes are collected and seats are divided in a representative body. Together with the electoral formula, the ballot structure and the electoral threshold, they represent a key element of the electoral system. They are commonly incorporated into proportional representation electoral systems, as a means to ensure great geographical representativeness, closer links between elected representatives (deputies) and voters as well as to simplify the organization of elections (Rogelj, 2012). The size of electoral zones has a significant impact on the degree of proportionality of the division of seats, the nature of party competition and on the extent to which elections conform to the principle of equal suffrage.

Regulation of electoral units for elections to the National Assembly of the Republic of Slovenia is determined by two laws. The National Assembly Elections Act (Official Gazette of the Republic of Slovenia, 2017) stipulates the establishment of eight electoral units, and that eleven deputies are elected in each electoral unit (see Figure 2) and that electoral units are formed in accordance with the principle that one deputy votes on behalf of approximately the same number of residents. The law also stipulates that districting of electoral units and districts must take into account their geographical integrity and common cultural and other characteristics. The spatial dimensions of electoral units are determined by the Act on the Determination of Constituencies for Elections of Deputies to the National Assembly (Official Gazette of the Republic of Slovenia, 2005).

Electoral units were formed in 1992 on the basis of the then administrative division of the state. Since then, there have been significant changes in the spatial distribution of the population, administrative management and spatial development of Slovenia. Analysis of the existing organization of electoral units has shown that it only partially meets the legal criteria. In this regard there are a number of problematic issues, including: increasing disparities in the number of inhabitants/voters between electoral units (Figure 1); the division of the City of Ljubljana and three other municipalities into several electoral units (Figure 2); and discrepancies between electoral unit boundaries and established

regional and sectoral divisions of the state (Figure 3). The latter is particularly problematic as it makes it difficult for voters and deputies to identify with the electoral unit in which they are voting/elected. Despite the primary division of seats being determined in electoral units, voters and deputies rarely identify with them.

The article presents three proposals to alternatively administer electoral units. The proposals are based on different starting points, so they each have different advantages and disadvantages.

The first proposal (Figure 5 and Table 3) builds on the same starting points as the existing regulations and conforms to existing legislation. It divides the country into eight 11-seat electoral units, each with approximately the same number of voters. Compared to the present system, it provides more geographically consistent electoral units, thus it addresses most of the most problematic issues in the current system. The main disadvantage of the proposal is that there are large differences in the number of voters between individual electoral units, which moves the system further away from the principle of equal suffrage. Another problem with the proposal is that it does not eliminate all the anomalies of the current system, which means that electoral units are not geographically consistent.

The second proposal (Figure 6 and Table 4) is based on completely different starting points. The proposal presupposes the creation of a regional level of local self-government and the harmonization of the borders of electoral units with regional borders. It builds on the proposal for the *Territorial Division of Slovenia into 10 regions with special status for the City of Ljubljana and City of Maribor* (Državni svet [National Council], 2019). It primarily aims to present the key advantages and disadvantages of a system based on spatially very heterogeneous electoral units. In this proposal, the spatial dimensions of electoral units are predetermined, and their size (number of seats) is determined with reference to the number of voters using a simple (Hare) quota and the largest remainder method.

Alignment of regional and electoral unit borders and the establishment of relatively small electoral units increases the geographical representativeness of the electoral system and enables closer connections between deputies and voters. Small geographically consistent electoral units eliminate the need to divide electoral units into districts, as they also ensure smaller regions are represented in the National Assembly and at the same time facilitate the smooth implementation of preferential voting, since voters get a better overview of the candidates. The biggest problem of the second proposal is that it does not meet the principle of equal suffrage. Because when there are a greater number of smaller electoral units, there are larger discrepancies in the number of voters who vote for each representative.

The third proposal (Figure 7 and Table 5) represents a kind of compromise or intermediate variant between the first and second proposals. The proposal does not specify a fixed size of electoral unit, but does set a limit on them. It envisages the creation of eight differently sized electoral units, in which a minimum of nine and a maximum

of 12 seats are allocated. The size limit reduces the negative impact of very small/large electoral units, while increasing the flexibility to determine their spatial dimensions and the degree to which they conform to the principle of equal suffrage. At the same time, it significantly reduces the differences in how party competition plays out between individual electoral units.

Highly geographically consistent electoral units are the main advantage of the third proposal. The proposal eliminates all anomalies of the existing system and almost perfectly mirrors the established regional and sectoral divisions of the state. Another advantage of the proposal is its high degree of conformity to the principle of equal suffrage. It is also important that relatively large electoral units are less affected by changes in the spatial distribution of the population. As a result, the size of electoral units can be expected to be more stable with there being less need for redistricting. In terms of the shortcomings of the proposal, it is likely there would be differences in the nature of party competition, which are characteristic of arrangements with differently sized electoral units. It should be emphasized that differences, due to two-level allocation of seats and small differences in the size of electoral units, would not have a major impact on the division of seats between the parties, but would likely have a small impact on intra-party allocation of seats.

Any change in the organization of electoral units must include clearer criteria specifying on what basis they are formed. It is necessary to determine the permissible deviation in the number of voters between individual electoral units and to specify the criteria on the basis of which the geographical integrity of electoral units is assessed. This would avoid the different interpretations of the legislation that we are witnessing in the current debate on electoral reform. It should also be specified when or under what conditions electoral units be redrawn. Should a solution encompassing different sized electoral units be introduced then there will also need to be a clear and fair way of assigning seats among electoral units, since this would be a precondition for fair and just elections.

Reforming the organization of electoral units is not necessarily essential though it does make sense to do so, especially should preferential voting be introduced.

(Translated by James Cosier)



THE INFLUENCE OF COVID-19 ON INTERNATIONAL LABOR MIGRATIONS FROM BOSNIA AND HERZEGOVINA TO EU

Izvirni znanstveni članek
COBISS 1.01
DOI: 10.4321/dela.53.71-95

Abstract

The article deals with the contemporary labor migrations from Bosnia and Herzegovina to Slovenia and the other countries of European Union, specifically during the period of the COVID-19 pandemic. On the basis of fieldwork among the participants in these migrations, it seeks to identify the specifics of circumstances and situations that arose suddenly with the closure of political borders and the demands of social distancing. In these circumstances, we supposed that labor migrants found themselves to be a particularly vulnerable group of population. The case study has denied that this is completely true. On the other hand, labor migrations from Bosnia and Herzegovina to Central, Western and North European and some non-European countries have been a continuous process for the last century and at least migration flows must be taken as a fact which directions, volumes and character are greatly influenced by labor market regulations in each individual EU member and other states. Periodically, specific political and social situations also gain importance. The COVID-19 pandemic has exactly such an impact.

Keywords: labor migrations, Slovenia, EU, Bosnia and Herzegovina, COVID-19

... *Faculty of Arts, University of Maribor, Koroška cesta 160, SI-2000 Maribor

... **Obala 144, Lucija, SI-6320 Portorož

... ***Department of Geography, Faculty of Arts, University of Ljubljana, Aškerčeva 2,
... SI-1000 Ljubljana, Slovenia

... e-pošta: bojan.cudic@um.si, matjaz.klemencic@um.si, jernej.zupancic@ff.uni-lj.si

VPLIV COVID-19 NA MEDNARODNE DELOVNE MIGRACIJE IZ BOSNE IN HERCEGOVINE V EU

Izvleček

Prispevek obravnava vprašanje sodobnih delovnih migracij iz Bosne in Hercegovine v Slovenijo in druge države Evropske unije, in sicer specifično za čas pandemije COVID-19. Na podlagi terenskega dela med migranti skuša opredeliti posebnosti okoliščin in situacij, ki so nastale nenadno z zapiranjem političnih meja in zahtevami družbenega distanciranja. Predvidevali smo, da so se delovni migranti v teh okoliščinah znašli kot posebej ranljiva skupina prebivalstva. S študijo primera smo dokazali, da to ne drži povsem. Po drugi strani pa so delovne migracije iz Bosne in Hercegovine proti državam Srednje, Zahodne in Severne Evrope kontinuiran proces zadnjega stoletja in je vsaj selitvene tokove treba vzeti kot določeno družbeno konstanto, na katere smer, številčnost in značaj v veliki meri vplivajo ureditve trga dela v posameznih članicah EU, obdobje pa dobijo prevladujoč vpliv tudi specifične družbene razmere. Tak vpliv predstavlja tudi pandemija COVID-19.

Ključne besede: delovne migracije, Slovenija, EU, Bosna in Hercegovina, COVID-19

.....

1 INTRODUCTION

The onset of the COVID-19 pandemic in the early months of 2020 (Shrivastava S., Shrivastava P., 2020) also had a profound effect on migration flows. In order to curb the spread of this new and apparently highly contagious disease, countries introduced one after another a series of measures that can be grouped together under the common notions of social distancing and hygiene measures. Temporary restrictions on movement virtually interrupted the established migratory flows for work, education, and tourism. The article pays special attention to the field of temporary guest labor migration between Bosnia and Herzegovina (BiH) and EU countries, especially Central Europe. Based on a qualitative analysis of interviews conducted in April 2020, information was obtained on the circumstances, course and specific problems for migrants along the path of otherwise normal migratory flow, in the source of migrants i.e. Bosnia and Herzegovina and in the target areas of these migrations. We examined in detail the measures that directly and indirectly affected the described work relocations and identified the adjustments of the participating migrants in specific circumstances for migrants.

Why BiH? The country belongs to one of the most migratory intensive countries in Europe. The motives and reasons as well as circumstances were different, but during the last century the emigration flows were constant. For Slovenia, the immigration from BiH is clearly the largest one; the BiH's diaspora represents an important part of

Slovene society. In the past year (2019), the number of issued residence permits for citizens of BiH was the largest among all issued permits. According to the Eurostat data, it was issued 56,355 first permits for BiH's citizens just in 2019 (Eurostat, 2020). BiH is geographically close to Slovenia and both countries share a common past during the so-called Yugoslav period (and also before); that all stimulates migration flows.

The research focused mainly on the effects of specific circumstances triggered by the rather sudden onset of the COVID-19 pandemic on labor migrants. We assumed that labor migrants from BiH were a more vulnerable group of workers for job loss due to the measures of the governments of the countries in which they worked. However, the effects of a pandemic cannot be considered outside the context of other migratory flows from the country under study. That's why we paid some attention to the historical background of migrations from BiH during the modern period.

The article is divided into three parts: an introductory part with explanations, an outline of migration traditions and practices between Bosnia and Herzegovina and Central Europe, and an empirical part with a presentation of field qualitative analysis. The introductory part presents the main premises of migration in the geographical area between BiH as the source of migrants and target areas in Central European countries and more broadly in the EU. The methods of work and data collection in the field are described in more detail, as well as the presentation of the sources for statistical and other data and, also, the methods of collection of relevant documents. The second part presents an in-depth analysis of past migration flows, the circumstances in which individual migrations took place and the consequences that these migrations have left on the BiH as a source as well as transitional and target areas. This historical-geographical outline explains temporary or permanent migration as a typical and fairly constant way for the population of BiH to respond to various challenges in their country. Labor migrations represent a certain social durable phenomenon which resulted in perceptions of inhabitants of BiH about the advantages of emigration to achieve personal socio-economic goals. The third - empirical part - is the analysis of migration related events during the period of declared pandemics and measures of social distancing and analysis of the course and consequences of it on migration flows. The concluding part follows the conclusions regarding migration policy in the specific social conditions that arose during the pandemic. This is also important because it is likely that Europe will face similar challenges in the future.

2 METHODOLOGY OF RESEARCH AND SOURCES

Research of international (especially labor) migrations is a demanding task. Due to the nature of these migrations, which are often not accurately (or not at all) officially recorded, and are also not accurately identifiable in some cases of periodic assessment due to the seasonal nature, it is necessary to rely on various estimates and information

obtained directly in the field and from the media. As far as figures are concerned, certain derogations and only indicative estimates must be accepted. Surveys or targeted interviews, on the other hand, bring the latest trends and a range of information about the nature and various processes and problems associated with these flows. Shortly after the onset of the COVID-19 epidemic/pandemic in Europe, limited field data collection and information collection was practically the only way to focus the effects of labor migration and related issues in the areas of emigration, transitional and target areas. We use terms like labor migration (migrants) as well as working migrants (and migration when thinking about the phenomenon or a process), because the “work” is a predominant motive or reason for movements of individuals across international (political) borders. Taking a longer period into account, many “seasonal” or temporary migrations became permanent due to various reasons and / or circumstances. The consequences are diasporas, established in almost all countries of Western, Northern and Central Europe and other countries of the world. This process is known for Slovenes too, despite the fact that Slovenia became a *neto-immigrant* country during last decades of 20th century (Ilc Klun, 2014).

Fieldwork included conducting targeted interviews with migrant workers who took part in return flows due to the declaration of the COVID-19 pandemic in the countries where they worked, and subsequent return to these countries when the circumstances allowed. In this way, we only got a homogeneous social group in terms of status and circumstances. However, it was much more diverse in terms of structure (age, gender, education, and position in the profession or in the work they performed).

The structure of the interviews was planned because we wanted to find out the experiences of migrants and the problems they had to cope with by current job losses and return problems along with legal and administrative procedures and especially social and economic consequences due to loss of income and return to work. Only indirectly were we able to identify the authentic problems of employers who found themselves without workers and had to, at least some of them, in some way compensate for this due to the nature of their field of economic activities. However, the focus was mainly on migrants and their specific problems. Considering the short time and very changing circumstances in this area (it was not known how long the epidemic, which required mainly different measures of social distancing, could last), the rapid preparation of the interviews and their implementation was very important.

The survey was conducted in April 2020. Twenty-two interviews took place all in the north-west part of the country and surrounding areas in Republika Srpska entity. Among twenty-two migrants interviewed they originated from different cities i.e.: Banja Luka (7), Derвента (5), Glamoč (3), Bosanski Petrovac (3) Prnjavor (2), Drvar (1) and Brod (1). By gender structure twelve were men and ten were women. By age structure three workers interviewed were younger than 25 years, seventeen were between 25 and 40 and three were between 41 and 60.

By the level of education, the survey included relatively well educated and skilled migrants: 13 or a good half of respondents had higher or university education, 5 were well qualified and experienced workers, while 4 were unskilled workers with primary level of education. The respondents work or worked in institutions or companies in the following sectors: transport, industry, education, IT, construction, catering, sales and health. According to the results of this field research, single people and people who had a family with children from BiH decided to work in EU countries. Among the respondents, there were seven workers living alone, six living with a partner, while nine had a family with children.

In the survey the respondents answered questions related to work in the EU, and the research was partly related to the emergence of coronavirus and the consequences of the pandemic in the field of international employment and the flow of people and work. The sample was small, so that any quantitative approach might be questionable. The interview was semi-structured. We turned to qualitative approach, using migrants' life experiences in the context of corona pandemic, as mentioned before (as well below). Due to personal contact when interviewing, we estimate that the respondents answered correctly and that we can trust the gained information.

In doing so, we also had to critically consider the significant role of strong emotions by which the interviewees were overwhelmed. Since people we interviewed lost their work and income, and had difficulties in crossing borders, we expected greater criticism of their own situations because of the response of various institutions. They had to face a number of disadvantages which came with the establishment of mandatory distancing measures and in some cases quarantine. They also had to confront the absence of systematic care for returnees by home countries as well as with unwelcoming reception in the home country. Therefore, we tried to consider situations, but to take subjective opinions and experiences with some reservations. However, the subjectivity of responses in studying the life experiences of migrants as a specific and often vulnerable group of the population is a common and by no means exceptional case. Probably the most appropriate method to explain the situations of migrants is the qualitative analysis. Interviews with carefully planned sample of respondents (who are / were directly involved into labour migration movements) is the base, also for the analysis by biographic-narrative method. The use of biographical-narrative method is not very common in geographical research, but in some regards demonstrate clear advantages. International migrations are exactly that field of research, where this method might be used (Ilc Klun, 2017). We simply must count on these methods. We believe, however, that we were able to obtain a realistic picture of the circumstances and situations that arose from the vast majority of respondents, which individual respondents personally took dramatically.

Another source of information was mainly news obtained from the media reporting what was happening during the "corona time": this phrase was quickly adopted for a specific short period of the declared epidemic COVID-19 and can be used as a

technical term. As circumstances changed rapidly, the media were the main source of information for the population and at the same time also for reactions and reflections. News about the spread of the epidemic and, above all, various measures was introduced by the media, but could also be checked on the websites of various state services. In these cases, the information was mainly summarized to describe the circumstances and the wider developments.

The third essential source of data are statistical censuses and estimates of migration from Bosnia and Herzegovina as a source area of emigrants. While considering some older migration flows, we focused on the migration dynamics after 1960. The year is not a precise turning point in the history of migration of the described area, but it well marks the initial period of changed economic conditions in the Yugoslav federation, which began with rapid and planned industrialization largely also in Bosnia and Herzegovina, but only in selected areas which were rich in raw materials and energy resources. However, the very rapid planned development of the beginning of the industrial paradigm apparently also accelerated internal migratory flows, which were partly directed towards domestic industrial areas. Statistical censuses conducted every ten years show a sharp increase in the population employed in industry, mining, and services, as well as an intensive displacement outside BiH. The opening of the labor market to “immigrants”, who as “guest workers” became part of international migration flows from Southern Europe to the north resulted in large flows directed towards Central, Northern and Western Europe. We have shown in more detail the migrations to Slovenia, which in the Yugoslav period (until 1991) were the subject of internal inter-republican migrations, but with the disintegration of Yugoslavia they became emigrants as a demographic category due to political changes. During the decade of the Yugoslav wars of succession migrations due to crisis situations (refugees) took over the predominant character. For this period, various estimates are much more useful, summarized from the literature and only partially from statistical censuses. Later, after the stabilization of the situation and in the first decade of the 3rd millennium also the relative economic success of Slovenia, economic migrants, both permanent and temporary, again became the predominant category of migratory flows in this wider area. Due to the weakness of statistical censuses in the region of origin, data from different registers in the target countries, which record labor migration accurately due to immigration quotas and work permits issued in the EU labor market, are much more useful. After 2004 (major enlargement of the EU), various forms of cross-border daily, weekly, and seasonal employment also began to increase, but this is not always recorded in the context of regulated labor migration. At the same time, the group we were studying was not among the most vulnerable groups, because most of the members were either well educated or were needed in the special situations that followed the epidemic.

3 HISTORICAL CONTEXTS OF EMIGRATION FROM BIH

The historical framework of migration(s) from BiH as a typical long-term emigration country and the formation of relatively large diaspora from BiH in European and non-European countries is necessary to address if we want to satisfactorily explain current trends in migration flows from Bosnia and Herzegovina. Historical circumstances created the circumstances and conditions of migration, determined their abundance, character and direction. In addition to political changes, wars and conflicts, economic changes in BiH were important as reasons for emigration. In addition to material conditions, information, legal and political circumstances, and the formation of a mind set on migration were also important as the most appropriate form of resolving socio-economic issues in BiH. It is the formation of a certain “tradition” of migration in one and diasporas in different European environments that, regardless of how these diasporas came into being, has significantly stimulated migration flows – and still does. Existing immigrant communities provide information to both parties – both potential migrants and the reception environment, and at the same time act as an attractive core for the chain migration.

Due to limited space, the historical framework is shown very briefly and only in the main phases. It is divided into two periods: the older and longer period of the formation of BiH in the current territorial framework to an independent state and the timeframe of an independent state from the end of the civil war in 1995 to the present day. In fact, this represents the Dayton structure of BiH and its position in the Balkan neighbourhood and wider in Europe. This refers mainly to the fact that Bosnia and Herzegovina is one of the few non-integrated European countries and a country under international supervision. In addition to the legacy of the last war, this creates a mix of circumstances due to which citizens’ trust in the state administration is low and at least somewhat accelerates thinking that employment abroad is the most appropriate form of social prosperity.

3.1 The migrations from Bosnia and Herzegovina during older modern period

The current territorial framework of Bosnia and Herzegovina is a legacy of the rivalry between the Ottoman and Habsburg Empires and was finally formed in the 19th century. Later, only minor territorial changes followed. The complex processes of ethnic identification have gradually formed three ethnic communities, of which the current Bosniaks are the most numerous, but the youngest community in terms of the process of final formation. Serbs and Croats have their ethnic and political cores in neighboring countries. However, in BiH these groups enjoy a status of a constituent community and not a minority. The Serb community is organized mostly in the Republika Srpska entity, while Bosniaks and Croats mostly in the cantons of the federal sub-state – the Federation of Bosnia and Herzegovina.

Bosnia and Herzegovina is historically a land from which many waves of emigrants left. People settled in BiH in quite large numbers during its Habsburg period after occupation in 1878 and annexation in 1908. We can prove this by reading the statistical data on mother tongue according to the census of 1910.

Table 1: Mother tongue of the internal immigrants from Austria-Hungary to Bosnia and Herzegovina in 1910.

Mother tongue	Number of immigrants
Slovene	3,864
German	23,183
Non-South Slavic	27,044
Magyar	5,795
Total	59,886

Source: Winkler 1931, pp. 212–213.

Most of these people served as officials and soldiers for the Habsburg state. The territory of BiH formed the XV corps of the Austro-Hungarian Common Army (Hazemali, 2017, p. 172). There were also some immigrants with specific skills like miners and entrepreneurs (Winkler, 1931, pp. 212–213). There were 1,989,929 people living in BiH in 1910, 1,931,802 in 1921, and 2,316,000 in 1931 (Klemenčič, Žagar, 2004, p. 110). Of course, World War II had negative impact on the population development, but in 1961 there were 3,278,000 people living in BiH due to high birth rates in particular of Muslim part of population. Twenty years later in spite of the negative migration balance of approximately 400.000 we can follow a significant increase of the number of inhabitants of BiH to 4,121,000 (Klemenčič, 2000, p. 152) The trend continued until the last Yugoslav census of 1991, when there were 4.377.033 residents in the country (Pašalić, Lalić, 2020, p. 13).

During the period of the second (socialist) Yugoslavia, Bosnia and Herzegovina was one of its federal republics. Due to its central location and the associated strategic security on one hand, and especially the abundant mineral and energy wealth on the other, the planned industrialization of the socialist type significantly changed the economic and social structure of Bosnian society. Within a few decades, large industrial centres were formed that employed domestic labor. By the end of the 1980s, society of BiH was already industrialized and had a significant industrial-technological infrastructure, as well as a relatively skilled population. However, at the same time, intensive emigration from Bosnia and Herzegovina to other developed regions of the Yugoslav federation developed. Slovenia was particularly attractive for immigration. Immigrants from BiH came to have the same jobs as in the environment of their own republic, but as a rule for much higher incomes. The same motive drove many into a fairly large flow of labor migration to Central, Western and Northern Europe (Bertić, 1987). These “guest workers” became a social constant and an anchor

for new migration flows. A specific social subculture of “guest workers” was formed (Mežnarić, 1986). Despite the weaknesses of the lifestyles of these emigrants with the separation of families and the rift between the places of work and the home environment, the decades-long process shaped not only a large diaspora but also significantly structured receptive societies. Slovenia became an important anchorage for BiH emigration. They came from all three ethnic groups, which are also well represented in Slovenia (Verska, jezikovna in narodna sestava ..., 2003). Slovenia is thus faced with both trends: the characteristics of more than a century of emigration and at the same time the characteristics of the immigrant society (Komac, 2007). In the context of our research, it is important that the established diasporas from BiH have in the future and to this day acted as attractive cores of new immigration, including labor migration.

Second challenge was a civil war in BiH after dissolution of Yugoslav federation. As a result of the war in Bosnia and Herzegovina in the first half of the 1990s more than 2 million refugees had to leave their homes (Pirjevec, 2003, pp. 451–454). According to the UN High Commissioner for Refugees and various government institutions most of the refugees had originally resettled within the borders of Bosnia and Herzegovina (1.2 million). Many settled in the successor states of the former Yugoslavia and in other European countries and outside Europe (Klemenčič, Žagar, 2004, p. 320). In Slovenia, there were approximately 75,000 refugees, and most of them became new citizens (Zupančič, 2004). Since that, the next migration follows two decades later, when Bosnia became a transitional country on a Balkan-route for transcontinental migrants, mainly from Asia (Rogelj, 2017). Some Bosnian citizens follow these migrants.

Table 2: Number of refugees from BiH in 1995 according to the countries of settlement.

Country of immigration/refugees	Number of refugees
Croatia	453,000
Montenegro	38,600
Macedonia	28,000
Serbia	405,000
Sweden	50,000
Netherlands	33,000
Turkey	52,000
Saudi Arabia	7,000
Libya	3500
Total	1,070,100

Source: Klemenčič, Žagar, 2004, p. 320.

By 1996 approximately 20,000 Bosniaks/BiH's Muslims were accepted as refugees in the United States. According to the data of the Office of Immigration Statistics of the Department of Homeland Security during the period 1996–2001, the United States accepted more than 123,000 refugees from Bosnia and Herzegovina who had lived as refugees in different European countries. According to some estimates the number of those who settled in the US from Bosnia and Herzegovina amounted to more than 230,000. The majority of Bosniaks settled in St. Louis, Missouri, which hosts the largest number of Bosniaks outside Europe, in New York, Chicago and some smaller US cities. Most of Serbian and Croatian refugees joined their friends and relatives in classic settlements of both ethnic groups i.e. Pittsburgh, Pennsylvania, Chicago and Joliet, Illinois (Klemenčič 2013, p. 770). The data from 2011 Canadian census show that 22,920 people stated that they were of Bosnian descent (Statistics Canada, 2020). The majority of BiH's Canadians emigrated to Canada as refugees during and after the last war in BiH.

3.2 Recent migration trends from Bosnia and Herzegovina

In spite of all peace agreements most refugees are still not able to return to their homes, or even they do not want to return to their homes. Consequences of the war, including the changed ethnic distribution, remnants of continuing ethnic intolerance, lack of economic security, and poor economic conditions were among the key reasons why refugees left regions in the Bosnia and Herzegovina. The refugees who left Mostar in Herzegovina have not been able or do not want to return to their homes. As a consequence of the very bad economic situation the masses of economic migrants continue to emigrate to join their relatives and friends in foreign countries. It is also interesting to note that, although many home places were destroyed during the last war, most of the houses were renewed by 2020. We have to note however that people, who successfully integrated in their new social environment, found jobs and built new homes and accommodated into new life in Western European countries, USA, Canada or Australia. They do not want to return to their home country. This is common for all immigrants but especially for those whose standard of living in the countries of emigration is much lower than in the countries of immigration. Additional factor could be lack of economic security and prosperity. Both played a role in BiH as well as in the low rates of return to then Yugoslavia after World War I and World War II. (Klemenčič, 1987, p. 46). Also emigrants themselves still have habit of visiting their real estates, properties and relatives in BiH, while their children and grandchildren are not so keen to come. Grandchildren do not come even once a year. They live their own life as they have acculturated or even assimilated in their new homelands, as observed by one of the authors (Ćudić).

It is interesting to note that a quarter of century after Dayton agreement was concluded a certain number of Muslims/Bosniaks and Croatians have come to live in

Republika Srpska and Serbs migrated into Federation BiH, because they have, due to enacted quotas and results of 1991 census priority for employment in public sector. Also, the reasons for emigration have changed comparing to the 19th and 20th century. The pull factors are better education system, health services and public support system in general in addition to the above-mentioned push factors. Using social media (Facebook, Instagram, Twitter) they are comparing quality of their life with their peers who live in developed countries of the Western World. Consequently, many people are leaving their comparatively well-paid jobs in BiH and together with their families move to different Central- and Western European countries, North America and Australia. There are even examples of people leaving their businesses when leaving the country. To conclude: in the last 10 years the main issues which have led people to emigrate are the quality of living environment and search for prosperity and economic security. Before the pandemic of COVID-19 several hundred people even emigrated from BiH to China to study and work as they recognize it as a place where they would be able to find some kind of economic security (as observed by co-author Ćudić). There they must be ready to live in even more diverse place than it is BiH.

According to the official census data the number of inhabitants of Bosnia and Herzegovina between 1991 and 2013 decreased from 4,377,033 to 3,531,159, i.e. the net decrease was almost 20%. This was a result of the wars of the first half of the 1990s as well as the economic crisis which followed. It is shown also in the percentage of the unemployed which according to the official data was 43.2%. There was however a significant difference between the entity of Republika Srpska (37.3%) and the entity of Federation BiH (45.9%). Of course there are quite a few workers who participate in the so-called grey economy otherwise people would not be able to survive. The population also depends heavily on remittances of emigrants. BiH so represents quite a reservoir of potential emigrants (Pašalić, Lalić, 2020, p. 13).

One of the most significant indicators of the economic and political situation in a chosen country are the data on migration balances. Since 1991 those balances for Bosnia and Herzegovina as a whole and for all of the entities have been highly negative.

Table 3: Migration balances in Bosnia and Herzegovina during the period 1991–2019.

Entity of BiH/territorial unit	Migration balance 1991–2019	Migration balance 2015–2019
Republika Srpska	-497,423	-77,758
Federation BiH	-805,060	-146,368
Brčko District	-14,525	-4,594
Total	-1,317,008	-223,720

Source: Pašalić, Lalić, 2020, p. 13.

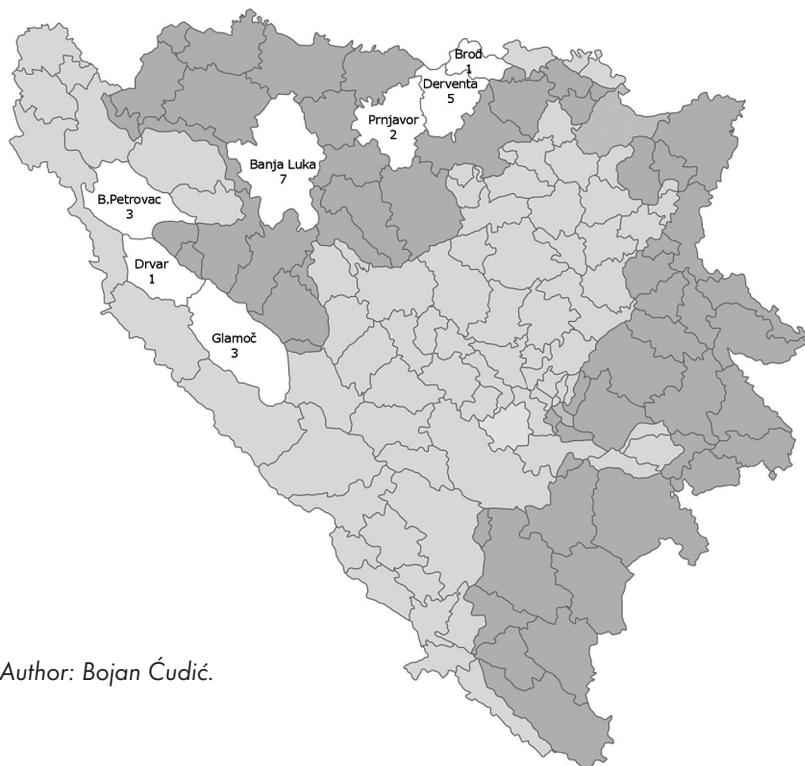
These are the consequences of war as well as bad economic situation after the war. It is worth noting that the trend continued also during the last five years as migration balance for BiH was highly negative.

These data show that the pace of emigration from BiH as a whole, and especially from the Federation BiH accelerated especially during the last five years when there was no war, but economic conditions worsened (Pašalić, Lalić 2020, p. 13). The result of all these developments is that the number of inhabitants of BiH in 2019 decreased to 3.069.025 (Pašalić, Lalić, 2020).

4 CORONA VIRUS PANDEMIC AND WORKING MIGRATIONS FROM BOSNIA AND HERCEGOVINA: CASE STUDY

According to our survey the coronavirus pandemic (COVID-19) in most cases has not endangered jobs and incomes of BiH workers working in the European Union (EU), although it has significantly affected their work, and mostly some low-skilled workers have lost their jobs.

Figure 1: BiH municipalities that are covered by the survey, N=22.



Author: Bojan Ćudić.

In regard to the current employment status, two respondents stated that they were unemployed, three had temporary, and as many as 16 respondents had a permanent employment.

The survey showed that workers of all ages, all levels of education and different occupations had the same opportunity for employment in EU countries, and that there were various ways to get a job in one of the countries of the EU.

When it comes to education, there were no respondents who completed only primary school, while one respondent stated that he had a vocational education, five completed a technical secondary school or grammar school, 13 had a university degree or college, and three stated that they had another type of education.

The respondents stated that they had worked or were working as: drivers (4 respondents), journalist / human resources administrator (1), researcher at a faculty (1), worker in catering and cleaning facilities (1), mechanical engineer – teacher in secondary school (1), worker in an electrical cabinet company (1), workers working in cleaning (3), worker in industry (1), educator and trade intermediary (1), mechanical engineer in the industrial sector (1), sales manager in industry (1), electrical engineer in industry (1) computer scientist (2), auxiliary worker in the machine industry (1), worker in the field of finance (2). The respondents found work through specialized websites with job offers or social networks and through relatives and acquaintances, and they got jobs by applying for job through an employment agency, based on a recommendation, or had already worked for a foreign company in BiH and they had been transferred to another job in one of the EU countries.

Regardless of their profession, some of the respondents had and used the opportunity to find another job in the EU, which means better pay and working conditions (low-skilled workers), or with higher pay and better working conditions and a possibility of promotion to a higher position or employment in the profession (highly qualified workers).

The respondents work or worked in Italy, Croatia, Slovenia, the Czech Republic, Austria, or Germany and have between 8 months and 14 years of work experience in one of the EU countries, as it is presented on map 2.

Figure 2: European countries where respondents work, N=22.



Author: Bojan Čudić.

4.1 Motives for migration

Economic motives for migrating in search of better employment opportunities have been the common reason for most migrations for several decades apart from political crisis and war (Rančič, 1990). The phrase “better life” is thus a uniform synonym for an individual’s decision to move to a chosen changed location. When it comes to choosing the country of immigration these are mainly the countries of Central, Western and Northern Europe. However, economic motives are just a kind of cloak or cover, diverse circumstances, conditions, information, resources and finally also perceptions

of quality of life, which unfold in a more detailed analysis of individual stimulated individual to decide to move for work (Lazanin, 2017). The mentality of potential migrants in particular plays a very important role in this. The fact that emigration typically continues in the most emigration-intensive regions, even in cases where they have comparable employment nearby, suggests that other circumstances, especially the existence of an already established immigration core, make life easier for potential migrants. As many jobs are temporary, regular opportunities to communicate with the home environment are crucial. Material or economic motives should therefore be viewed in many ways and considering the migrant's personal and family situation (Peračković, Rihtar, 2016). This is what the respondents in our sample are basically stating in their answers. It is interesting to note that for most of them better salaries than in BiH are important, while at the same time also the opportunities for better working experiences, as well as the improvement of their professional skills and living in better organized social environment are important.

Even in the interviews the economic motive is clearly highlighted. However, the respondents later described it in more detail with other characteristics, among which the acquisition of experience and references, the acquisition of start-up capital for home activities, better working (including material, technical) conditions, organization and order and interpersonal relations. This motive also fits well with a convincing level of satisfaction with work and the working environment abroad, although they stated that they have to sacrifice a lot for this.

The sample consists of 22 respondents. When they answered the question how important work in the EU for them is, 18 of them answered that having a job in one of the countries of the European Union is important because they are provided with good earnings. The salaries are much better in EU than in BiH. For four respondents, earnings are not a reason at all for deciding to work in one of the EU countries. For one, working in the EU is important primarily because he can live in an organized system. For three of them the employment in the EU gives them an opportunity to advancement and professional development. Three respondents stated that they would return to BiH as soon as they earned enough money. A researcher who works at a university in Slovenia pointed out that working there enabled him to earn a good salary, improve the quality of work, and make the contacts, that opened new business opportunities for him.

A respondent who worked first in Germany on maintenance and cleaning of facilities and then in catering in Italy, stated that working in the EU meant that she could live a normal life and had fulfilled certain desires, both for herself and her child. For a worker working on maintenance and cleaning of facilities in Austria, a job in the EU means a better future and financial security.

For a driver employed in Slovenia, this job is important in order to earn enough money to start a business in BiH. His intention is to return there to fulfil his ambitions for which he needs another five to seven years.

For a mechanical engineer who, after working in school and in a manufacturing company, got a job in a secondary school in Germany, a job in the EU is important to gain basic capital as well as acquaintances and experience to start his business in BiH. He sees his current job and lifestyle as temporary. A driver, who works in Slovenia went there to earn and repay debts because he had a family business in BiH that is now in loans. When he repays the debts, he will surely return to BiH and continue to work in family business he started earlier. A mechanical engineer employed in the Austrian industry sector considers working in the EU important because of good living conditions and opportunities for training. He plans to stay in the company he is currently working for up to five years to complete masters and doctoral studies. As a disadvantage of living and working in Austria he mentioned a weak social life.

For a worker who works as a hygienist in a rehabilitation center in Germany, a job in the EU is important for her and her family's future, especially for her retirement. A respondent who works on the maintenance and cleaning in a clinic in Germany believes that working in the EU means a lot of sacrifices, especially for families and people he lives with, but that the working conditions are much better than in BiH. A respondent working in the industry sector in Germany stated that his job in the EU was important for him to ensure the existence of his family. For a respondent employed in education sector in Germany as a trade intermediary, working in the EU is important for his existence. For a respondent employed in the industrial sector, working in Germany is currently the only way to provide a financial existence for himself and his family. An electrical engineer employed in a factory in Austria considers a job in the EU important for his family's existence.

A sales manager employed in the industrial sector was the only one to state that working in Germany was not essential or existential for him, but that he had decided to work there due to political turmoil and corruption, i.e. unregulated system in BiH and bad prospects for young people, and the return to the home country and building a career in it would not be a problem, as far as the financial side is concerned.

For a respondent employed in the IT sector in Germany, a job in the EU is important in terms of gaining new experience (different work environment, legal regulations, more diverse environment and challenges), and she believes that working conditions are better than in BiH. A respondent employed in the IT sector in Germany stated that working in the EU brought him new experiences that he could not have gained otherwise and the opportunity to learn a new language, and that he had the opportunity to advance and build a career at his fingertips.

For a driver of a construction company in Croatia, working in the EU is the most important from the financial point of view, because he was unemployed for a long time and is currently earning income to support his family. For a worker in the financial sector in Austria, working in the EU is important because of the salary, as well as for another employee of a bank in Austria. For a worker working on cleaning facilities in Austria this is important for financial security and better security.

For a respondent working as a human resources administrator in the Czech Republic (who previously worked in Germany), working in the EU is important because of working in a multicultural environment where more languages are used and because of greater chances for development, which is why the decision to leave the company in BiH, where she had worked for five years and had a good job, prevailed.

An auxiliary worker in a factory in Sweden stated that working in the EU was important to him because, after being unemployed for a long time, he earned income to support his family. A driver employed in Slovenia considers working in the EU important because of a secure salary and health insurance, but as a disadvantage he states that he feels like a foreigner. Most of the other respondents shared positive impressions in relationships with residents. Especially, this is a case with respondents that have a higher level of education.

4.2 Impact of the pandemic on employment and economic position

The central research question was how the onset of the COVID-19 pandemic affected migrant workers, their employment, and the resolution of economic and social issues, as well as how migrants adapted to the situation. Retention, change of the type and manner of work and working conditions, or loss of work are certainly the most important consequences. According to the employment consequences, the studied migrants could be divided into four groups, which roughly represents a typology of possible consequences. The authors used the method of biographical-narrative analysis. Therefore, the numerical ratios in the presentation (Table 4) are for illustration only and individual experiences are shown later in the text.

Table 4: Typology of social-spatial consequences of pandemic COVID-19 to working relations.

Consequence/ reaction type (what happened to the job)	Branch of activity before pandemic	Countries, where the respondents work	Education/ Professional skills
lost job permanently (5)	personal services, tourism, industry	D, SWE, CRO, IT, IT	lower education (4), professional (1)
fluctuation of employment (4)	industry, education (2), transport	D, AT, SLO, D	high (3), professional (1)
from home, then return (4)	administration, education, finance, industry	CZ, SLO, AT, AT	high (4)
remain working (9)	industry, finance, IT (2), tourism, traffic, personal services (2)	D, D, D, AT, AT, AT, AT, SLO, SLO	high (6), professional (3)

Source: interviews (B. Ćudić), April 2020, N=22.

In the first group are those who lost their jobs due to circumstances in labor market. 5 of the 22 workers surveyed, or about 22,7% of those surveyed, stated that after the borders were closed due to the pandemic in February 2020, they lost their jobs in the EU. All those who lost their jobs during that period have a secondary school degree and were employed in a job for which unskilled labor was required. This survey has showed that the corona virus had a negative impact on various sectors, as well as that the consequences of the pandemic were felt by all countries in which the respondents lived. The fact that they lost their jobs was stated in an interview by a worker who had worked in an electrical cabinets factory in Germany, an auxiliary worker who had been employed in a mechanical industry in Sweden, two workers who had worked in Italy and Austria on cleaning facilities (the worker in Italy had also worked in a catering industry), as well as a worker working as a driver at a construction site in Croatia. In economic terms, the pandemic, according to this survey, most often affected middle-aged workers because three of the five workers between the ages of 41 and 60 lost their jobs. One female worker between the ages of 25 and 40 and a female worker under the age of 25 also lost their jobs.

On the other hand, as the survey showed, the pandemic did not cause problems for highly qualified workers. Although it affected the way things were completed, the pandemic did not affect the employment and salaries of 17 respondents, including all 13 respondents with higher or faculty education. The other four are unskilled workers.

The second group are those who had to adapt to new circumstances on the work market by either changing the working conditions, location and in some cases even the employer. Fluctuation is probably a good mark that both the workers (i. e. migrants) and employers have adapted to new circumstances. For workers (migrants) the most important issue is to retain financial source, particularly for those who are in the country with families. There were four of them.

Third type is especially significant for »corona-period«: working from home. Since the most commonly used slogan was »stay home« (and this means to remain working, if possible, too), the tele-working became the first provisional solution for many branches as education, finance and assurances, administration, consulting and many others, including marketing, sale of different goods, development, research etc. »All online!« was a slogan, which »solved« many things. Among the respondents, there were 4, who continued their job by jumping to online way of work. A human resources administrator (Czech Republic), a faculty employee (Slovenia), an electrical engineer working in industry (Austria) and a financial worker (Austria) worked from home in BiH.

The fourth group represent those who remain working, even though there were some adaptations in modus operandi. A bit surprisingly, there were 9 of all surveyed, or a bit less than half. This represents the working migrants as vulnerable, but flexible group. The work availability crucially depends on their skills and education.

As many as nine respondents stated that they worked in the same way as before the pandemic (same working hours, worked in their workplaces), but with increased

protection measures, four worked from home, three did not go to work or worked with reduced scope of activities but regularly received full payment, while one respondent did not go to work for some time but received full payment, after which he worked as before the pandemic.

When it comes to people who worked as usual, there are two employees in the IT field (Germany and Austria), two workers working on maintaining cleanliness in hospitals (Germany), a sales manager (Austria), two drivers (Slovenia), a worker working in the field of finance (Austria) and a worker working in industry (Germany). Among those who did not work or worked on a reduced scale, but received a salary, there were two workers working in education (Germany) and one mechanical engineer (Austria). The driver who works in Slovenia did not work for a while because he was in Bosnia and Herzegovina and could not return to Slovenia, but his employer paid him a salary during that time, and later he continued to work.

The survey showed that the preservation of a job was influenced by a company or institution in which a worker was employed, so, for example, a driver who was employed in a construction company lost his job, while drivers who worked in companies which transport goods, as expected, worked constantly or with certain breaks. The situation is similar with workers who worked on cleaning and maintenance jobs, where those who did those jobs in houses or apartments lost their jobs, while those who did the same jobs in hospitals worked regularly.

Describing their experience during the pandemic, most of the workers, 7 out of 9 who worked at their workplace, stated that the employers were correct in fulfilling all their obligations and that they respected all prescribed protection measures, except for a driver employed in Slovenia who stated that he had to work more than Slovenian workers and a worker working in the field of finance in Austria who stated that he only had a mask of all protective equipment. Working in special conditions had in some cases positive effects when it comes to jobs performed by highly qualified workers. One respondent working from home said that this way of working had had an impact on higher productivity, but that direct communication had been lacking, while another stated that working from home had proved to work well, so it is considered that in normal circumstances workers, if they wish, work from home one or two days a week. In his answers, one respondent, who worked all the time, stated that his company had used the period of general standstill to develop new business models, and that he himself expected advancement. When it comes to expectations after the end of the pandemic, workers who lost their jobs believe that after the situation normalizes, they will start working again.

4.3 The life experiences of migrants

In some cases, a better job meant moving to another country within the EU. Thus, a worker who is employed in Germany in a factory that manufactures electrical cabinets found that job after having worked in Slovenia on cutting iron. The driver employed

in Slovenia got the job through an employment agency, but after a short time he moved to work in another company that offered him better working conditions. A driver who got a job in Croatia through an advertisement, based on a recommendation, got a job in Slovenia. A worker who found a job in the journalism, communications and political science sector in Germany through an advertisement, found a new, better job based on an advertisement from Amazon in the Czech Republic, where she works as a senior human resources administrator for the German market. A mechanical engineer working in Germany first worked in a hotel, and two years later he managed to get a job in the profession – first in the company “Bosch”, and then in a secondary school.

The survey in which the workers described their experiences with the work in the EU also showed that workers from BiH employed in EU countries are generally satisfied with employers, working conditions and earnings.

20 respondents stated that they had a completely positive experience with working in the EU, while two respondents made complaints about employers and working conditions. Respondents stated the following as positive sides of working in the EU: good working conditions, good salaries, paid overtime work, a strong union, a possibility of advancement, an organized system, fair employers with whom they can communicate and who fulfil what is written in the employment contract, regular settlement of obligations to workers, benefits, bonuses and salary increases, security in the labor market.

The driver employed in Slovenia was not satisfied with the working conditions, pointing out that he had a permanent employment contract, but that it was not respected in all cases by the employer and that the workers had to fight for good working conditions and that it took a lot of time, that he worked more than his colleagues who are Slovenians, and he also stated that his employer had not provided him with a meal allowance, but that he had done it himself. A respondent who worked in the industry sector in Sweden stated that he had been satisfied with the business approach and salary, which had been in accordance with the agreement and the contract, but he emphasized that he had to fight for all rights himself and that there had been no room for mistakes with the employer.

The survey showed that most respondents, regardless of their profession or education, have a need or desire to learn a language of a country in which they work, and only one respondent does not know any foreign language. As many as 19 of 22 of them communicate business and privately in a language of a country in which they currently work, while two communicate only in English, and one only in Serbian. A driver working in Slovenia communicates only in Serbian (Serbian is spoken by his employer and can communicate when necessary), while a worker working in education in Germany as a trade intermediary and a worker working in Sweden as an auxiliary worker in industry communicate in English.

When it comes to people who worked in two EU countries, a worker who worked in Germany in the field of communications and then got a job in the Czech Republic as a human resources manager speaks German and English, but not Czech, while a

worker who worked in Italy and Germany in the catering sector speaks both Italian and German.

It is interesting that business communication in English is mandatory for seven workers in Germany and Austria (workers in the IT and financial sector, engineers, sales manager, sales broker), and six of them also use the language of the country (German) in which they work. A researcher working at a faculty in Slovenia communicates business in English and Slovenian.

A respondent who first worked in a hotel in Germany and then got a job in a secondary school, first used English, and then was obliged to learn German. Only English was used at the beginning of his work in Germany by a respondent employed in cleaning and maintaining a clinic, but then he learned the German language he uses at work. A driver who works in Slovenia initially communicated in Serbian, but after a while he learned Slovenian language.

When it comes to housing conditions during work in the EU, it turned out that the situation was more or less similar for all workers, regardless of what and in which country they worked. Thus, more than half of the respondents – 15 of them – live as tenants. For five respondents, the apartment is provided by their employers, while two respondents had their own apartments. When it comes to workers whose apartment is provided by an employer, it is a driver of a construction company in Croatia, a worker who works in a factory in Germany, two drivers of transport companies in Slovenia and a hygienist who works in a hospital in Germany. A worker who has been working in the IT sector in Germany for 1.5 years and a worker who has 15 years of work experience in Germany and Italy, and who bought the apartment in Italy while living in Germany as a tenant, have their own apartments.

5 CONCLUSIONS

In the study on labor migration from Bosnia and Herzegovina to the EU, we paid special attention to the effects on migrants' work and life after the COVID-19 pandemic: how these rapid changes affected their employment and economic and social issues, as well as how migrants adapted to the resulting situation. Due to limited time and communication opportunities, 22 interviews were conducted, which were later interpreted according to a biographical-narrative approach. The general impression is that labor migrants have proven to be a flexible group and have largely retained work and the associated economic benefits. The general impression is that the pandemic did not endanger their jobs more than employed locals in the same environments. Problems due to measures of social distancing and closing of borders, and in some cases repatriation, also mostly took place without major complications. It has also been shown that migrants with higher education and / or qualifications are socially safer than those with lower education, which is also due to greater flexibility of migrants

on the one hand and employers' awareness of the importance of foreign workers. The latter can probably be attributed to the relatively high level of trust in BiH workers. The meaning of integration of immigrants into societies is therefore important issue; interesting, that more and more countries built relatively common, if not unique model, how to incorporate foreign workers into society (Lukić, Tomašević, 2020, pp. 145–146). COVID-19 therefore had an impact on the way and location of work, but in the short term it did not significantly jeopardize jobs, nor did it have a stronger impact on the allegedly weaker group of foreign workers in the EU.

Opomba: Članek je nastal v okviru delovanja dveh programskih skupin, in sicer Programske skupine P6-0372 in P6-0229.

References

- Bertić, I. (ed.), 1987. Veliki geografski atlas Jugoslavije. Zagreb: Sveučilišna naklada Liber.
- Eurostat, 2020. First permits by reason, length of validity, and citizenship. URL: https://ec.europa.eu/eurostat/web/products-datasets/product?code=migr_resfirst (accessed 29.10.2020).
- Hazemali, D., 2017. The Battle of Galicia: the disintegration of the Austro-Hungarian land forces on the eastern front in the first world war, with special emphasis on the role of the Graz's III corps and Slovenian soldiers. *Studia Historica Slovenica* 17, 1, Maribor, pp. 161–196.
- Ilc Klun, M., 2014. Teoretična in terminološka izhodišča izseljenstva ter poznavanje tematike izseljenstva med slovenskimi učenci in dijaki. *Dela*, 41, str. 165–181.
- Ilc Klun, M., 2017. Biografsko-narativni metodološki pristop za poučevanje in razumevanje vsebin slovenskega izseljenstva. *Dela*, 48, str. 61–76. DOI: 10.4312/dela.48.2.61-76.
- Izdana dovoljenja za prebivanje januar-december. 2019. URL: <https://www.gov.si/podrocja/drzava-in-druzba/priseljevanje-v-slovenijo/> (accessed 14.07.2020).
- Klemenčič, M., 1987. Ameriški Slovenci in NOB v Jugoslaviji. Maribor: Založba Obzorja.
- Klemenčič, M., 2000. Prostovoljne in prisilne migracije kot orodje spreminjanja etnične strukture na območju držav naslednic nekdanje Jugoslavije. *Razprave in gradivo: revija za narodnostna vprašanja*, 36/37, str. 145–172.
- Klemenčič, M., 2013. Bosnians, Bosniaks (Muslim), and Bosniak Americans, 1940-present. In: Barkan, E. R. (ed.). *Immigrants in American history: arrival, adaptation, and integration*. Santa Barbara, Denver, Oxford: ABC-CLIO, pp. 767–773.
- Klemenčič, M., Žagar, M., 2004. The former Yugoslavia's diverse peoples: a reference sourcebook. Santa Barbara: ABC-CLIO.

- Komac, M. (ed.), 2007. Priseljenci. Študije o priseljevanju in vključevanju v slovensko družbo. Ljubljana: Inštitut za narodnostna vprašanja.
- Lazanin, S., 2017. Životna priča jednog iseljenika kao izvor za proučavanje migracija, *Migracijske i etničke teme*, 33, 2, pp. 221–229.
- Lukić, V., Tomašević, A., 2020. Immigrant integration regimes in Europe: Incorporating the Western Balkan countries. *Acta geographica Slovenica/Geografski zbornik*, 60, 1, pp. 143–154. DOI: 10.3986/AGS.7286.
- Mežnarić, S., 1986. Bosanci. A kuda idu Slovenci nedeljom. Ljubljana: Založba Krt.
- Pašalić, S., Lalić, N., 2020. Demografski indikatori i demografska (GIS) analiza. Opštine, gradovi, kantoni, Republika Srpska, Federacija BiH, Distrikt Brčko, Bosna i Hercegovina. Bijeljina: Pedagoški fakultet.
- Peračković, K., Rihtar, S., 2016. Materijalizam kao društvena vrijednost I poticaj namjerama iseljavanja iz Hrvatske. *Migracijske i etničke teme*, 32, 3, Zagreb, pp. 295–317.
- Pirjevec, J., 2003. Jugoslovanske vojne: 1991–2001. Cankarjeva založba, Ljubljana.
- Rančić, M. (ed.), 1990. Pogledi na migracije stanovništva Jugoslavije. Beograd: Centar za demografska istraživanja, Univerzitet u Beogradu.
- Rogelj, B., 2017. Violent borders: refugees and the right to move. *Dela*, 48, pp. 129–132, Ljubljana.
- Shrivastava, S., Shrivastava, P., 2020. Ensuring safe repatriation of the citizens amidst the threat of Corona Virus Disease 2019 Pandemic. *Cukurova Medical Journal*, 45, pp. 767–768. DOI: 10.17826/cumj.727470.
- Statistics Canada, 2020. 2011 National Household Survey: Data tables. URL: <https://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/dt-td/Rp-eng.cfm?LANG=E&APATH=3&DETAIL=0&DIM=0&FL=A&FREE=0&GC=0&GID=0&GK=0&GRP=1&PID=105396&PRID=0&PTYPE=105277&S=0&SHOWALL=0&SUB=0&Temporal=2013&THEME=95&VID=0&VNAMEE=&VNAMEF=> (accessed 29.10.2020).
- Verska, jezikovna in narodna sestava prebivalstva Slovenije. Popisi 1921–2002, 2003: Posebne publikacije, št. 2. Ljubljana: Statistični urad Republike Slovenije.
- Winkler, W., 1931. Statistisches Handbuch der Europaeischen Nationalitaeten. Wien, Leipzig: Wilhelm Braumueller, Universitaets-Verlagsbuchhandlung.
- Zupančič, J., 2015. Geografija Balkana in njegovega obrobja. Ljubljana: Znanstvena založba FF.
- Zupančič, J., 2004. Ethnic structure of Slovenia and Slovenes in the neighbour countries. In: *Slovenia: A geographic overview*. Ljubljana: Založba ZRC, pp. 87–92.

COVID-19 IN MEDNARODNE DELOVNE MIGRACIJE IZ BOSNE IN HERCEGOVINE V EU

Povzetek

Prispevek obravnava vprašanje sodobnih delovnih migracij iz Bosne in Hercegovine v Slovenijo in države Srednje Evrope, in sicer specifično za čas razglašene pandemije COVID-19. Predvidevali smo, da so dokaj nenadna zapora meja, vračanje državljanov v domovino, družbeno distanciranje in druge okoliščine, povezane z ukrepi držav, v katerih so delovni migranti delali in bivali, posegli v delovni in življenjski ritem vseh, tujih delavcev pa še posebej. Osrednje raziskovalno vprašanje je bilo, kako je nastop pandemije COVID-19 vplival na delovne migrante, njihovo zaposlenost in reševanje ekonomsko-socialnih vprašanj ter tudi, kako so se migranti prilagajali na nastale razmere. Da bi ugotovili učinke pandemije na status in način dela ter položaj migrantov, je bila izvedena kratka terenska raziskava med udeleženci teh migracij: 22 intervjujev. Zaradi nizkega števila in drugih posebnosti vzorca smo se odločili za biografsko-narativno metodo, po kateri je spremljanje zanimivih življenjskih sekvenc migrantov podlaga za ilustracijo razmer, v katerih so se migranti znašli. Tega ne moremo posplošiti. Predvidevali smo, da so se delovni migranti v teh okoliščinah znašli kot posebej ranljiva skupina prebivalstva. S študijo primera smo dokazali, da to ne drži povsem. Udeleženi migranti so bili iz entitete BiH Republike Srbske, v vzorcu so rahlo prevladovali moški in višje- ter visoko izobraženi oziroma ustrezno kvalificirani. Po drugi strani pa so delovne migracije iz Bosne in Hercegovine proti državam Srednje, Zahodne in Severne Evrope kontinuiran proces zadnjega stoletja in je vsaj selitvene tokove treba vzeti kot določeno družbeno konstanto, na katere smer, številčnost in značaj v veliki meri vplivajo ureditve trga dela v posameznih članicah EU, obdobje pa dobijo prevladujoč vpliv tudi specifične družbene razmere. Tak vpliv predstavlja tudi pandemija COVID-19.

Poleg uvoda in metodoloških opomb je v prispevku prikazana zgodovina migracij iz BiH v novejši moderni dobi, to je nekako od srede 19. stoletja dalje vse do danes. Ta časovna zamejitev predstavlja čas, v katerem je prostorski okvir BiH skoraj enak, spreminjale pa so se družbene in politične razmere, ki so teritorij BiH postavljale v državne tvorbe Osmanskega imperija, nato habsburške Avstro-Ogrske, kraljevine Jugoslavije, socialistične jugoslovanske federacije in po njenem razkroju v seriji vojn med 1991 in 2001 ustanovitev BiH (1992). Posebej smo se osredotočili na obdobje po 1995, ki je pomemben mejnik predvsem zaradi daytonskega mirovnega sporazuma, ki je končal štiriletno državljansko vojno, a oblikoval administrativno dokaj zapleteno delujočo državo pod mednarodnim nadzorom. Te faze političnega razvoja so zaradi kontekstov, ki so jih ustvarjale, pomembno vplivale na migracijske tokove iz Bosne in Hercegovine ter znotraj nje. Značilno namreč je, da so se migracije povečevale tako v času političnih kriz in vojaških konfliktov (kjer je bila glavna oblika in razlog selitev begunstvo) kot v časih ekonomskega razvoja. Medtem ko so krize navadno dokaj

očiten razlog in okoliščina selitve, so selitve v času blagostanja v prepletu motivov bolj zapletene. Ključno pa je, da je mogoče vse, celo krizne migracije v določeni meri, postaviti na skupni imenovalec ekonomskih oziroma materialnih okvirov. Ti pa nika-kor niso edini, a so skoraj vselej prisotni.

Nastop COVID-19 predstavlja določen stres, ki v večji meri prizadene migrante. Te navadno percipiramo kot ranljivo družbeno skupino, domnevajoč da bodo delo in s tem povezane materialne in druge koristi izgubili prej kot primerljiva skupina domačih delavcev. Vendar se je izkazalo, da so motivi za delo v tujini le izhodiščno ekonomski, motivov pa je precej več.

Splošen vtis je, da so se delovni migranti izkazali kot fleksibilna skupina in so večinoma zadržali delo in s tem povezane ekonomske koristi. Splošen vtis je, da zaradi pandemije njihova delovna mesta niso bila bolj ogrožena kot pri zaposlenih domačinih v istih okoljih. Tudi težave zaradi ukrepov družbenega distanciranja ter zapiranja meja ter v nekaterih primerih vračanja v domovino so večinoma potekala brez večjih zapletov. Izkazalo se je tudi, da so migranti z višjo izobrazbo in/ali kvalifikacijami socialno bolj varni kot oni z nižjo izobrazbo, kar gre tudi na račun večje prilagodljivosti migrantov na eni ter zavedanja delodajalcev o pomenu zaposlenih tujih delavcev. Slednje gre verjetno pripisati sorazmerno visokemu zaupanju v delavce iz BiH. COVID-19 je torej s svojimi posledicami sicer vplival na način in lokacijo dela, vendar pa kratkoročno ni bistveno ogrozil delovnih mest niti ni vplival močnejše na domnevno šibkejšo skupino tujih delavcev v EU.

Anatoly Stepanov*, Alexander Burnasov*,
Maria Ilyushkina**, Yury Kovalev*



HIDDEN GEOGRAPHICAL OPPORTUNITIES FOR CONVERGENCE OF RUSSIAN-KAZAKH BORDER AREA

Izvirni znanstveni članek
COBISS 1.01
DOI: 10.4321/dela.53.97-110

Abstract

The study of cross-border interactions of the former Soviet republics is in the centre of research of many experts in border studies. Dynamics and positive effects of convergence processes are observed in the border regions of the Russian Federation and the Republic of Kazakhstan. The past five years have clearly demonstrated the hidden geographical potential of cross-border cooperation between these states, which is explained by a qualitatively new phenomenon in the post-Soviet space – the formation of the Eurasian Economic Union (EAEU). Therefore, the top-down initiatives have strengthened the processes of economic, social, cultural and political convergence of the regions of Russia and Kazakhstan. The purpose of this study is to consider the overlap and the double effect of “hidden” and “formal” integration of border regions of Russia and Kazakhstan and to assess their impact on the social and economic development of border territories.

Keywords: Russian Federation, Republic of Kazakhstan, cross-border cooperation, convergence, integration.

... *Department of International Relations, Ural Federal University, Lenin Street, 51,
... Yekaterinburg,
... **Department of Linguistics, Ural Federal University, Lenin Street, 51, Yekaterin-
... burg,
... e-mail: anatoly_stepanow@mail.ru, burnasov@mail.ru, ilyushkina_maria@mail.ru,
... yykowaljaw@gmail.com

SKRITE GEOGRAFSKE PRILOŽNOSTI ZA KONVERGENCO RUSKO-KAZAHSTANSKEGA MEJNEGA OBMOČJA

Izvleček

Proučevanje čezmejnih interakcij nekdanjih sovjetskih republik je v središču raziskovanja številnih strokovnjakov s področja mejnih študij. Dinamika in pozitivni učinki konvergenčnih procesov so bili obravnavani na mejnih območjih Ruske federacije in Kazahstana. Minulih pet let je jasno demonstriralo skriti geografski potencial čezmejnega sodelovanja med temi državami, kar je mogoče pojasniti s kvalitativno novim fenomenom v postsovjetskem prostoru – oblikovanjem Evroazijske gospodarske unije (EAEU). Potemtakem so pobude od zgoraj navzdol okrepile procese gospodarske, družbene in politične konvergence regij Rusije in Kazahstana. Namen te raziskave je torej proučiti prekrivanje dvojnega učinka skrite in formalne integracije mejnih regij Rusije in Kazahstana in oceniti njihov učinek na družbeni in gospodarski razvoj mejnih območij.

Ključne besede: Ruska federacija, Republika Kazahstan, čezmejno sodelovanje, konvergenca, integracija

1 INTRODUCTION

The historical background of the convergence of the Russian and Kazakhstan border should be sought in the 18th–19th centuries when the expansion of the Russian Empire reached the lands of the nomadic people of Central Asia.

The fundamental principle of the future frontier was Cossack defensive line that arose on the southern and eastern borders of the Russian Empire. In the 18th and 19th centuries the fortified line along the Irtysh River marked the beginning of Omsk, Semipalatinsk, Koryakovsk (modern Pavlodar) and Ust-Kamenogorsk; the fortified line along the river Ishim modern Kurgan and Petropavlovsk; and Orenburg line of fortresses Orenburg, Uralsk, Chelyabinsk, Troitsk, Sol-Ilets and Atyrau. Each of these lines reflects the historical position of the frontier between the settled and nomadic population, continuous and focal development.

In 1922, the USSR was proclaimed, and the Kazakh Autonomous Soviet Socialist Republic (KazASSR) was formed as part of the Russian Federation, which led to the demarcation of the Russian and Kazakh territories around 1925. The increase in the status of Kazakh autonomy as part of the RSFSR to the Kazakh Soviet Socialist Republic (KAZSSR) in 1936 actually formed the borders of the future independent Kazakhstan.

The economic and geographical discourse of border regions convergence can be studied from several perspectives. Firstly, we should note the geopolitical studies, which reflect the problems of correctness of drawing state borders in the post-Soviet space after

1990s. Secondly, we can clearly observe the population paradigm in border relations, where a person is embedded in the system of interdisciplinary analysis of demographic, ethnic and urban processes. The third aspect of cross-border research in the post-Soviet space is focused on the economic processes within the emerging Eurasian Economic Union with the developing free market for goods, capital, services and labour. And, finally, the fourth direction is the formation of border regions (analogous to Euroregions) which solves common social and economic problems in the border territories. From this perspective, the studies of political and economic geography of border territories are very interesting, considering “innovative regions” (Burnasov et al., 2017), “border infrastructure” (Golunov, 2009), “territories of advanced development”, the influence of transnational companies on border regions with high competitive advantages (Bashmakov, 2013), “agglomeration effect” of border cooperation (Dodonov, 2017).

The problematic field of the present study lies within the hidden geographical possibilities of convergence process in border regions. It is based on the proposition of rapid pace of socio-economic development in converging border regions due to the synergistic effects of cross-border cooperation, higher cooperation of national actors, and the elimination of barriers to interstate interaction. Analysing the convergence of border regions, the authors proceed from the fact that these processes contribute to a more sustainable development of border administrative units and to the convergence of their levels of social and economic development. They also increase the living standards of the population and reduce the degree of polarization of the regions. Summarizing the current theoretical achievements in the field of convergence of regional development, we should note that a so-called neoclassical approach is the most popular view in the scientific literature in its application to regional territories.

2 METHODS

The theoretical basis of the current research is formed by the works by Stüben (2005), Eltges (2013), Scholz, Dörrenbacher and Renning (2019), and Vardomsky (2009). The empirical basis of the research includes the use of the materials of the national statistical services of the Russian Federation and the Republic of Kazakhstan, statistics of different departments, reports on financial and economic activities of the companies and corporations, and regional and national regulations that characterize the cross-border cooperation. Convergence processes in the cross-border development of the regions of Russia and Kazakhstan are partly due to a complex of interrelated factors, such as:

1. historical factors, which may concern the history of the state border formation and the stages of border development and its potential over a long period of time;
2. economic factors, aimed at assessing various components of the economic potential, including the natural and human capital of border territories and their foreign economic relations, the prerequisites and problems of creating special

economic zones in the border area, other institutional instruments of economic development, its problems and prospects;

3. spatial factor, aimed at identifying border and cross-border territories, their structure, assessment of natural resources, environmental, economic and geographical factors of their long-term sustainable development;
4. geopolitical factor, aimed at studying the role of geopolitical position of cross-border territories in regional development, the formation and interaction of geopolitical interests and geopolitical potential of neighbouring countries in their border zones. Existing and potentially possible conflict situations in the border area may be a specific subject of the research.

3 RESULTS AND DISCUSSION

In general, the research hypothesis suggests that the convergence of “hidden geographical” opportunities for the development of border territories of Russia and Kazakhstan is possible as a result of the following factors:

1. Social factors of convergence of the borders between Russia and Kazakhstan. The fact that in the 20th century the borders of the Soviet Union republics were quite nominal created prerequisites for a common linguistic and educational space. During the transition from a planned administrative model to a market economy, there were no problems of social tension in the borders of Russia and Kazakhstan. Crossing the border possessed no difficulties due to the political agreements between two countries. In particular, citizens of Russia and Kazakhstan could cross the state border using their ID.
2. Geographical location as a “hidden” possibility of convergence of border regions, one-and-a-half-hour accessibility to the nearest regional centre, both in the Russian Federation and in Kazakhstan (approximately 150 km). However, this is not as important as the proximity of a transport crossing. Taking this factor into account, we can consider the border area as a border zone with expanding sections stretched along transport approaches to the border.
3. Economic factors through interconnection of transport networks and socio-economic systems of neighbouring countries. A specific infrastructure of the border area of Russia and Kazakhstan was formed in the Soviet times, which we consider to be a “hidden possibility” of convergence: checkpoints, often accessible for different types of transport, energy facilities built in the Soviet era for the needs of a single national economic complex and the objects of border, customs and other control services, communication, banking, currency, information, tourism, trade and other services that have been developing since the beginning of the 1990s. Thus, the border territory of Russia and Kazakhstan has gained a significant transit potential (a hidden geographical opportunity for logistics

development), since the export and import of the cargo from other territories and regions is carried out through its transport communications. As a result, multifunctional bilateral cross-border complexes were formed in the Russian-Kazakh border area. Each of them consists of a pair of settlements that are steadily connected by transport links and perform various foreign economic functions. In the future, they can become multi-sectoral cross-border socio-economic systems with a special regime of functioning and regulation. Special intergovernmental long-term agreements within the framework of the EURASEC integration should play an important role in the management of such systems. International coordinating commissions consisting of business representatives and regional authorities can act on the basis of these agreements. (12 Russian regions (the Republic of Altai, the Altai territory, Novosibirsk, Omsk, Tyumen, Kurgan, Chelyabinsk, Orenburg, Samara, Saratov, Volgograd, Astrakhan regions) and 7 Kazakhstan regions (Aktobe, Atyrau, West Kazakhstan, Kostanay, Pavlodar, North Kazakhstan, East Kazakhstan regions) are involved in cross-border economic cooperation.)

4. The “hidden” opportunity of extensive use of the resources and potential of the neighbouring country’s border (Russia has the longest border with Kazakhstan – 7512 km, which makes it particularly important for cross-border cooperation between these countries), including its land, forest, water, mineral, recreational and other natural resources.
5. The probability of involving a significant part of the border area population in various forms of interaction (up to 50% of the employed population) and the use of labour resources of the neighbouring region. Moreover, the potential for developing markets in the territories adjacent to the border on the other side is quite huge. In some cases, these markets may be formed as cross-border ones. At the same time, the market space is significantly expanding (the total gross product of the Russian-Kazakh border area exceeds \$350 billion).
6. The “hidden” possibility of developing interconnected combinations of various types of activities in the border area on the basis of mutually beneficial international cooperation in the field of trade, export-oriented industries, including small and medium-sized enterprises, industries for processing imported raw materials and semi-finished products, tourist companies and international tourism facilities, cultural and educational services, etc. At the same time, both traditional and new technologies available in neighbouring countries can be used effectively.
7. Creating specific institutions, norms and restrictions for individual border areas, such as duty-free trade zones, visa-free exchange zones, simplified control zones, etc.

3.1 Convergence of hidden economic and geographical opportunities of the Russian-Kazakh border area

In the era of planned administrative economy and the existence of a single state (USSR), the Russian-Kazakh border area was developing within a single national economic complex. Extensive development of industrial production within the so-called “territorial production complexes” contributed to the industrialization of the Russian-Kazakh border area. The most important industrial facilities were built here at the turn of the 1950s and 1960s. They still retain their industrial potential for the border regions of Russia and Kazakhstan. In the Soviet period, the Kazakh border was considered to be a source of raw materials for manufacturing enterprises of the Russian Federation. As a result, even today there are value chains in the fuel and energy complex (oil and gas fields of Western Kazakhstan), oil and gas processing plants in Russia (Orenburg and Samara regions), coal mining in Ekibastuz (Pavlodar region, Kazakhstan) and electricity generation at thermal power plants of the Russian border (Omsk and Chelyabinsk regions). The metallurgical complex of the Russian-Kazakh border region has maintained stable connections in the production of ferrous metals: Sokolovsko-Sarbaykskoye deposit of high-quality iron ores (Kazakhstan) with the production of cast iron, steel and rolled products at the Chelyabinsk and Magnitogorsk metallurgical works (Russia). A clear example of interconnection and interdependence in non-ferrous metallurgy can be the production of chromium by Novotroitsk chrome products plant, which has increased production of goods with high added value (metal and electrolytic chromium) by increasing imports of chrome ore from the Aktobe region of Kazakhstan in recent years.

“Production for production’s sake” was considered the main indicator of territorial development during the period of planned economy. It led to the closure of a significant number of “city-forming” enterprises of the Soviet era (Pavlodar tractor plant) or to the transformation of enterprises of the military-industrial complex (Petrovsk heavy engineering plant in Kazakhstan). Since the early 1990s, gaining profit has become the main indicator of doing business in both countries. This explains the modern interaction of multinational companies in the Russian-Kazakh border area in the system of continuous cycles of added value creation. For example, on the industrial site of the former Pavlodar tractor plant, Kazakhstan Corporation KSP Steel launched the production of large diameter seamless pipes for gas and oil pipelines, including the ones for enterprises of the Russian fuel and energy complex, while Petropavlovsk heavy engineering plant, which specialized in defence products in the Soviet years, passed the conversion stage and moved into the market era, producing oil drilling equipment and machinery as well as the equipment for the construction and maintenance of railway tracks, including the ones for Russian consumers.

The entrepreneurship of corporations in the field of mechanical engineering should be mentioned among the most striking examples of hidden economic and geographical opportunities of the Russian-Kazakh border area at the beginning of the

21st century. The most successful of more than a hundred joint ventures of Russia and Kazakhstan operating in the border area are the following:

A business project of the X-ray diagnostic equipment production: led installations, radiation protection equipment, mammography devices, fluorography devices, mobile laboratories of the Aktyubrentgen Plant (Kazakhstan), which carries out scientific cooperation with the Orenburg LLC Uralrentgen (Russian Federation) (Aktyubrentgen, 2019).

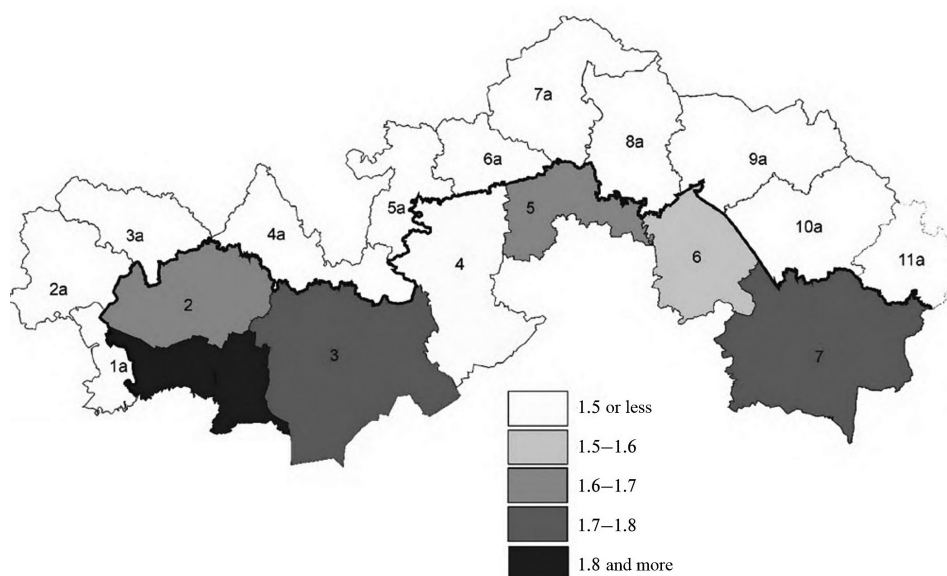
Investment of the Russian capital in transport engineering in Kazakhstan. The creation of KAMAZ trucks production with high localization is also among the successful projects. AO KAMAZ-Engineering is one of the first major and successful Kazakh-Russian joint cross-border projects in the field of automotive equipment production in Kokshetau. The company was established on June 2, 2005, and on August 5 of the same year the first dump truck and bus were assembled, and on August 19, 2005 the first production vehicle rolled off the production line. All manufactured products are sold on the domestic market of the Republic of Kazakhstan. AO KAMAZ-Engineering in Kokshetau is created in accordance with the licensing agreements with OAO KAMAZ and OAO NefAZ, which provide Kazakhstan's partner with the design documentation of Russia's leading car factories. The assembly process is organized in accordance with this documentation. This joint venture has produced more than 13,000 vehicles and special equipment since its creation. The production capacity of the plant is 1500 trucks per year. The range of products of the Kazakh enterprise includes 50 types of KAMAZ vehicles, including dump trucks, tractor units, dropside trucks and all-wheel drive vehicles, as well as 35 types of special vehicles (Autostat, 2019).

Formation of a regional automobile cluster in East Kazakhstan on the basis of AO Asia Auto Kazakhstan in Ust-Kamenogorsk. In 2000, the government of Kazakhstan decided to create a car factory for the production of passenger cars. The Russian company AVTOVAZ was considered a possible investor. As a result, 20 years later, not only AVTOVAZ models (Vesta, XRAY, Granta), but also Škoda (Octavia) and KIA (Sportage, Serato, Sorento) models are produced in Ust-Kamenogorsk (Aziaavto, 2019). The governments of both countries often consider these joint ventures as successful projects of the EURASEC integration. It is a well-known fact that one job created in the automotive industry automatically creates four jobs in related industries. This car factory will give an additional economic impulse of industrial convergence to the enterprises of metallurgical and chemical complexes of the border regions: the Altai territory and East Kazakhstan region.

One of the factors that could negatively affect the regional convergence of the Russian-Kazakh border area is the outflow of Russian-speaking residents of Northern Kazakhstan to the territory of the Russian Federation. A number of researchers (Burnasov et al., 2019; Karpenko, 2019; Vardomsky, 2019) objectively noted the current trend of the last thirty years such as the Russian-speaking population (Russians, Ukrainians, Belarusians) leaving Kazakhstan in search of permanent residence in Russia.

In particular, M. Karpenko's work shows a negative picture of the migration balance at the entire Russian-Kazakh border area. The researcher explains this situation mainly by "kazakhization" of the Northern regions of Kazakhstan, which has been traditionally characterized by a high share of the Russian-speaking population. However, the state program of the Republic of Kazakhstan for the resettlement of oralmans (ethnic Kazakhs who lived outside the Republic of Kazakhstan in recent years (2016–2019)) has not been successful enough, which gives a chance to maintain a balance between the Russian-speaking and Kazakh population in the border area.

Figure 1: Decrease in the share of the Russian population in the border regions of the Republic of Kazakhstan in the period from 1989 to 2016.



Russian Federation: 1a – Astrakhan region, 2a – Volgograd region, 3a – Saratov region, 4a – Orenburg region, 5a – Chelyabinsk region, 6a – Kurgan region, 7a – Tyumen region, 8a – Omsk region, 9a – Novosibirsk region, 10a – Altai Territory, 11a – Altai Republic.

The Republic of Kazakhstan: 1 – Atyrau region, 2 – West Kazakhstan region, 3 – Aktobe region, 4 – Kostanay region, 5 – North-Kazakhstan region, 6 – Pavlodar region, 7 – East Kazakhstan region.

Compiled according to Karpenko, 2019, p. 27.

As we can see, Figure 1 represents the outflow of the Russian speaking population (including people from the Ukraine, Belarus, etc.) from the border regions of Kazakhstan to the territory of the Russian Federation. On the basis of the cartogram method (the higher index is in the darker tones) the regions with the maximal outflow are

shown. It is obvious that the outflow from the Western and the Eastern Kazakhstan was more intense than in the Northern Kazakhstan. It is due to the employment problems as more qualified specialists with particular skills moved to the border areas in search of well-paid positions.

Moreover, the economic development rates of Kazakhstan and Russia in the era of integration development (2013–2019) showed the reverse side of hidden economic and geographical opportunities. In the border regions of Kazakhstan, unemployment rates were lower than in the border regions of the Russian Federation (except for Tyumen and Orenburg regions), which in turn, when creating a common market for goods, capital, services and labour, helped to attract labour from the border regions of Russia to the regions of Northern Kazakhstan (Table 1).

Table 1: Population and unemployment in the border regions of Russia and Kazakhstan (2019).

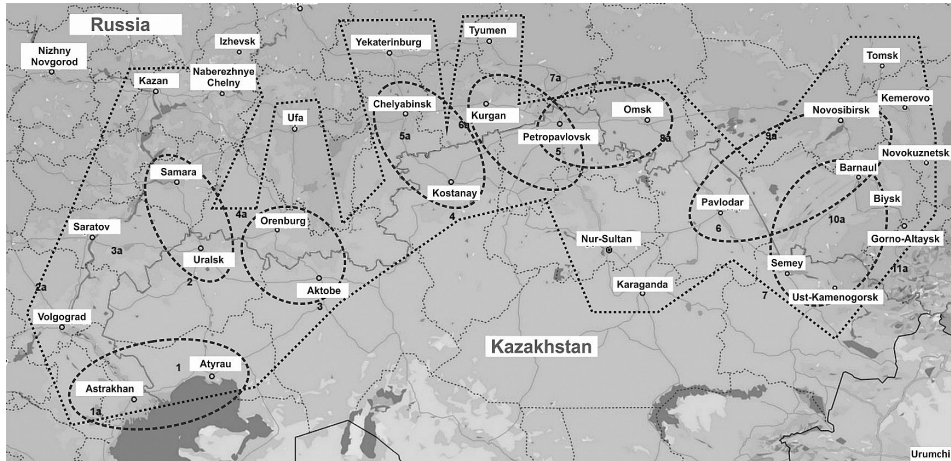
Russian Federation	Population (thousands of people)	Unemployment rate (%)	The Republic of Kazakhstan	Population (thousands of people)	Unemployment rate (%)
Astrakhan region	1000.1	7.5	Atyrau region	646.4	4.5
Volgograd region	2500.5	5.6	West Kazakhstan region	657.0	4.8
Saratov region	2440	5.0	Aktobe region	881.7	4.8
Orenburg region	1963.0	4.4	Kostanay region	868.1	4.6
Chelyabinsk region	3476.0	5.6	North-Kazakhstan region	548.1	5.0
Kurgan region	835.0	8.0	Pavlodar region	752.3	4.7
Tyumen region	3723.0	3.1	East Kazakhstan region	1.369	4.3
Omsk region	1944.0	6.7			
Novosibirsk region	2793.0	6.7			
Altai Territory	2333.0	6.1			
Altai Republic	219.0	11.2			

Calculated by the authors according to: Regiony Rossii, 2019; Regiony Kazakhstana..., 2019.

Eurasian integration contributed to the revival of socio-economic processes in the border regions of Russia and Kazakhstan. Among the hidden geographical opportunities, we can consider the potential for the agglomeration effect; in the era of planned economy, border agglomerations were successfully integrated into the structure of emerging territorial and industrial complexes, creating an “agglomeration industrial base” (Atyrau-Astrakhan, Samara-Uralsk, Chelyabinsk-Kurgan-Petropavlovsk, Omsk-Pavlodar, Barnaul-Ust-Kamenogorsk). Now, in the era of market transformations, we can talk not only about growth poles or territories of advanced development, but also about emerging cross-border regions that are of great importance for the economies of both countries (more than \$500 billion) (Karpenko, 2019); the regions of the Kazakhstan border region contribute 36% of the country's total GDP. The share of the Russian part of the border area (without the Autonomous districts of Tyumen region) is 12% (Karpenko, 2019). The existing potential of future cross-border regions can strengthen synergetic effects in the economy, which are expressed in the formation of production and cooperative interregional networks, industrial and regional clusters, unified educational spaces, etc. (Figure 2).

Regional differences in the economic development, specialization, the level and ratio of domestic prices, tax and investment legislation, the income of the population, etc. become an important hidden resource of cross-border cooperation, which allows for an active exchange of relevant goods and factors of production. In short, cross-border cooperation based on the proximity of differences and common resource and geo-economic situation plays an important role in the development of the economy of border territories.

Figure 2: Borders of the emerging border agglomerations and outlines of cross-border regions of the Russian Federation and the Republic of Kazakhstan.



Russian Federation: 1a – Astrakhan region, 2a – Volgograd region, 3a – Saratov region, 4a – Orenburg region, 5a – Chelyabinsk region, 6a – Kurgan region, 7a – Tyumen region, 8a – Omsk region, 9a – Novosibirsk region, 10a – Altai Territory, 11a – Altai Republic.

The Republic of Kazakhstan: 1 – Atyrau region, 2 – West Kazakhstan region, 3 – Aktope region, 4 – Kostanay region, 5 – North-Kazakhstan region, 6 – Pavlodar region, 7 – East Kazakhstan region.

Created by the authors based on *Regiony Rossii*, 2019.

4 CONCLUSION

In conclusion, it is worth noting that Russian-Kazakh cross-border cooperation has common historical, socio-economic and cultural basis, due to the existence of common federal states on this territory for many centuries. During the Soviet era, the inter-republic space was linked through the creation of a unified transport, production and service infrastructure, and the formation of common goals and development strategies. After dissolution of the Soviet Union and creation of new independent states, Russia continues its rich political heritage and the long national tradition, but in new border situations. However, the influence of the border on the inter-regional interaction here was not as separating as in the other regions of the former USSR (Georgia and Russia, Russia and Estonia). Inter-regional ties, although being weakened, continued to function even during the difficult transition period. Moreover, integration processes in the Eurasian space have strengthened Russian-Kazakh interregional interaction. Economic cooperation between the regions is actively developing within the framework of production networks, inter-regional goods and services exchange.

What is more, processes of pendulum migrations are observed. The formed common transport corridors play a special role in this sphere and their development in the future has a huge “hidden” geographical potential. The existing settlement system in the border regions is capable of generating high agglomeration effects here. Large cities are the centres of attraction for both human resources and large capital. The border territories have become objects of investment by transnational corporations in the field of automotive, instrumentation and general engineering. The existing educational and innovative potential in the border cities represents a hidden geographical opportunity for the future development of these territories.

The polarized border area is also one of the hidden factors in the development of these territories. The differences in the standards of living, prices, goods and services created, and regional culture can contribute not only to the strengthening of economic and social dynamics in the region, but also to the formation of a wide range of new ideas and prospects for further territorial development. Especially in the periods of crisis (as we can observe now in relation to COVID-19 pandemic), the diversity of border regions becomes the main factor of the regional resistance.

The formation of a common market (as in the EU) becomes an important hidden geographical factor as well. It will lead to the deepening of inter-regional cooperation. Freedom of movement of the capital, goods, services, people and ideas will have a positive impact on the economic growth in the region, social climate and quality of life of the population.

References

- Aktjubrentgen, 2019. Spezialisazija predpriyatija AO “Aktubrentgen”. URL: http://www.aktubroentgen.kz/php/index.php?option=com_content&view=article&id=39&Itemid=88 (accessed 20.11.2019).
- Autostat, 2019. “Kamaz-Inzhiniring” s momenta otkrytija vypustil bolee 12.5 tys. grusovikov. URL: <https://www.autostat.ru/news/38478/> (accessed 20.11.2019).
- Aziaavto, 2019. Istoriya zavoda AZIAAVTO. URL: <http://aziaavto.kz/ru/istoriya-zavoda> (accessed 20.11.2019).
- Bashmakov, A.A., 2013. From border cooperation to Eurasian economic integration. Alma-Aty: Kazakh Institute of strategic research.
- Burnasov, A., Ilyushkina, M., Kovalev, Y., Stepanov, A., 2017. Research and development of innovative systems in BRICS countries. *Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach*, 323, pp. 5–23.
- Burnasov, A., Ilyushkina, M., Kovalev, Y., Stepanov, A., Nyussupova, G., 2019. The transformation of economic development in the border regions of Russia and Kazakhstan in the post-Soviet period. *Studies of the Industrial Geography Commission of the Polish Geographical Society. Conditions for Regional and local Development*, 33, 2, pp. 132–141.

- Dodonov, V., 2017. Economic collaboration between Kazakhstan and EU and social and economic effects. Almaty: Fr, Ebert's Fund.
- Eltges, M., 2013. Regionale Konvergenz und Divergenz – die Frage der Fragen. Informationen zur Raumentwicklung, 1, pp. 51–66.
- Golunov, S.V., 2009. Cross-Border cooperation of Russia and Kazakhstan: problems and ways of development. Mirovaja ekonomika i mezhdunarodnye otnosheniya, 6, pp. 84–91.
- Karpenko, M.S., 2019. Cross-Border dimension of Eurasian integration of Russia and Kazakhstan: Challenges for cooperation. Izvestia RAN. Seria geographicheskaja, 1, pp. 24–36. DOI: 10.31857/S2587-55662019124-36.
- Regiony Kazakhstana v 2019 godu. 2019. Statisticheskii ezhegodnik [Regions of Kazakhstan in 2019: Statistical yearbook]. Astana: Ministerstvo Natsionalnoi Ekonomiki Respubliki Kazakhstan.
- Regiony Rossii. 2019. Sozialno-ekonomicheskie pokazateli. [Regions of Russia: Socio-economic indicators]. Moscow: Rosstat.
- Scholz, C., Dörrenbacher, P., Renning, A., 2019. Europa Jenseits des Konvergenzparadigma. Divergenz-Dynamik-Diskurs. Baden-Baden: Nomos.
- Stüben, T., 2005. Regionale Konvergenz und Divergenz. Aachen.
- Vardomsky, L.B., 2009. Rossiiskoe porubezhje v usloviyakh globalizatsii [Russian borderlands in the context of globalization]. Moscow: LIBROKOM Publ.
- Vardomsky, L.B., 2019. Instituty ili proekty: Evraziiskaja integracija nuzhdaetsja v peremenach [Institutes or projects: Eurasian integration needs change]. Problemy sovremennoj ekonomiki, 3, 71, pp. 20–22.

SKRITE GEOGRAFSKE PRILOŽNOSTI ZA KONVERGENCO RUSKO-KAZAHSTANSKEGA MEJNEGA OBMOČJA

Povzetek

Proučevanje čezmejnih interakcij na območju bivših sovjetskih republik je v središču zanimanja številnih strokovnjakov, ki se ukvarjajo z mejami. Prispevek obravnava dinamiko in pozitivne učinke konvergenčnih procesov v mejnih regijah Rusije in Kazahstana.

Rusko-kazahstansko čezmejno sodelovanje ima – zaradi obstoja skupnih federalnih držav na tem ozemlju v preteklosti – skupne zgodovinske, socio-ekonomske in kulturne temelje. V času Sovjetske zveze je bil medrepubliški prostor povezan s skupno prometno, proizvodno in storitveno infrastrukturo ter skupnimi razvojnimi strategijami.

Po razpadu Sovjetske zveze in ustanovitvi novih neodvisnih držav Rusija nadaljuje svojo bogato politično dediščino in dolgotrajno nacionalno tradicijo, vendar v novi

mejni situaciji. V obravnavanem primeru nova meja na medregionalno interakcijo ni vplivala tako negativno kot v drugih obmejnih regijah bivše ZSSR (Gruzija in Rusija, Rusija in Estonija). Medregionalne vezi, čeprav oslabiljene, so se še naprej ohranjale celo v času težavnega tranzicijskega obdobja. Povrh tega so integracijski procesi v evrazijskem prostoru okrepili rusko-kazahstansko medregionalno interakcijo. Gospodarsko sodelovanje med regijami se razvija znotraj okvira proizvodnih omrežij ter medregionalne izmenjave dobrin in storitev.

Še več, opaziti je mogoče procese dnevnih migracij. Skupni transportni koridorji igrajo na tem področju posebno vlogo in njihov razvoj v prihodnosti ima velik skrit geografski potencial. Obstoječ naselbinski sistem v mejnih regijah je zmožen generirati intenzivne aglomeracijske učinke. Velika mesta so središča privlačnosti tako za človeške vire kot kapital. Mejna območja so pritegnila investicije s strani transnacionalnih korporacij. Obstoječ izobraževalni in inovacijski potencial v mejnih regijah predstavlja skrito geografsko priložnost za prihodnji razvoj teh ozemelj. Polarizirano mejno območje je tudi eden izmed skritih dejavnikov razvoja teh ozemelj. Razlike v življenjskem standardu, cenah ter ustvarjenih dobrinah in storitvah ter regionalni kulturi lahko prispevajo ne samo h krepitvi gospodarske in družbene dinamike v regiji, ampak tudi k oblikovanju širokega spektra novih idej za nadaljnji razvoj. Še zlasti v obdobjih kriz lahko raznolikost mejnih območij postane glavni dejavnik regionalne odpornosti.

Oblikovanje skupnega trga (kot v primeru EU) postaja pomemben skrit geografski dejavnik in bo prispevalo k poglobljanju medregionalnega sodelovanja. Svoboda gibanja kapitala, dobrin, storitev, ljudi in idej bo imela pozitiven učinek na gospodarsko rast v regiji, družbeno ozračje ter kakovost življenja prebivalstva.

(Prevedel Dejan Cigale)



FORUM THEATRE – ASSESSING OPENNESS TO TEMPORARY PARTICIPATORY USE PRACTICES OF THE SOMEȘUL MIC RIVER AREA IN CLUJ- NAPOCA, ROMANIA

Izvirni znanstveni članek
COBISS 1.01
DOI: 10.4321/dela.53.111-129

Abstract

We present the research results after administering a questionnaire survey about perceptions of the forum theatre as a participatory temporary use practice of the Someșul Mic River area in Cluj-Napoca, Romania. The study aim was assessing inhabitants' willingness to get involved into the forum theatre activity, putting it into practice and proposing solutions for riverside development. We concluded that the forum theatre could be used to promote ideas and community-based solutions for urban renewal.

Keywords: forum theatre, Cluj-Napoca, Romania, voluntary activities, urban regeneration, territorial planning

*Babeș-Bolyai University, Faculty of Geography, 3-5 Clinicilor St., Cluj-Napoca, 400006, Romania

**Babeș-Bolyai University, Faculty of Geography, Department of Regional Geography and Territorial Planning, and Territorial Identities and Development Research Centre, 3-5 Clinicilor St., Cluj-Napoca, 400006, Romania
e-mail: kobulniczky.bela11i@yahoo.com, ilovanoana@yahoo.com, oana.ilovan@ubbcluj.ro

FORUMSKO GLEDALIŠČE – PRESOJANJE ODPRTOSTI ZA PRAKSE ZAČASNE PARTICIPATIVNE RABE OB REKI SOMEȘUL MIC V MESTU CLUJ-NAPOCA, ROMUNIJA

Izvleček

V članku predstavljamo rezultate raziskave o percepcijah forumskega gledališča kot prakse participativne začasne rabe ob reki Someșul Mic v mestu Cluj-Napoca, Romunija. Namen raziskave je bil presoditi pripravljenost prebivalcev za vključitev v dejavnosti forumskega gledališča, njegovo uresničitev v praksi in predlaganje rešitev za razvoj obrečnega prostora. Zaključujemo, da lahko forumsko gledališče uporabimo za spodbujanje idej in na skupnosti temelječih rešitev za urbano prenovo.

Ključne besede: forumsko gledališče, Cluj-Napoca, Romunija, prostovoljne dejavnosti, urbana regeneracija, teritorialno načrtovanje

1 INTRODUCTION

In this exploratory study on inhabitants' willingness to use forum theatre in urban renewal activities we considered that it might be a possible temporary use and planning practice and an occasion for identifying other possible ones for the Someșul Mic area, in Cluj-Napoca city, Romania. The reason for approaching this subject is that of underlining the necessity of urban regeneration practices, considering social inclusion (i.e. irrespective of age, race, ethnicity, and sexual orientation), discussing sensitive topics and community building. We analyse the opportunity of implementing a temporary use of the territory in a non-formal framework (i.e. the forum theatre), focusing on improving relations among those using the riverbanks of the Someșul Mic and on territorial planning ideas for the respective area.

Why would it be useful to organise a forum theatre activity nearby the Someșul Mic? This would enable gathering in one place the voices of many people and the opportunity to listen to them, where communication limits among categories of people could be effaced. Forum theatre could be a temporary or long-term leisure and creative space for non-formal activities benefiting the local community. This will be further discussed below.

The problem we identified was the limited knowledge about inhabitants' willingness to get involved into voluntary cooperation activities based on arts (i.e. the forum theatre) in urban open public space, such as the riverbanks of the Someșul Mic, in a context in which non-governmental organisations (NGOs) are becoming increasingly active aiming at environmental-friendly practices and at social revitalization and cohesion. The

study aim was assessing inhabitants' willingness to participate in the forum theatre activity and to propose solutions for riverside development. The research questions were the following: What are the population's opinions about their possible involvement into a forum theatre activity? What are their proposals for riverbank activities?

Until now, there has not been implemented any large size top-down project by the local public administration. However, the urban space along the river has already been hosting a series of bottom-up initiatives (mostly introduced by NGOs), involving inhabitants in transforming and experiencing the river.

Thus, the public space along the river is re-appropriated, while socio-spatial and cultural practices, including building temporary architecture and creating community events (Samson, 2010; Someș Delivery, 2020; Veer, Moga, Mateiu, 2015) enable the construction of belonging (Bell, 1999). Our proposal of implementing the forum theatre could be one of these activities, in the framework of happenings and temporary interventions having the function of urban catalysts (Oswalt, Overmeyer, Misselwitz, 2013), targeting the riverside community and lifestyle through everyday urban rituals (Tiwari, 2010).

2 THEORETICAL BACKGROUND

2.1 Urban regeneration

Experiencing the place of daily living can be realised through various means. H. Lefebvre (1991) defines this lived space as the space of everyday life, where social relations take place, a space of representation, while E. Soja (1991) calls it third space and defines it as experienced space (the mixture between H. Lefebvre's perceived and conceived space). Studying how people experience space is done by geography among other sciences (architecture, urbanism, psychology, etc.) and this can be realised by exploring inhabitants' practices in relation to places. Such practices include activities of functional reconversion or of urban regeneration. In such a context, the co-production of an architectural culture and of community values is crucial.

Urban regeneration is defined as the large-scale process of adapting the built environment according to various degrees of direction from the state (Jones, Evans, 2008, p. 2, quoted by Ilovan et al., 2019, p. 330). Nevertheless, a series of factors other than the state have been considered so far for the redevelopment of urban Romania, with scientific debates on the topics of territorial identity (Ilovan et al., 2016; Ilovan, Voicu, Colcer, 2019), of resilience (Bănică, Muntele, 2015; Bănică, Istrate, Muntele, 2017), in the context of the social economy and volunteering (Drăgan, Popa, 2017), of spatial restructuring (Jucu, 2016) or of industrial restructuring (Voiculescu, Jucu, 2016).

Although urban regeneration was approached by pointing out the need of qualified professionals (Ilovan, 2018; Ilovan et al., 2019; Veer, Moga, Mateiu, 2015), through

our research, we aim to show that citizens' involvement is equally important for improving the urban area in both a creative and sustainable manner. Therefore, educational experiments for the young to experience urban regeneration through direct involvement into projects (Buzasi, Csete, 2017; Caneparo, Bonavero, 2016; Ilovan, 2018; Ilovan et al., 2019; Sassano et al., 2017) and for the other age groups, focusing on participants' cooperation in finding solutions to local community's needs, are paramount for empowering people to make their urban planning, economic, social and cultural choices, where the civil society has a say (Potluka, Špaček, 2019).

Romanian experience in urban regeneration, however recent, is varied enough to offer the knowledge background and tools for successful outcomes (Asociația Komunitas, 2015; Medeșan, Panait, 2017). Such an educational experiment for the larger public is the forum theatre that could be assimilated as an innovative urban regeneration workshop or activity mobilizing people and ideas.

2.2 Forum theatre as a participatory method for urban regeneration

Forum theatre, besides image theatre, invisible theatre, newspaper theatre, the rainbow of wishes (Boal, 2017) and legislative theatre, is among the main forms of the Theatre of the Oppressed (Borș, 2017). It is known as the Boal method of theatre and therapy, when internalised oppressors live in the head of the oppressed (Boal, 2017, p. 26, note 1). The Theatre of the Oppressed is a concept promoted by *Augusto Boal (1931-2009)*, Brazilian playwright, inspired by *Paulo Freire (1921-1997)*, the founder of the critical pedagogical movement (Boal, 2017). Between 1960 and 1980, many countries in Latin America (Brazil, Argentina, Peru, etc.) coped with poverty, dictatorship, and conflicts. In 1971, Boal, as a cultural activist, was exiled to Argentina by the Brazilian military regime. There, in 1973, he published *Theatre of the Oppressed* and founded the first companies and centres of Theatre of the Oppressed in Peru, Ecuador and Argentina, involving workers, the poor and inmates. After returning to Brazil, in 1986, he set up in Rio de Janeiro the *Theatre Centre of the Oppressed* (Borș, 2017).

Forum theatre may be performed in two ways: (a) a script prepared by actors or non-actors is used and (b) the play is based on improvisation. Any participant may step in a situation presented on stage. The dynamics of the entire activity is obvious when participants get more and more involved in the unfolding of the play. When participants act as stage characters, the idea of forum is amplified: the moment becomes a public debate on societal problems.

Forum theatre type activities were implemented in schools, hospitals and in the street. Organising debates about various topics (human trafficking, domestic violence, substance abuse, corruption, etc.), seen from different perspectives, attracted researchers' attentions (i.e. psychologists, sociologists, geographers), leading to an interdisciplinary approach to forum theatre. It was adopted as an educational component of

managing daily issues about self-esteem (Howard, 2004), refugees and the homeless (Day, 2002), social problems (Sanders, 2004), and the practice and ethics of medical professions (Garett, 2010). We considered some of these topics for our questionnaire.

Organisation stages of the forum theatre activity are script development, unfolding the play without solving the problem, the forum, and interventions (Boal, 2006). Its components are: the dialogue between Joker and participants (Day, 2002; Grădinaru, 2013), preparing the moments based on a script that does not involve solving the problem (Thambu, Balakrishnan, 2014), participants memorise the script for the stage moment considering body language, customs, communication capacity with other participants (Passila et al., 2013), capacity to interpret the moment by activating critical thinking and one's feelings for other participants (Rae, 2013; Reiman, Dotger, 2008), making decisions based on interactions among participants (Jung, 2008), transforming forum theatre into a form of public art on prevailing topics such as vice, social bias and ignorance (Levy, 1997), controlling emotions and capacity to accomplish this intervention (Thambu, Balakrishnan, 2014).

3 STUDY AREA

The study area is represented by the riverbanks of the Someșul Mic, in the city of Cluj-Napoca, Romania, an urban area with more than 300,000 inhabitants and a multicultural heritage (Figures 1 and 2). From west to east, on a length of over 15 km, the Someșul Mic river crosses the city of Cluj, which is situated in the convergence area of two valleys: of the Someșul Mic River and of the Nadăș River, and of other shorter valleys (Pop, 2007, p. 124). The corridor of the Someșul Mic River is outflanked by Feleac Massif and by the Transylvanian Depression on the right, while the Hills of Cluj and Dej outflank this corridor on the left, respectively (Pop, 2007, p. 71). Because of the infrastructure works, this urban part of the river divides the city. Returning the river to the city or turning citizens' face towards the river and to adapting practices in using it has been an endeavour of architects and urban planners recently (Mitrea, 2011), in the public sector (i.e. the public administration of Cluj) and in the private one (NGOs such as miniMASS Association and its initiative *Someș Delivery* and PRACTICA architecture office studio – the latter having won a contest for implementing an urban regeneration project of restoring the river).

Figure 1: Study area: Someșul Mic River in Cluj-Napoca, Romania.

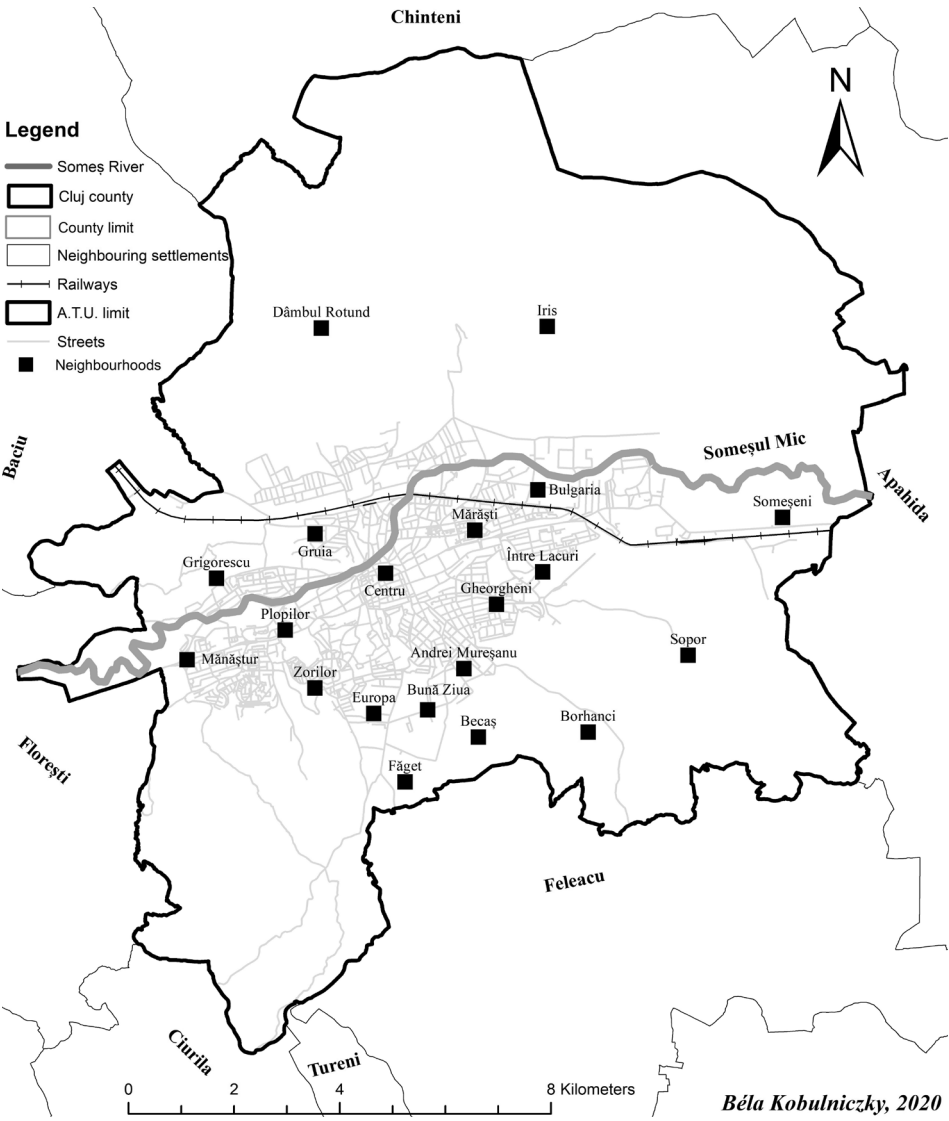
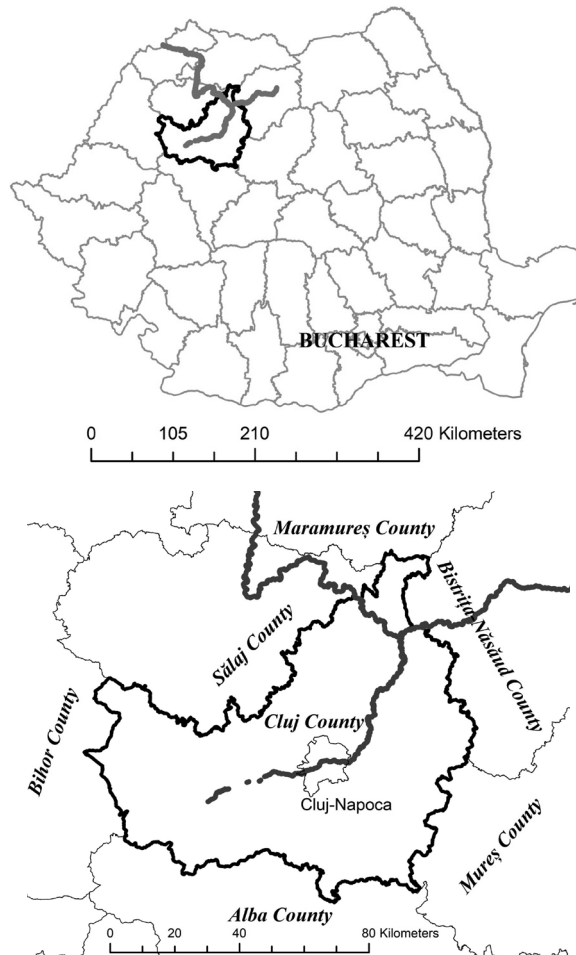


Figure 2: Location of study area within Romania.



The proposal to activate the riverbanks of the Someșul Mic was considered starting with 2015, with the *Someș Delivery* project (Someș Delivery, 2020a). Organisers decided to have many activities attracting people to varied leisure spaces, using their imagination to combine natural and human-made components within creative areas. During the five editions of *Someș Delivery*, the following activities were organised: theatre, film projections, extending the riverbanks through temporary architecture (Figures 3 and 4), exhibitions, interactive games, etc. Most of their activities consist of events and territorial arrangements aiming at: knowing better the area, informing the larger public and the inhabitants nearby, transforming places, organising and taking part at new experiences, improving population's experience of space, reconnecting to the river and improving

connections among citizens in the urban area, entertainment, creating safe, comfortable and permanent access to the river and its banks, providing protected places for small scale events, offering a new perspective upon the river (i.e. a source of inspiration due to its resources), setting up an environment for dialogue about planning, maintaining and improving the biodiversity of the river and riverbanks, creating pedestrian connections, involving the community in all transformations, raising awareness and enabling them to understand the potential of the area (Someș Delivery, 2020b).

Figure 3: Temporary architecture on the Someșul Mic riverbanks in 2018; upper right corner: connection between Armătura Park and the Nadăș River, tributary of the Someșul Mic, confluence (photo: G. Moțco).



Figure 4: Dwellings nearby the Someșul Mic riverbanks and Armătura Park, in 2018 (photo C. Ursu).



4 METHODOLOGY

4.1 Methods and research material

Data collecting and processing was realised through quantitative and qualitative research methods. We administered a questionnaire survey on Facebook, from the 27th of June 2019 to the 7th of March 2020. Respondents live in Cluj-Napoca. The questionnaire was conceived to be addressed to any inhabitant of the city or user of the Someș riverbank. Such a questionnaire could be addressed in the future to those living nearby the riverbanks for narrowing down the group of users, depending on the location of a proposed activity at a certain moment.

The semi-structured questionnaire aimed to enable us to assess whether such an activity – forum theatre – raises the local community's interest. At the beginning of the questionnaire, we presented how the forum theatre activity could be organised. Next, we considered the following aspects that we should assess: population's involvement, topics, relationships among social groups based on age, race, ethnicity, sexual orientation, and the relevance of riverside regeneration events for the respondents. We asked respondents to come with proposals for temporary activities in the river area. Personal data about respondents were collected (age, education, occupation, ethnicity). The research material is represented by the answers (of 118 respondents) to the online questionnaire. We interpreted its results using textual analysis and graphical representations.

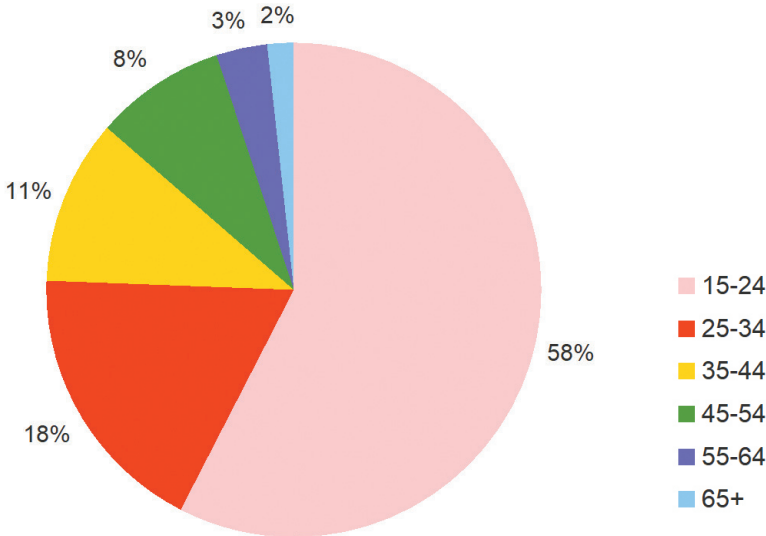
In addition, we searched for information about urban regeneration in general and in Romania, about participative practices in territorial planning and about forum theatre. Field trips in the city enabled us to identify possible locations for the forum theatre activity. Considering the qualitative methods, the discourse analysis was used to analyse the answers to the open question in the questionnaire survey.

4.2 Participants

There are small differences between the demographic structure of the sample and the demographic structure of the city of Cluj-Napoca. Thus, one may consider this a limitation of the study in terms of representativeness of the sample. 6% more women participated than men. The most open to participate at the survey were the young, accounting for 58% of the respondents (Figure 5), while the young population of the city (15–29 years old) is one third of the total population. It may be concluded that they are the most willing for creative activities based on improvisation and spontaneity, as the questionnaire announced in its title and aim description that it focused on a theatre activity. However, this result may be augmented by the fact that the other age groups, and especially the old, have less online access/activity (on Facebook) to get to fill in the questionnaire. Romanians were the majority to answer and 7% were Hungarian ethnics.

Considering respondents' education level, over 50% had a Bachelor's diploma, followed by M.Sc. and Ph.D. graduates (compared with around 40% of the population of the city), then by those with high school education; a small percent graduated secondary school. 46% were employed and 30% were university students having a job. The less represented were pupils, retired persons and the unemployed. G. Raagma (2002, pp. 69–71) showed that those with higher education levels and better paid jobs are more interested in volunteering for their community.

Figure 5: Respondents' age groups.

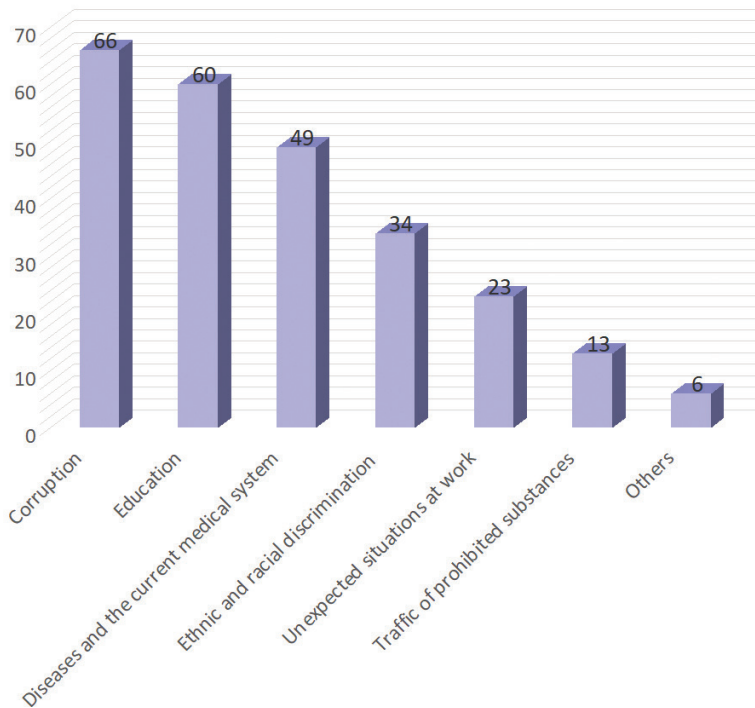


Source: Answers to the questionnaire survey.

5 RESULTS

The analysis refers to populations' availability to get involved into the forum theatre to discuss personal/societal issues and temporary arrangements of the Someşul Mic area. 77% of the respondents agreed to get involved into forum theatre activities. Concerning *the daily issues to be debated in the forum theatre*, respondents chose mainly corruption, thus reflecting a problem of the Romanian society, while substance abuse was not an issue (Figure 6). This item allowed for multiple answers.

Figure 6: Daily issues.



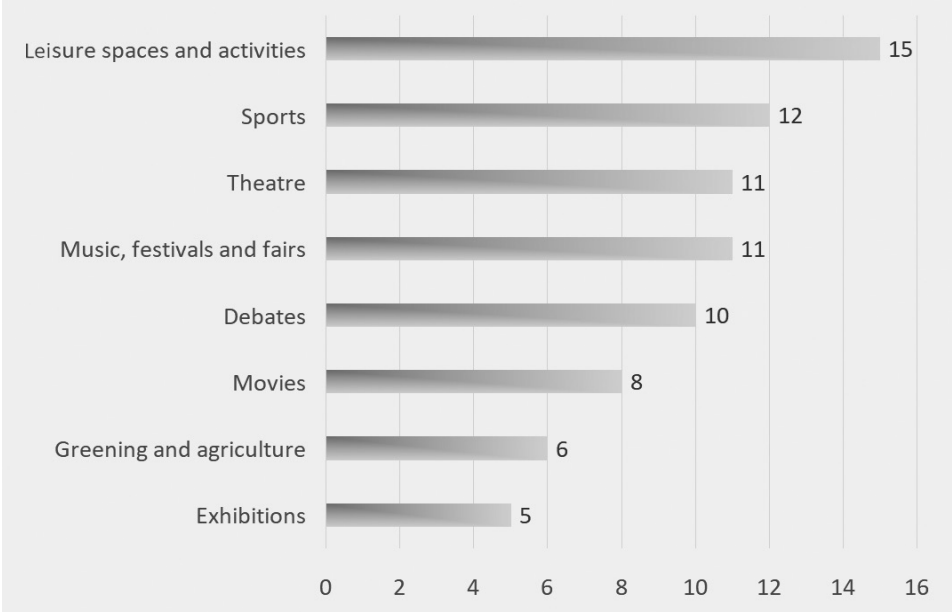
Source: Answers to the questionnaire survey.

Respondents were open to communicating with others irrespective of their age, race and ethnicity (almost 100%). Most of them agreed to interact with persons having a different sexual orientation to theirs (83%).

Regarding the *importance for the respondents of cultural events organised on the riverbanks*, they considered a 5-point Likert scale where 0 (not at all) up to 5 (very important) were the options. 45% considered these events very important, 26% chose 4, 19% chose 3, 6% chose 2, and 2% of them chose each 1 and 0.

Through an open question, the respondents were asked about their ideas for arranging the riverbanks of the Someșul Mic. Their answers were highly varied. 64 respondents came with new and creative ideas. Several of them were proposed by a similar number of respondents: leisure spaces and activities, sports, theatre, music, festivals and fairs, debates (Figure 7). In the category of *leisure spaces and activities*, we grouped those related to relaxing, walking, having picnics, reading, interactive games, quizzes. Proposals for sports activities included marathons and other sports competitions, cycling, fishing, rowing, sailing, horse riding, and dance. Types of festivals mentioned were the music (modern and folkloric) and culinary ones. One may see that the theatre (for adults or children), was in top three in their hierarchy concerning the activities that the river and its banks could foster. Therefore, considering these answers, the forum theatre is as much an option as the other activities situated at short distance (Figure 7).

Figure 7: Respondents’ proposals for arranging the riverbanks of the Someșul Mic.



Source: Answers to the questionnaire survey.

Involving students and the public into educational activities was a recurrent solution: “thematic outings, debates on educational topics”; “activities for children, maybe also in Școala Altfel [School in Another Way] programme”; “lectures in the open space, conferences”; “ecological education involving students, observing the birds, geographical education”; “round-table type events on various topics, with professionals (non-formal education, biodiversity, cultural heritage)”; “theatre for children”.

However, one respondent objected: “I don’t think that cultural events are appropriate. I propose only activities for leisure and sports”. Nevertheless, one may acknowledge that respondents’ proposals were varied and encompassing multiple categories of activities coming in one answer: “debates, activities for children, observing the local fauna, live music shows, thematic evenings, fairs, workshops”; “walking, cycling routes, places for reading and leisure, thematic circuits featuring various river-crossed urban sections”; “activities for informing the public of Romania’s situation, leisure activities and interactive games for groups”; “organising events (cultural, culinary, with flowers, sports, and music)”.

One respondent pointed out that other factors should have been taken into account when proposing activities, besides the presence of the river: “Considering the geographical area, multicultural events could be organised for getting to know and accept other ethnicities’ traditions and customs”. Similarly, another respondent, besides proposing activities, underlined that it would be useful to consider the example of other rivers and cities: “More film projections, theatre plays, cleaning the Someşul Mic, larger spaces for leisure such as the ones of Mureş, crossing Arad city, or of Tejo in Lisbon”.

Respondents were open to sharing ideas and experiences in the framework of the forum theatre, as it enabled the creation of networks among participants with common interests and joint experiences of collaboration for knowledge production on a certain topic or on related topics.

The social, environmental and economic benefits of the forum theatre could be assessed if it becomes a usual activity in the proximity of the river, promoting both the riverside communities and the river, by involving both the locals and the river. Through the forum theatre, current chances and challenges in riverbank regeneration can be explored, setting the scene for future debates and activities. It can ensure the knowledge and skills necessary in fostering grass-root initiatives. Thus, the critical engagement of the people in participatory bottom-up approaches is promoted, starting with practices of urban/community/place regeneration in the proximity of the river and enabling eventually their informed engagement in urban renewal policies.

6 DISCUSSION AND CONCLUSIONS

The performative act (Thrift, 2008) of the forum theatre could be integrated within the bottom-up initiated spatial practices, encouraging inhabitants’ participation and cooperation in discussing community and societal issues, as well as how such issues could be solved or at least alleviated by using the space provided by the river and activities associated with it, developing inhabitants’ taste and skills for common initiatives (Sennet, 2012). Using the forum theatre to develop other experiential learning practices aiming at urban sustainability, ecology and overall regeneration, as well as constructing community belonging and place-attachment is supported so far by the

total or partial success of other grass-roots initiatives in the city (La Terenuri [At the Playgrounds], Someș Delivery – for instance, with temporary architecture in Armătura Park, H33 among many others – cf. Ilovan et al., 2019 on the Urban Regeneration Workshop in Cluj-Napoca, Romania; Ilovan et al., 2020a, 2020b). Moreover, forum theatre, as a small-scale event, could be organised in Armătura Park (Figure 8), nearby the Someșul Mic and its tributary, the Nădăș.

Through the forum theatre, people develop their intercultural and social competences (to cooperate in a constructive manner, to discuss with each other on sensitive topics, to tolerate the new, the unexpected, to be open to diversity), and spatial ones (i.e. to explore and represent the urban space).

Figure 8: Armătura Park in Cluj-Napoca, appropriate place for the forum theatre, on the Someșul Mic riverbanks, in 2018 (photo: M. Crengăniș).



The aim of our exploratory study was to get insight into population's perceptions of organising or participating at the forum theatre activity, in the framework of activating the riverbanks of the Someșul Mic, in Cluj-Napoca city, Romania. The questionnaire used could be addressed in the future to those living nearby the riverbanks for narrowing down the group of users, depending on the location of a proposed activity at a certain moment.

An innovative approach to discussing current urban regeneration issues, the forum theatre can bring together community leaders, regular inhabitants, activists, cultural associations, practitioners, entrepreneurs, public authorities, etc., in trying to raise population's awareness and empower it by getting involved in answering their needs. The forum theatre could be used successfully to promote social and cultural ideas for urban renewal, while the juxtaposition with the riverbank regeneration of the Someșul Mic brings to the fore an environmental perspective on community-based solutions. In Cluj, cultural innovation can be built on this background to promote cultural and social inclusion in a framework of community governance and urban renewal.

The transferability of this practice to other places, not necessarily nearby rivers, is another strength. Respondents' answers showed that people wanted to discuss their daily problems in a forum theatre and that they could provide various proposals for river and riverbank activities.

Further research should involve more inhabitants while putting the idea of the forum theatre into practice, possibly with the help of volunteering professionals (architects, geographers, sociologists, psychologists, actors, etc.). Thus, the impact of the activity could be assessed on both people and territory.

(Translated by Oana-Ramona ILOVAN)

Acknowledgements

We express our gratitude to those who completed voluntarily the questionnaire, to architect Adriana Măgerușan, Ph.D., who guided our field trip in Armătura Park and informed us on Someș Delivery initiative, and to colleagues who advised us to publish this paper in Dela Journal, after presenting a preliminary version of this research at the EUROGEO conference, in Ljubljana, in August 2019. We also thank the two reviewers who contributed through their suggestions to improving our paper.

Note: Authors contributed equally to this paper.

References

- Asociația Komunitas, 2015. Spații urbane în acțiune. Activare comunitară în cartierele de blocuri din București/Urban Spaces in Action. Community Activation in Bucharest's Socialist Neighbourhoods. București: tranzit.ro Publishing House.
- Bănică, A., Muntele, I., 2015. Urban vulnerability and resilience in post-communist Romania (Comparative case studies of Iași and Bacău cities and metropolitan areas). *Carpathian Journal of Earth and Environmental Sciences*, 10, 4, pp. 159–171.
- Bănică, A., Istrate, M., Muntele, I., 2017. Challenges for the resilience capacity of Romanian shrinking cities. *Sustainability*, 9, 12, 2289. DOI: 10.3390/su9122289.
- Bell, V., 1999. *Performativity and belonging*. London: SAGE Publications.
- Boal, A., 2006. *The aesthetics of the oppressed*. Oxford: Routledge.
- Boal, A., 2017. *Teatrul Oprimărilor și alte poetici politice [Theatre of the oppressed and other political poetics]*. București: Editura Nemira.
- Borș, O.M., 2017. *Teatru forum – Ghid [Forum theatre - guide]*. URL: https://www.anpcdefp.ro/library/Rapoarte%20C8%99i%20analize/Ghiduri_CONNETOR_2017/Ghid%20Teatru%20Forum_RO.pdf (accessed 09.03.2020).
- Buzasi, A., Csete, M.S., 2017. Ex-ante assessment of urban development projects. *European Journal of Sustainable Development*, 6, 4, pp. 267–278. DOI: 10.14207/ejsd.2017.v6n4p267.
- Caneparo, L., Bonavero, F., 2016. Neighborhood regeneration at the grassroots participation: Incubators' co-creative process and system. *ARCHNET-IJAR International Journal of Architectural Research*, 10, 2, pp. 204–218.

- Day, L., 2002. Putting yourself in other people's shoes: the use of forum theatre to explore refugee and homeless issues in schools. *Journal of Moral Education*, 31, 1, pp. 21–34. DOI: 10.1080/03057240120111418.
- Drăgan, Al., Popa, N., 2017. Social economy in post-communist Romania: What kind of volunteering for what type of NGOs? *Journal of Balkan and Near Eastern Studies*, 19, 3, pp. 330–350.
- Garett, J., 2010. Students learn medical ethics through forum theatre class. *Community College Work*, April 5. URL: <https://www.thefreelibrary.com/Students+learn+medical+ethics+through+forum+theatre+class-a0223598007> (accessed 16.03.2020).
- Grădinaru, A.-M., 2013. Joker. <https://www.nonformalii.ro/metode/teatru-forum/joker> (accessed 09.03.2020).
- Howard, L.A., 2004. Speaking theatre/doing pedagogy: re-visiting theatre of the oppressed. *Communication Education*, 53, pp. 217–233.
- Ilovan, O.-R., 2018. Excelență didactică pentru sustenabilitatea comunității academice și responsabilizare civică [Didactic excellence for the sustainability of the academic community and civic awareness]. URL: <http://territorial-identity.ro/announcements/> (accessed 7.12.2018).
- Ilovan, O.-R., Havadi-Nagy, K.X., Dulamă, M.E., Mutică, P., Adorean, E.-C., Colcer, A.-M., Cimpoieș, P.O., 2019. Learning challenges and benefits during the international workshop on urban regeneration. 5th ERD Conference, European Proceedings of Social and Behavioural Sciences, 63, pp. 330–338.
- Ilovan, O.-R., Jordan, P., Havadi-Nagy, K.X., Zametter, T., 2016. Identity matters for development: Austrian and Romanian experiences. *Transylvanian Review*, 25, Supplement 1, pp. 261–276.
- Ilovan, O.-R., Măgerușan, A., Boțan, C.N., Dulamă, M.E., Ursu, C.-D., Mutică, P., Jucu, I.S., 2020a. Experiencing and bringing back the river in the urban flow: Someș Delivery. 6th ERD Conference, European Proceedings of Social and Behavioural Sciences (in print).
- Ilovan, O.-R., Medeșan, S., Colcer, A.-M., Adorean, E.-C., Dulamă, M.E., Ciineanu, M.-D., Benedek, R., 2020b. Raising civic awareness and involvement through urban regeneration: At the Playgrounds, Mănăstur. 6th ERD Conference, European Proceedings of Social and Behavioural Sciences (in print).
- Ilovan, O.-R., Voicu, C.-G., Colcer, A.-M., 2019. Recovering the past for resilient communities: territorial identity, cultural landscape and symbolic places in Năsăud town, Romania. *Europa Regional*, 26.2018, 2, pp. 14–28. URL: <https://nbn-resolving.org/urn:nbn:de:0168-ssor-66830-6>.
- Jones, P., Evans, J., 2008. *Urban regeneration in the UK: theory and practice*. London: Sage.
- Jucu, I.S., 2016. Recent issues of spatial restructuring in Romanian medium-sized towns: Spatial conversion and local urban regeneration. *Ecology, Economics, Education and Legislation Conference Proceedings, SGEM 2016*, vol. III, International Multidisciplinary Scientific GeoConference-SGEM, pp. 493–500.

- Jung, S.H., 2008. The journey to transform: theatre in education and paradigm shifting. Unpublished Ph.D. Thesis. United Kingdom: University of Exeter. URL: <http://hdl.handle.net/10036/70043> (accessed 09.03.2020).
- Lefebvre, H., 1991. The production of space. Malden, MA: Blackwell.
- Levy, J., 1997. Theatre and moral education. *Journal of Aesthetic Education*, 31, 3, pp. 65–75. DOI: 10.2307/3333488.
- Medeşan, S., Panait, L., 2017. cARTier. Interventii Periferice [cARTier. Peripheral Interventions]. Cluj-Napoca: Idea.
- Mitrea, V., 2011. Mediul natural. Un atu neglijat [The natural environment. A taken for granted advantage]. In: Mitrea, V., Tudose, E., Buzuloiu, Pănescu, A. (eds.). Cluj-Napoca în proiecte. 50 de ani 1960-2010 [Cluj-Napoca in projects. 50 years. 1960-2010]. Cluj-Napoca: Imprimeria Ardealul, pp. 11–29.
- Oswalt, P., Overmeyer, K., Misselwitz, P., 2013. Urban catalyst. The power of temporary use. Berlin: DOM Publishers.
- Passila, A., Oikarinen, T., Parjanen, S., Harmaakorpi, V., 2013. Interpretative dimension of user-driven service innovation forum theatre in facilitating renewal in Finnish public health care. *Baltic Journal of Management*, 8, 2, pp. 166–182. DOI: 10.1108/17465261311310009.
- Pop, G.P., 2007. Judeţul Cluj [Cluj County]. Bucureşti: Editura Academiei Române.
- Potluka, O., Špaček, M., 2019. Civil Society in urban areas: a partner for territorial cohesion? In: Medeiros, E. (ed.). *Territorial cohesion. The urban dimension*. Cham: Springer Nature Switzerland, pp. 23–37.
- Raagmaa, G., 2002. Regional identity in regional development and planning. *European Planning Studies*, 10, pp. 55–76.
- Rae, J., 2013. Facilitating learning spaces in forum theatre. *European Journal of Training and Development*, 37, 2, pp. 220–236. DOI: 10.1108/03090591311301707.
- Reiman, A.J., Dotger, B.H., 2008. What does innovation mean for moral educators? *Journal of Moral Education*, 37, 2, pp. 151–164. DOI: 10.1080/03057240802009124.
- Samson, K., 2010. From master planning to processual strategies. In: Kiib, H. (ed.). *Performative urban design*. Aalborg: Aalborg University Press, pp. 216–227.
- Sanders, M., 2004. Urban odyssey: theatre of the oppressed and talented minority youth. *Journal for the Education of the Gifted*, 28, 2, pp. 218–241. DOI:10.1177/016235320402800205.
- Sassano, G., Graziadei, A., Amato, F., Murgante, B., 2017. Involving citizens in the reuse and regeneration of urban peripheral spaces. In: Silva, C.N., Buček, J. (eds.). *Local government and urban governance in Europe*. Cham: Springer, pp. 193–206.
- Sennett, R., 2012. The rituals, pleasures and politics of cooperation. New Haven, London: Yale University Press.
- Soja, E., 1996. Thirdspace: journeys to Los Angeles and other real-and-imagined places. Oxford: Basil Blackwell.
- Someş Delivery, 2020a. URL: <http://somesdelivery.ro/> (accessed 7.03.2020).

- Someș Delivery, 2020b. Arhiva Proiecte [Projects archive]. URL: <http://somesdelivery.ro/proiecte/?fbclid=IwAR0cb4BI1crtnWe4w058WG02OYaJt2lutPNUdC-JsAcT0Exob35dZwArznY4> (accessed 09.03.2020).
- Thambu, N., Balakrishnan, V., 2014. Forum theatre as a moral education pedagogy in ATIKAN. *Jurnal Kajian Pendidikan*, 4, 1, pp. 1–12.
- Thrift, N., 2008. Non-representational theory. *Space | politics | affect*. London, New York: Routledge.
- Tiwari, R. 2010. *Space-body-ritual: performativity in the city*. Plymouth: Lexington Books.
- Veer, K., Moga, M., Mateiu, M., 2015. Someș Delivery 2015. *Zeppelin*, 137, pp. 70–75.
- Voiculescu, S., Jucu, I.S., 2016. Producing urban industrial derelict places: The case of the Solventul petrochemical plant in Timișoara. *European Urban and Regional Studies*, 23, 4, pp. 765–781. DOI: 10.1177/0969776414541134.

FORUMSKO GLEDALIŠČE – PRESOJANJE ODPRTOSTI ZA PRAKSE ZAČASNE PARTICIPATIVNE RABE OB REKI SOMEȘUL MIC V MESTU CLUJ-NAPOCA, ROMUNIJA

Summary

Prispevek obravnava t. i. forumsko gledališče (Boal, 2017) kot mogočo začasno rabo in načrtovalsko prakso na območju ob reki Someșul Mic v mestu Cluj-Napoca (Romunija). Analizira priložnosti za implementacijo začasne rabe prostora znotraj neformalnih okvirov forumskega gledališča, pri čemer se osredotoča na izboljšane odnose med uporabniki obrežij reke Someșul Mic in na ideje za teritorialno načrtovanje na obravnavanem območju.

V okviru raziskave je bilo izvedeno anketiranje prebivalcev mesta Cluj-Napoca, ki se je osredotočalo na njihovo pripravljenost za vključitev v dejavnosti forumskega gledališča. Pokazalo je, da bi se bilo 77 % anketirancev pripravljenih vključiti v tovrstne dejavnosti.

Forumsko gledališče lahko spodbuja udeležbo in sodelovanje prebivalcev v razpravi o skupnostnih in družbenih vprašanjih ter o tem, kako je mogoče ta vprašanja rešiti ali olajšati z uporabo prostora, ki je na voljo ob reki, ter z dejavnostmi, povezanimi z njim, pri čemer se razvija tudi odnos prebivalcev do skupnih pobud. Skozi forumsko gledališče ljudje razvijajo svoje medkulturne in družbene (za konstruktivno sodelovanje, za razpravljanje o občutljivih vsebinah, za toleriranje novega, nepričakovanega in za raznolikost) ter prostorske kompetence (npr. za raziskovanje in reprezentiranje urbanega prostora).

Kot inovativen pristop k razpravljanju o vprašanih urbane regeneracije lahko forumsko gledališče združi voditelje skupnosti, prebivalce, aktiviste, kulturna društva, ljudi iz prakse, podjetnike, javne oblasti itd. v poskusih ozaveščanja in opolnomočenja prebivalstva na ta način, da se odziva na njihove potrebe. Forumsko gledališče je mogoče uspešno uporabiti za promocijo družbenih in kulturnih idej za urbano prenovu, povezava z regeneracijo obrežja reke Someşul Mic pa postavlja v ospredje okoljsko perspektivo na skupnosti temelječih rešitev.

Ena izmed prednosti te prakse je njena prenosljivost na druga območja. Odgovori anketirancev so pokazali, da si ljudje želijo razprave o vsakodnevnih problemih v okviru forumskega gledališča in da lahko dajo različne predloge za dejavnosti na reki in ob njej. Nadaljnje raziskovanje bi moralo zajeti več prebivalcev, hkrati pa bi bilo treba forumsko gledališče uresničiti tudi v praksi, morda s pomočjo prostovoljcev (arhitektov, geografov, sociologov, psihologov, igralcev ...). S tem bi bilo mogoče ugotavljati vpliv tovrstne dejavnosti tako na ljudi kot na prostor.

(Prevedel Dejan Cigale)



MIGRATORY DYNAMICS OF THE RURAL POPULATION OF THE APUSENI MOUNTAINS IN THE POST-SOCIALIST PERIOD

Izvirni znanstveni članek

COBISS 1.01

DOI: 10.4321/dela.53.131-150

Abstract

The aim of the present article is to draw up an analysis on the migratory dynamics of the population from the Apuseni Mountains in the Post-Socialist era. In order to accomplish this aim, we collected statistical data from two representative years, namely 1992 and 2011, which correspond to two censuses. The analysis was meant to reveal the evolution of the settlements (people who settled in the area) and of emigration, as registered in the two reference years and to identify the causes that determined the evolution of the emigration and immigration.

Key words: migratory dynamics, rural population, Apuseni Mountains, net migration rate, ArcGIS

... *Babeș-Bolyai University, Doctoral School of Geography, Faculty of Geography,
... 400006, Cluj-Napoca, Romania

... **Babeș-Bolyai University, Faculty of Geography, Department of Regional Geo-
... graphy and Spatial Planning, 400006, Cluj-Napoca, Romania
... e-mail: lungmadalin@yahoo.com, alina.muresan@ubbcluj.ro

MIGRACIJSKA DINAMIKA PODEŽELSKEGA PREBIVALSTVA V GORSKI POKRAJINI APUSENI V POSTSOCIALISTIČNEM OBDOBJU

Izvleček

Namen članka je predstaviti analizo migracijske dinamike prebivalstva v gorski pokrajini Apuseni v postsocialističnem obdobju. Za dosego tega cilja smo zbrali statistične podatke dveh popisov prebivalstva iz let 1992 in 2011. Analiza razkriva razvoj naselij (prebivalstva, ki se je naselilo na tem območju) in procese izseljevanja, ki so evidentirani na podlagi omenjenih popisov, ter identificira razloge za procese izseljevanja in priseljevanja.

Ključne besede: migracijska dinamika, podeželsko prebivalstvo, gorstvo Apuseni, selitveno gibanje, ArcGIS

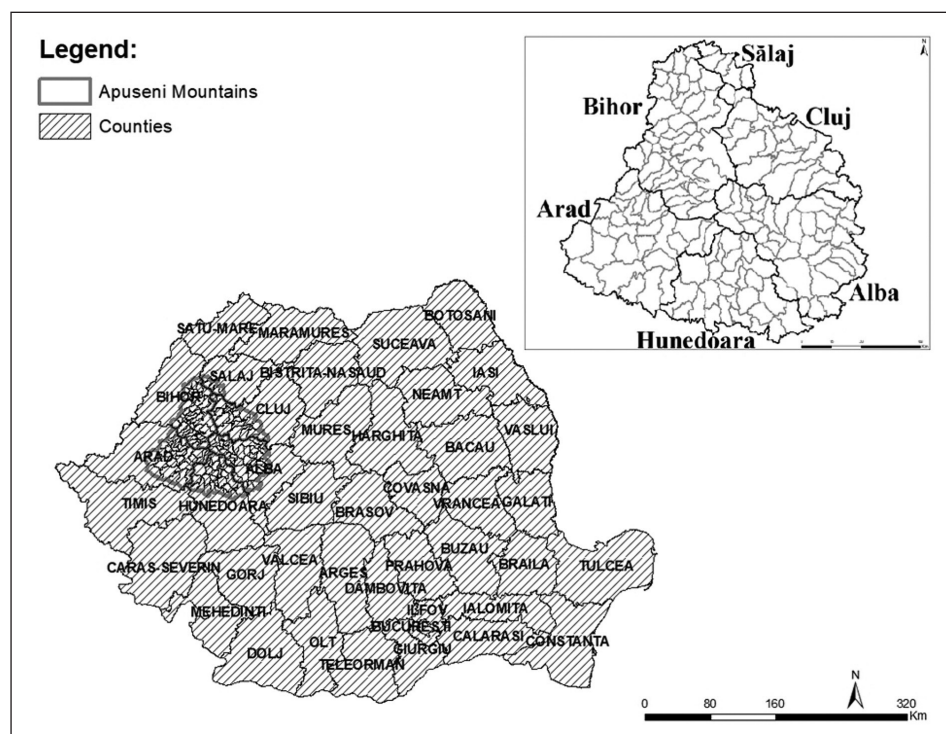
1 INTRODUCTION

The aim of this article is to draw up an analysis of the migratory dynamics of population in the rural areas of the Apuseni Mountains. In order to analyse the emigration and immigration phenomena in the rural areas of the Apuseni Mountains, we considered statistical data for the years 1992 and 2011. The present study is needed because of some risk phenomena (depopulation, migration) which mostly affect the rural areas of the Apuseni Mountains. The present study completes another study (Lung, 2018), in which the analysis was focussed on the natural dynamics of the rural population in the Apuseni Mountains. That study emphasised great dysfunctionalities in population natural dynamics, thus only 10 communes, out of the total of 140, registered positive growth rate.

The Apuseni Mountains (Figure 1) are a mountainous group—part of the Romanian Carpathians, which occupy areas within six Romanian counties: Alba, Arad, Bihor, Cluj, Hunedoara and Sălaj. The area of this Carpathian region is 10,750 km². The Apuseni Mountains border Barcău Valley in the North and Mureş Valley in the South, Transylvanian Depression in the East and Western Hills in the West. They have three peaks over 1800 m: Gilău-Muntele Mare 1,826 m; Vlădeasa 1,836 m and Bihor 1,849 m—the maximum altitude in the Apuseni Mountains (Pop, 2000).

In a study by Mureşan (2016), the Apuseni Mountains are considered a *demographically critical region*, which implies the existence of demographic phenomena that have a negative impact on the population. Ten years ago, Căndea et al. (2006) had stated that the Apuseni Mountains were a *disadvantaged region*, and after five years, Drăgan (2011) categorised the Apuseni Mountains as a *peripheral region*. The most recent study conducted on these mountains (Surd et al., 2017) makes a detailed

Figure 1. The geographic location of the Apuseni Mountains.



analysis of the settlements in the area, in which demographic, socio-economic and other phenomena are merged into a unique perspective.

The population from the Apuseni Mountains was under research from different angles. Constantin (2011) researched the population and the settlements from the mining areas, identifying dysfunctionalities concerning the dynamics of population. She also advanced several scenarios for reinvigoration at social and economic levels. The demographic risks in the Apuseni Mountains have been observed and studied for the first time after the end of the Socialist period by Surd et al. (2007).

The socialist period in Romania extended for more than four decades, from 1948 to 1989 (21st December) and was defined by strong industrialization, especially in cities, which generated an intense rural-urban migration, as well as by agricultural collectivization. Many rural areas, mostly in the mountains, faced the risk of the succumbing to the depopulation phenomenon.

The migration dynamics of population (international-national, rural-urban) have been the subject of study for researchers around the world, being tackled in various ways (Esbenshade, 2007; Çağlar, Nina, 2010; Motomura, 2010; Boswell, Andrew,

2011; Provine, Gabriella, 2011; Scholten, 2011; Stupariu et al., 2018; Caponio, Jones-Correa, 2018).

2 METHODOLOGY

In order to delineate the Apuseni Mountains from a territorial-administrative point of view, and the rural areas implicitly, we used the limits defined by Drăgan (2011) in his study on the resilience of the Apuseni Mountains regional system. In conformity with his delineation, the Apuseni Mountains region includes 153 territorial-administrative units, out of which 13 are towns and 140 are communes. Spatially speaking, the Apuseni Mountains comprise areas from six counties, therefore the article will refer to six regional sub-systems: Alba Apuseni, Arad Apuseni, Bihor Apuseni, Cluj Apuseni, Hunedoara Apuseni, Sălaj Apuseni. Absolute statistical data on emigration and immigration for the two moments in time chosen for analysis (1992 and 2011) have been obtained from the Romanian National Institute of Statistics, from the Tempo – Online platform. The same platform was the source for the number of inhabitants for each commune. The latter was used for calculating the emigration and immigration rates. We point out that data concerning the number of people who left the region and the number of people who came into the region have been taken out from the section in which both internal migration and external migration are registered together. Once we had the data, these have been processed by means of Microsoft Excel 2013, and the rates for each of the two indicators sought after have been obtained. Afterwards, the net migration rate for each commune was calculated. At the same time, we draw up three maps for each year analysed, in order to show spatial distribution of the emigration rate, the immigration rate and the net migration rate. We used ArcGIS 10.3 to generate the maps. The same program was used to draw up the map for the geographic location of the Apuseni Mountains.

3 RESULTS AND DISCUSSIONS

Figure 2 shows that there had been 3,799 settlements in the rural areas of the Apuseni Mountains in 1992. Out of these, 27.5% (1,046) were in Bihor Apuseni sub-region. Nevertheless, only one territorial-administrative unit registered more than 100 settlements (103 in Aştileu commune). Yet Bihor Apuseni sub-region is the most extended and comprises no less than 34 communes. Căbeşti, Finiş and Roşia communes had only five settlements each.

Arad Apuseni sub-region registered 894 settlements (23,5 %) into its 26 communes, with a maximum value in Târnova (93); and with minimum values registered in Şilindia (9), Archiş (8), Tăuţ (7), and Hăşmaş (6).

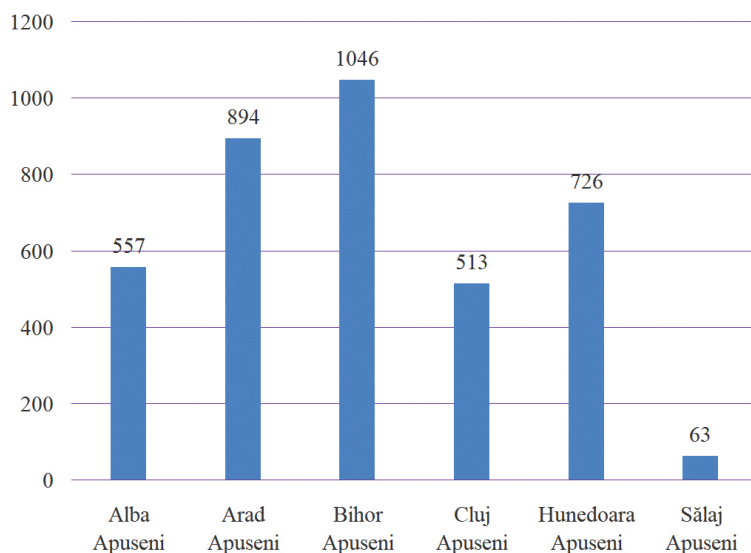
There were 726 (19.1%) settlements in the Southern part of the Apuseni Mountains, in the sub-region of Hunedoara County. The highest number of persons (89) settled in Certeju de Sus, seven persons in Bulzeştii de Sus and Luncoiu de Jos, respectively and only one person was registered as having settled in Burjuc.

There were 557 people (14.6%) settled in Alba Apuseni sub-region, being the only area in the Apuseni Mountains in which there were communes that registered no settlement in the period immediately after the Socialist era (1992). The two such communes were Arieşeni and Ceru-Băcăinţi. Similarly, there was also a low number (under 10) of persons who settled in Almaşu Mare (8), Blandiana (2), Cricău (5), Horea (4), Întregalde (4), Sălciua (2), Scărişoara (4). The highest number of persons settled was registered in Roşia Montană (56).

Cluj Apuseni sub-region registered 13.5% (513) out of the total number of persons who immigrated into the Apuseni Mountains region in 1992. It is in this sub-region that the highest number of settlements in the Apuseni Mountains region was registered in 1992, namely in Gilău commune —116 (22.6% of the total number of persons settled in Cluj Apuseni sub-region).

Sălaj Apuseni represent the smallest part of the Apuseni Mountains, comprising only five communes. This is the explanation for the small number of settlements—only 63 (Cizer 11, Halmăşd 11, Plopiş 17, Săg 1, and Valcău de Jos 23).

Figure 2. Numerical distribution of the people settled into the rural areas of the Apuseni Mountains in 1992.



Data source: National Institute of Statistics.

Spatial distribution of immigration rates (Figure 3) in the Apuseni Mountains in 1992 is characterised by heterogeneity, with lower or higher rates for each of the six sub-regions of the Apuseni Mountains. The highest rate in the entire rural area of the Apuseni Mountains was registered in Arad County sub-region, namely in Moneasa commune (67.4‰).

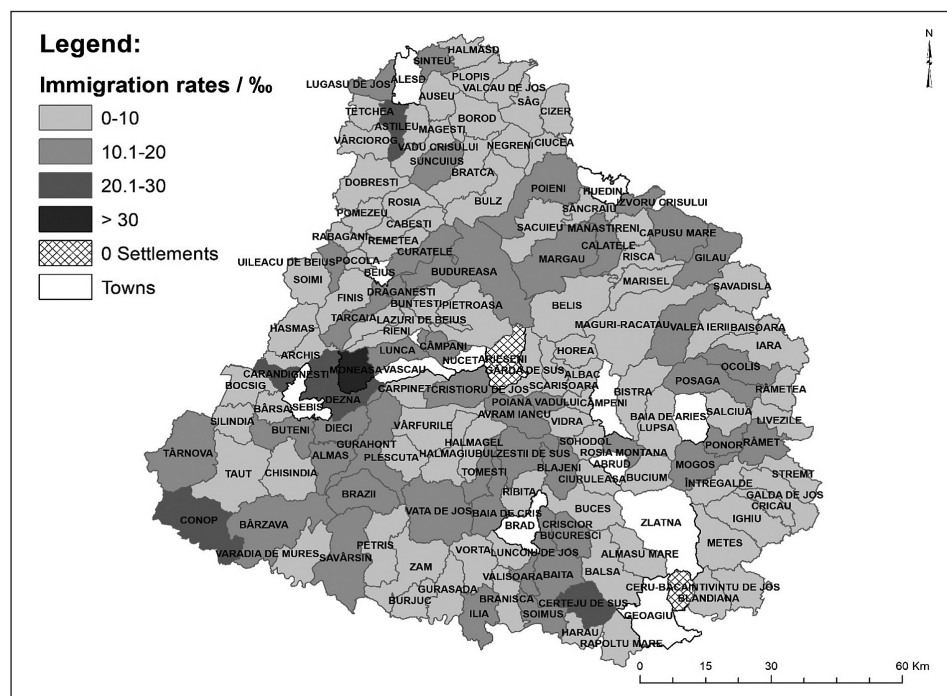
Of all the communes with an immigration rate below 10‰, most were found in the Alba Apuseni, where 75.7% of the communes (25) registered values below this threshold, followed by the Bihor Apuseni (22 communes or 64.7% of this subregion's rural territory), Cluj Apuseni (61.1% or 11 communes), Arad Apuseni (13 communes or 50%), Hunedoara Apuseni (11 communes) and Sălaj Apuseni, where none of the five communes registered values above 10‰. The highest rate of the entire rural territory of the Apuseni was in the Arad Apuseni, specifically Moneasa (67.4‰). In the Bihor Apuseni, the highest value was 25.7‰, in the commune of Aştileu, also having the highest number of settlers in this part of the Apuseni. Certeju de Sus Commune has the maximum value of immigration in the Hunedoara Apuseni (22.8‰), while, in the Alba and Cluj Apuseni, the maximum values of the immigration rate do not exceed 20‰.

After analysing the data from Figure 3 as well, one might observe that 60% of the rural areas in the Apuseni Mountains registered immigration rates in the range of 0–10‰ in 1992, followed by rates in the range of 10.1–20‰ – with a share of 33% from the total communes. The lowest values, only 6% and 1% respectively, are in the range of 20.1–30‰, or above 30‰. Thus it is clear that the rural space of the Apuseni Mountains was not a pull factor for population settling in the first years of the post-communist period. Despite 3799 people having settled the rural areas of the Apuseni, the immigration rate remained low (9.3‰).

The number of emigrants from the Apuseni Mountains registered for 1992 (Figure 4) was 7308, as statistical data show.

Out of this number, no less than 1794 (24.5%) emigrated from Alba Apuseni. This part of the Apuseni Mountains represented one of the most productive mining regions in Romania, with rich silver and gold resources. The majority of population was working in mining industry which, after the 1989 Revolution, experienced an ample restructuring process. This generated massive layoffs, therefore the incomes of the families started to decrease, and workplaces were nowhere to find. Under these circumstances, living standards declined, stimulating the beginning of emigration towards other regions in Romania or even abroad. The average number of employees in industry decreased by 63.5%, from 1,107 in 1996 to only 404 in 1999. Mining industry registered the most significant dysfunctionalities. In only three years, the number of employees decreased with 63.7%, from 1,077 in 1996 to only 390 in 1999 (Boţan, Ilovan, 2006, p. 118). Three territorial-administrative units registered over 100 emigrations each: Albac (114), Bistra (142) and Lupşa (137). The economic activities of these communes had been predominantly agricultural, yet approximately 20–30% of the active population in Albac commune worked in industry. At the same time, more

Figure 3. Spatial distribution of the immigration rates in the rural areas of the Apuseni Mountains in 1992.



Data source: National Institute of Statistics.

than 40% of the active population in Bistra commune was incorporated in industry (Mureșan, Boțan, 2015, p. 52).

Bihor Apuseni follows Alba Apuseni. 1,692 people emigrated from here in 1992, which represents 23.1% out of the total number of emigrants. The mining tradition in Bihor County was similar to the one in Alba County, and the restructuring had similar consequences.

Unfortunately, the same communes which had been predominantly industrial registered the highest number of emigrants. Thus, just the mining area which includes Borod, Dobrești, Șuncuiuș and Vadu Crișului communes registered 20% out of the total number of emigrations in Bihor county Apuseni Mountains. The highest number of employees in industry in 1992 was 1,390 persons in Dobrești commune, all working in mining. In only eight years, the number of employees working in industry registered a decrease by 87.1%, while in mining there was no employee registered, thus the decrease of 100%. In Șuncuiuș, there were 1,076 employees who worked in industry, 1,065 of them solely in mining. In 2002, the number of employees

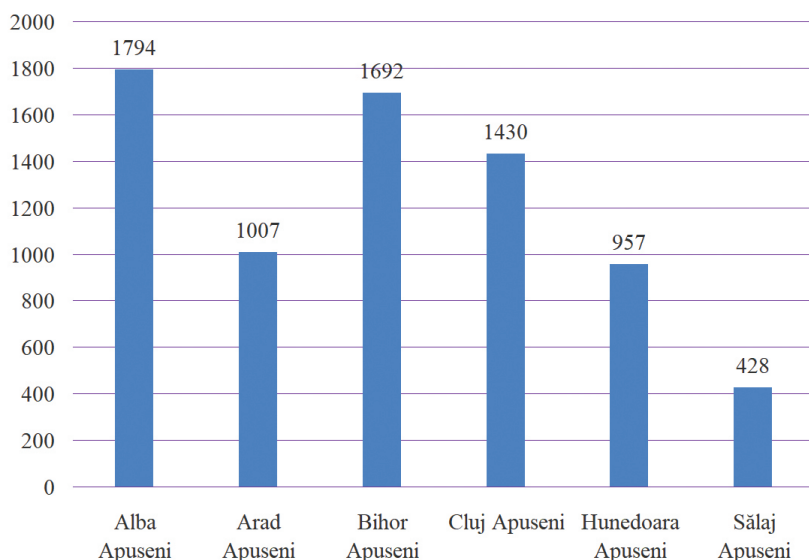
in industry decreased by 78.2% as compared to 1992; and the number of persons working in mining decreased by 93.5%. In Borod, 556 people worked in the industry sector, most (98.9%) as miners. From 1992 to 1994 there was an increase in the number of miners by 56.7%, a state followed by a decrease to 0 of the persons working in mining during the period 1994–2004. Vadu Crişului was the only commune which had not had miners until 1995, the following year their number being 160, and until 1998, the number decreased by 64.3% (Morar, 2011). Under these circumstances, we can conclude that the changes and the layoffs in industry caused major dysfunctions in Bihor Apuseni, leading to population emigration.

19.5% out of the total number of emigrants from the Apuseni Mountains in 1992 were registered in the Cluj County sub-region. Six territorial-administrative units had more than 100 emigrations registered (Beliş 104; Căpuşu Mare 112; Gilău 127; Măguri-Răcăţău 132; Poieni 112; Săvădisla 115). The reason people emigrated from Măguri-Răcăţău commune was linked to its geographical location, as the commune is located at more than 1,000 m altitude. The lack of workplaces and the poor state of the transportation routes reinforced emigration towards lower-altitude areas, where access to services and workplaces was easier. Căpuşu Mare and Săvădisla communes are part of the *Călata Land*—from an ethnographic point of view (Buş et al., 2017), thus they have a significant number of Hungarian ethnics, some of whom emigrated outside Romania. The high number of Hungarians who emigrated gave a boost to a similar process among the Romanians. In 1992 Săvădisla commune had the following ethnic structure: 52% Hungarians and 48% Romanians, while in Căpuşu Mare there were 62% Romanians and 32% Hungarians. Emigration in Gilău was determined by the small distance—only 16 km—from Cluj-Napoca municipality, a distance which can be covered in optimum traffic conditions in just 15–20 minutes. The inhabitants from Beliş and Poieni communes emigrated towards Huedin town, which offered good prospect for superior life standards, with access to medical and educational services and to workplaces.

Arad Apuseni registered 13.7% out of the total number of emigrants from the Apuseni Mountains. Nevertheless, only Târnova commune registered more than 100 emigrants, most of them being part of the Ukrainian community.

Hunedoara Apuseni and Sălaj Apuseni sub-regions registered 13.1% and 5.8% emigrants, respectively, out of the total number of emigrants from the Apuseni Mountains. Plopiş commune from Sălaj County registered 148 emigrants, the majority being part of the Slovakian community. The beginning of the post-socialist period coincided with a decrease in agricultural and industrial activities to which Slovaks were used to, which determined the migration of the young Slovaks. At the same time, their migration was also due to the lack of education infrastructure in Slovak language (Ştefanko, 2004, p. 79).

Figure 4. Numerical distribution of emigrants in the rural areas of the Apuseni Mountains in 1992.

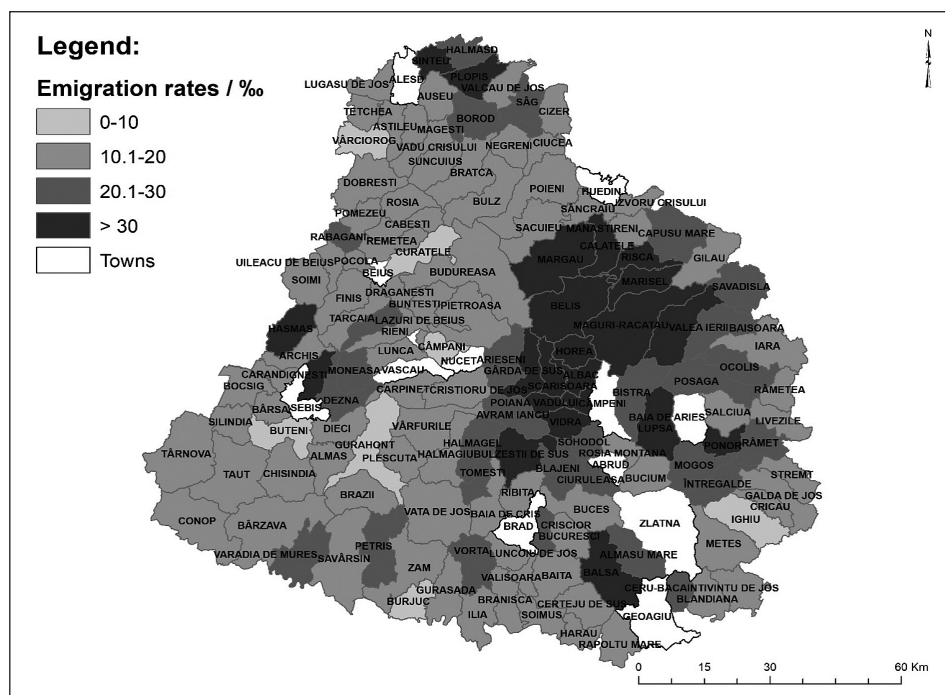


Data source: National Institute of Statistics.

Figure 5 shows the spatial distribution of the emigration rates in the Apuseni Mountains in 1992. The highest rate was registered in Beliș commune—part of Cluj Apuseni. Nevertheless, there had been many territorial-administrative units characterised by a higher number of people who left (more than the 104 in Beliș), yet if compared with the low number of inhabitants of this commune, the rate is 67.3%. In the Apuseni Mountains, this period, which immediately followed the Socialist period, was characterised by high emigration rates. Only seven communes registered values lower than 10‰ (Ighiu from Alba County with 9.2‰; Burjuc from Hunedoara County with 9.3‰; Gurahonț with 8.2‰ and Buteni with 7.6‰ from Arad County; Câmpani 10‰, Curățete 9.3‰ and Vârciorog 9.6‰—part of Bihor County).

If we compare these with the emigration rates in the urban areas of the Apuseni Mountains, we conclude that migration was prominently more intense in the rural areas. The highest emigration rate in the urban areas in 1992 was 27.5‰ in Baia de Arieș in Alba Apuseni, and the lowest was 11.7‰ in Vașcău town in Bihor Apuseni (Lung, Gligor, 2018).

Figure 5. Spatial distribution of the emigration rates in the rural areas of the Apuseni Mountains in 1992.



Data source: National Institute of Statistics.

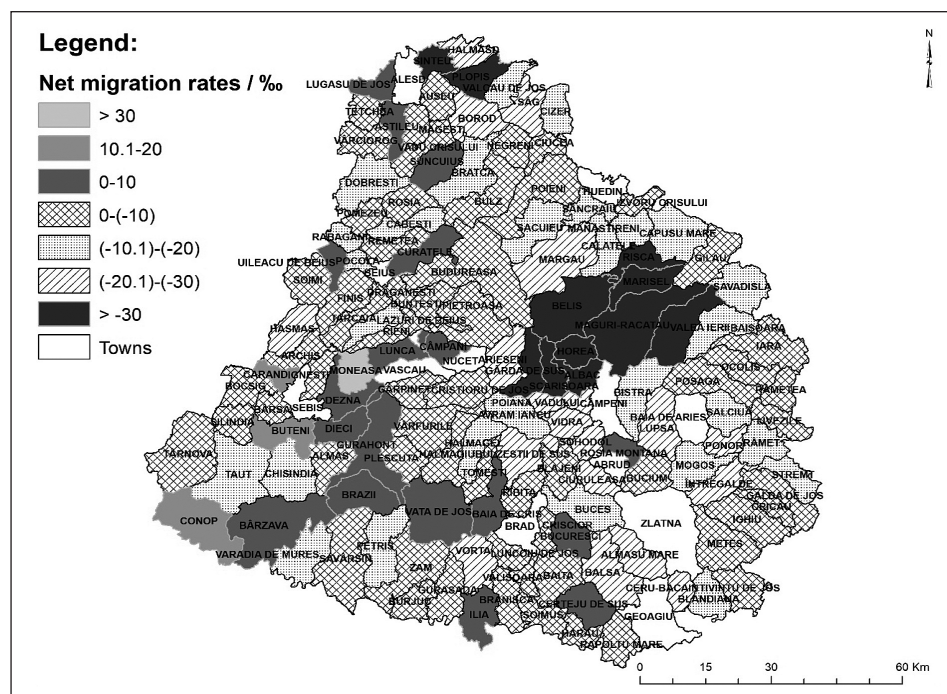
The analysis makes it clear that the year 1992 was characterized by emigration rates in the range of 10.1–20%, with a share of 58% of the total values of the emigration rate. There follow the rates in the range of 20.1–30% representing 21% of the total and the rates that exceeded 30% with 16%, respectively. Thus, we can highlight the excessive emigration of the population from the Apuseni Mountains, following the transition from communism towards capitalism and the social and economic changes that accompanied this transition. The restructuring process in industry determined significant layoffs, which led to a continuous decline in life standards.

The large number of emigrations, as compared to settlements, determined mainly negative net migration rates in the Apuseni Mountains in 1992 (Figure 6). Only 15.7% (22 communes) of the rural areas in the Apuseni Mountains registered positive net migration rates in 1992.

Out of the 22 communes, most are located in the Arad Apuseni (9 communes), followed by Bihor County (7 communes) and Hunedoara Apuseni (5 communes). Only Roșia Montană commune registered a positive net migration rate in Alba county

sub-region. Moneasa commune (Arad County) had registered the highest net migration rate from the entire area of the Apuseni Mountains. This is due to the high value of the rate of immigration (67.4%). At the other end, there was Beliș commune—part of Cluj county sub-region—with the lowest net migration rate, a negative one: -59.5% (due to a high value of the emigration rate, 67.3%).

Figure 6. Spatial distribution of the net migration rates in the rural areas of the Apuseni Mountains in 1992.



Data source: National Institute of Statistics.

In 2011, the number of settlements in the Apuseni Mountains was 4,653 persons (Figure 7), 22.4% more than in 1992. 26.5% out of the total number of settlements was registered in Bihor Apuseni. The commune with the highest number of settlements was Bratca—85 persons; nine persons settled in Șinteu and six in Criștioru de Jos, respectively. After Romania was integrated in the EU, the inhabitants from Bratca started to capitalize on the natural and anthropic potential of their commune through tourism-related activities. Therefore, guesthouses had been built offering good quality accommodation conditions and at fair prices, as compared to other areas. Șinteu commune is dominated in its ethnic structure by Slovaks (96%), thus being the only administrative

unit in the Apuseni Mountains with such ethnical dominance. The Slovaks who left immediately after the end of the Socialist era resettled in their native places—places from where they had been brought to colonize the area in the Apuseni Mountains. This explains the low number of people who have settled these lands in 2011.

20.4% of the total number of people who settled in the Apuseni Mountains chose Alba County. Ighiu was the commune with the highest number of settlements (122), it is in fact the biggest commune in Alba Apuseni, with 6,283 inhabitants in 2011. On the other hand, there were three communes in which less than 10 people settled. Blandiana 8; Ceru-Băcăinți 7; and Poșaga 9. Unfortunately, besides the fact that these communes have a low number of inhabitants (Blandiana 923; Ceru-Băcăinți 269; and Poșaga 1,048), the age structure shows a high share of the population over 65 years old: 25.8% in Blandiana; 27.1% in Ceru-Băcăinți, and 31.4% in Poșaga. These high shares of old-age population have an influence on migration. In fact, Ceru-Băcăinți is the commune with the lowest number of inhabitants in the Apuseni Mountains.

18.1% of the settlements from the total number registered in 2011 were in Arad Apuseni. Nevertheless, when compared to 1992, the settlements decreased by 5.5%. Târnova commune was in first place, with 109 settlements, in the context of Ukrainians' migration. The lowest number of settlements was registered in Brazii commune, only nine persons.

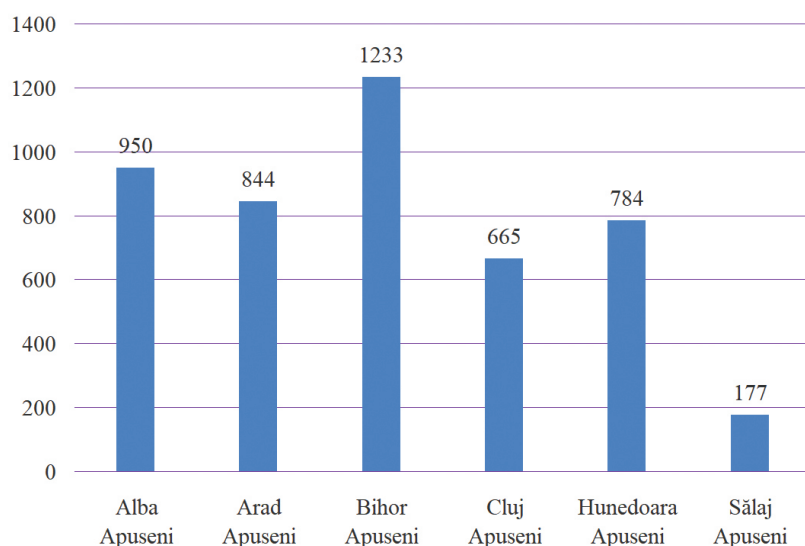
Hunedoara Apuseni integrated 16.8% of the persons settled in the rural areas of the Apuseni Mountains as a whole. As compared to 1992, there has been an increase of 7.9%. The highest number—80 inhabitants—was registered in Șoimuș commune, and the lowest number (8 inhabitants settled) in Vorța commune.

15.2% of the total number of persons who settled in the rural areas of the Apuseni Mountains chose Cluj County. As compared to 1992, 2011 registered an increase of 6.9%. 145 persons settled in Gilău—the commune with the highest number of persons settled. The fact that there are only 16 km between Gilău and the city of Cluj-Napoca represented a favourable factor to determine the migration, in the context of lower real estate prices. At the same time, life standards in Gilău improved as compared to 1992—projects had been implemented that facilitated works on urban and technical infrastructure (drinking water distribution system; sewerage system, gas distribution system). Izvoru Crișului commune registered the lowest number of persons settled—only 12. It is a territorial-administrative unit inhabited by 80% Hungarian ethnics, who migrated mainly in the first years of the post-socialist period. The major part of the population stayed in the commune and, with time, they started various family businesses to support them economically. In general, these businesses focus on selling handcraft products.

3.8% of the population who immigrated in the Apuseni Mountains settled in Sălaj county sub-region. The highest number of persons settled was 46 in Cizer commune—mainly represented by Roma people. Their number increased by 63.6% as compared to 1992. There were no more Hungarians and Slovaks in Cizer commune in 2011

and the Romanian population decreased by 26.1% as compared to 1992. There were 23 people who settled in Halmășd commune, the minimum value in Sălaj County in 2011.

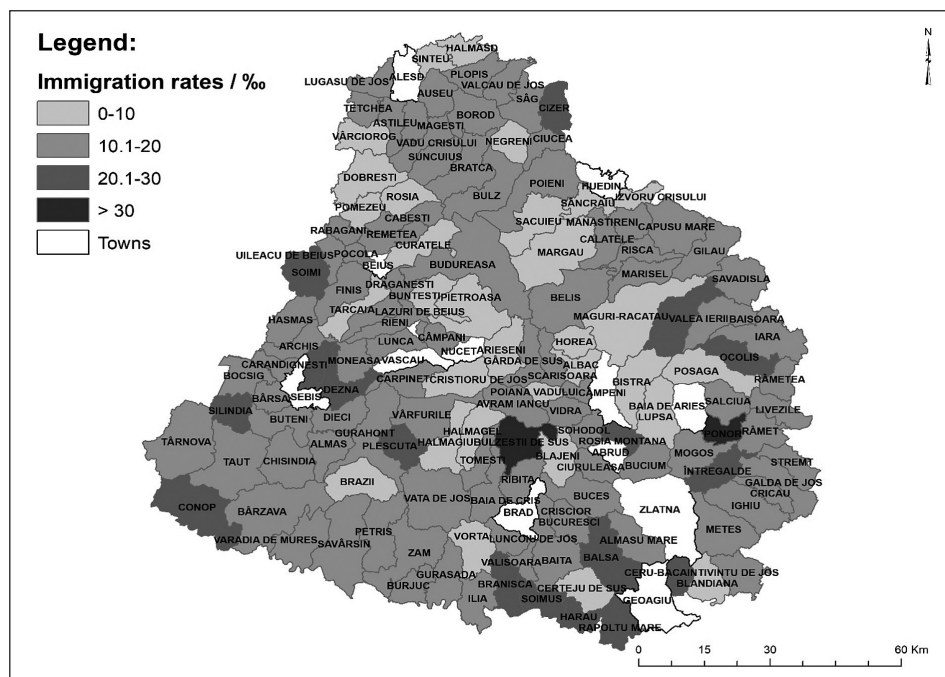
Figure 7. Number of persons settled in the rural areas of the Apuseni Mountains in 2011.



Data source: National Institute of Statistics.

Figure 8 shows the geographic distribution of the immigration rates in the rural areas of the Apuseni Mountains in 2011. The highest values of the immigration rate in the entire rural territory of the Apuseni were registered in the communes of Ponor, Alba Apuseni (59.3‰), Bulzești de Sus—part of Hunedoara county sub-region (40.6‰), Pleșcuța in Arad County (27.9‰) and Valea Ierii in Cluj County (27‰). Two other communes (one in the Bihor Apuseni, the other in the Sălaj Apuseni) exceeded the value of 20‰ for the rate of immigration. The lowest values, below 10‰, were found in 31 communes (22% of the entire rural space): 10 communes in the Bihor Apuseni, 8 in the Alba Apuseni, 6 in the Cluj Apuseni, 3 in the Arad Apuseni and Hunedoara Apuseni each and one in the Sălaj county subregion.

Figure 8. Spatial distribution of the immigration rates in the rural areas of the Apuseni Mountains in 2011.



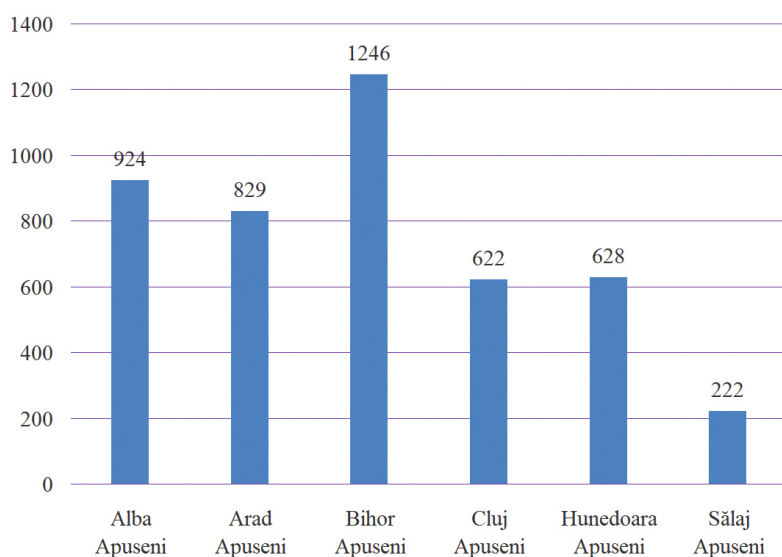
Data source: National Institute of Statistics.

In terms of the immigration rates percentage distribution in the Apuseni Mountains in 2011, 65% of the rural areas in the Apuseni Mountains was characterised by rates between 10.1 and 20‰, and 22% of the territorial-administrative units registered rates between 0 and 10‰. Only 12% of the communes had rates between 20.1 and 30‰ and only 1% had rates over 30‰.

Figure 9 presents the evolution of emigration in the rural areas of the Apuseni Mountains in 2011. Emigrations decreased by 38.8% that year as compared to 1992. Thus, there were 4,471 persons registered to have left from the rural areas of the Apuseni Mountains in 2011. 1,246 persons left from Bihor County, a decrease of 26.3% as compared to 1992. The highest number of emigrants was registered in Dobrești (75), and the lowest number in Pocola (13). If Alba county sub-region registered the highest number of emigrations in 1992, in 2011 the number of emigrants decreased by 48.4%. Ceru-Băcăinți and Livezile communes registered the lowest number of emigrants of 6 and 7, respectively. Emigrations from Arad county sub-region decreased with 17.6%, the highest number of emigrants being registered in Târnova (92), and the lowest in Șilindia (11). Emigrations in Hunedoara County decreased by 34.3% as compared to 1992, the highest number of

emigrants being 54 registered in Certeju de Sus, while Bulzeştii de Sus and Burjuc registered only 7 and 8 emigrants, respectively. Emigrations from Cluj county sub-region decreased as compared to 1992, with no less than 56.5%. Gilău registered 84 emigrants, and Sâncraiu—the lowest number of emigrants (only nine). Sălaj Apuseni registered a decrease of 48.1% as compared to 1992. 56 persons emigrated from Sâg, and the lowest number of emigrants was registered in Valcău de Jos (33). Unfortunately, these decreases in emigrations did not contribute to the improvement of the demographic context in the Apuseni Mountains, when they are matched with the population number. From 1992 to 2011, the population in the rural areas of the Apuseni Mountains decreased with 15%. The major part of population emigrated in the first years that followed the Socialist era; there had been 7,308 emigrations in 1992, and 4,471 in 2011. In effect, the 11,779 emigrations registered in the two years analyzed represent 12.3%, when matched with the rural population of the Apuseni Mountains in 2011.

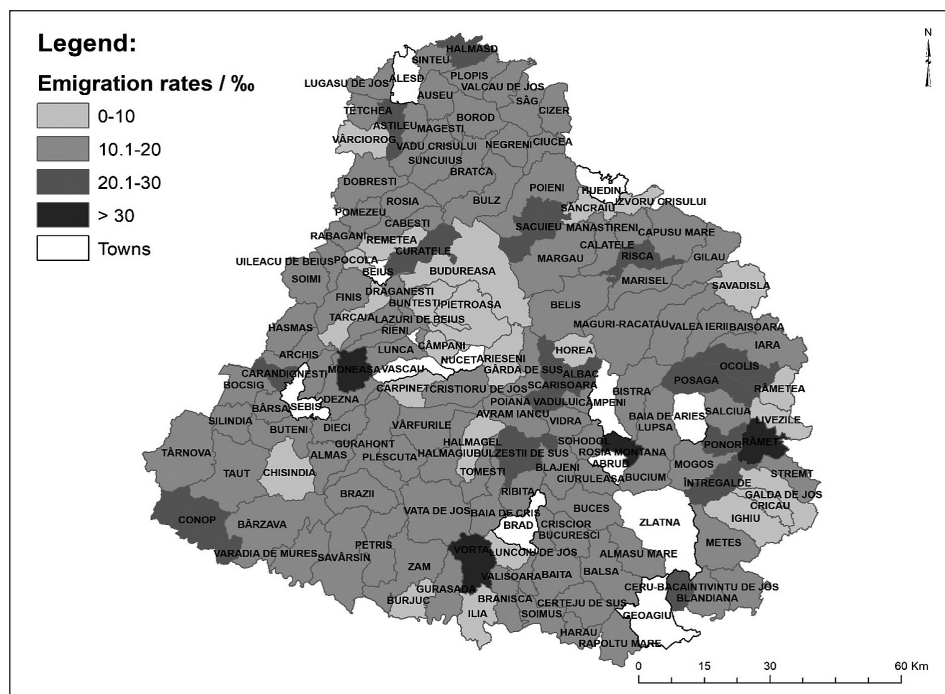
Figure 9. Numerical distribution of emigrations in the rural areas of the Apuseni Mountains in 2011.



Data source: National Institute of Statistics.

Figure 10 presents the geographical distribution of the emigration rates in the rural areas of the Apuseni Mountains in 2011. The highest emigration rate that year was 40,1 % in Râmeţ commune, part of Alba county sub-region, and the lowest was 5,5 % in Sâncraiu, part of Cluj county sub-region. Only three communes exceeded the value of 30 % (Râmeţ in the Alba Apuseni, Moneasa in the Arad Apuseni and Vorţa in the Hunedoara Apuseni), while 24 communes registered values below 10 %.

Figure 10. Spatial distribution of the emigration rates in the rural areas of the Apuseni Mountains in 2011.



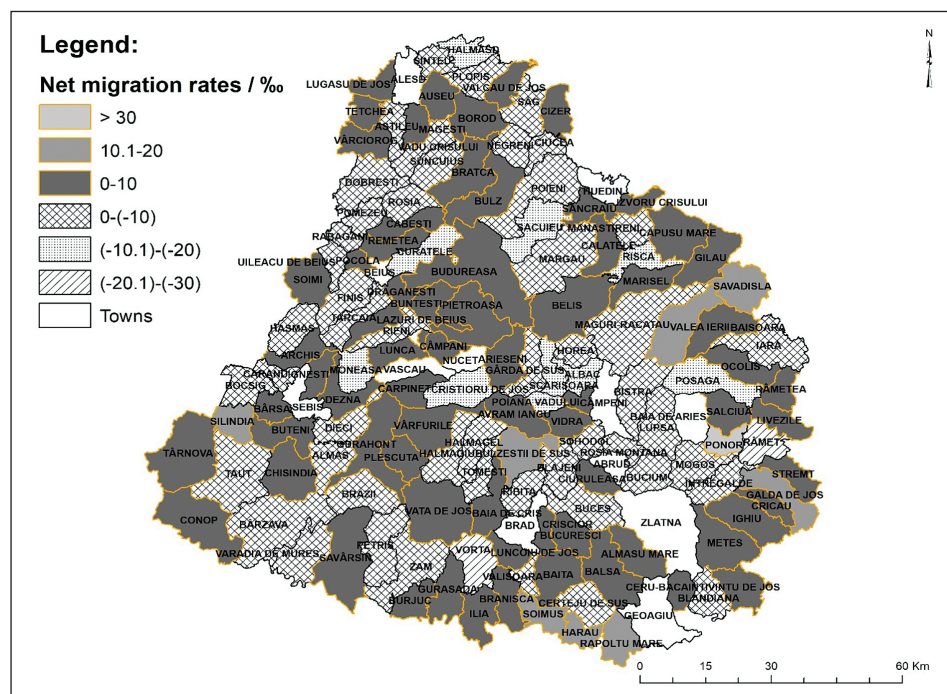
Data source: National Institute of Statistics.

Regarding the percentage distribution of the emigration rates in the rural areas of the Apuseni Mountains in 2011, it is clear that the rates between 10.1 and 20‰ are dominant with 69% of the total emigration rate values, followed by the rates between 0 and 10‰ with 17%. Higher rates—between 20.1 and 30‰—have a share of 11%, and the highest ones—over 30‰—are only 1%.

In 2011, positive net migration rates (Figure 11) were higher in number than in 1992. 55.7% of the rural areas in the Apuseni Mountains registered positive rates, and 88.4% of these had values between 0 and 10‰. This implies that, in numerous communes, the difference between settlers and emigrants is not significant, with possible dysfunctions that may generate a negative migratory balance. The highest net migration rate of the whole rural area in the Apuseni Mountains was 37‰ in Ponor commune—part of Alba Apuseni. At the other end, there was Vorța commune in Hunedoara Apuseni, which registered a net migration rate of -25.1‰. Besides Ponor commune, there had been eight communes which registered net migration rates over 10‰: Bulzești de Sus 14.8‰; Galda de Jos 10.6‰; Hărau 12.6‰; Rapoltu Mare 11.2‰; Săvădisla 11.6‰; Șilindia 14.4‰; Șoimuș 13.1‰; Valea Ierii 10.1‰. At the

same time, we need to emphasize that we identified eight communes in which the net migration rate was 0, the number of the persons settled being equal to the number of the persons who emigrated: Almaşu Mare, Avram Iancu, Beliș, Buntești, Buteni, Ocoliș, Pietroasa, and Sălciua.

Figure 11. Spatial distribution of the net migration rates in the rural areas of the Apuseni Mountains in 2011.



Data source: National Institute of Statistics.

4 CONCLUSIONS

Emigration primarily leads, in the case study area, to a decrease in the number of inhabitants which, in turn, can cause depopulation. As most emigrants are young people and adults, it also considerably disrupts the population age structure, with increases in the percentage of people over 60 years of age, thus causing demographic aging to set in. These two phenomena, which can be viewed as demographic risks, have the most significant negative impact on the functionality of the territorial system of the Apuseni Mountains (Boțan, 2010).

It can be said that the rural areas of the Apuseni Mountains are fragile from the migration dynamics point of view. In 1992, the number of the emigrants was higher than the

number of the people who settled in the area. Therefore, negative net migration rates were registered in the most parts of the rural areas. Unfortunately, industrial restructuring unbalanced life conditions, which stimulated migration. As we have stated, mining communes lost population constantly due to the layoffs, as the employees made redundant were forced to emigrate in order to find another workplace by which to support their families. In 2011, the migration situation was better. Population emigrated in lesser numbers, as the major part of those who emigrated in 1992 were young, therefore they left behind an aging population. The seniors were no longer interested in emigrating, as they had gotten used to the place where they had been living all their lives, some of them living by animal husbandry, others by crop farming. In fact, one can conclude that the positive net migration rates registered in 2011 are not high, the major part being in the range of 0–10%.

Unfortunately, the migratory dynamic in the Apuseni Mountains, alongside low birth rates, affects the school age population as well. The number of pupils in the rural areas of the Apuseni has continuously decreased during the post-communist period, with massive drops in student numbers. The most significant declines in school age populations took place in 13 administrative-territorial units: Blăjeni, Bucium, Ceru-Băcăinți, Ciucea, Întregalde, Livezile, Mogoș, Moneasa, Ocoliș, Râmreț, Râșca, Șinteu, and Tomești. The shrinkages in these administrative units were over 70% (Lung, 2019).

Under these conditions, the demographic component of the rural areas in the Apuseni Mountains continues to be vulnerable to depopulation phenomena, as there is a lack of efficient measures from the part of the decision makers.

References

- Boswell, C., Andrew, G., 2011. Migration and mobility in the European Union. Basingstoke: Palgrave Macmillan.
- Boțan, C. N., 2010. Țara Moților. Studiu de Geografie Regională [The Land of Moți. Study of Regional Geography]. Cluj-Napoca: Presa Universitară Clujeană.
- Boțan, C. N., Ilovan, O-R., 2006. Trends of industrial reconversion in the Land of the Moți. *Romanian Review of Regional Studies*, 2, 1, pp.113–120.
- Buș, R-M., Lung, M-S., Colcer, A-M., 2017. Traditional crafts and folklore as a means of economic development in the Land of Călata. *Territorial Identity and Development*, 2, 1, pp. 64–77.
- Çaglar, A., Nina, G-S., 2010. Introduction. Migrants and cities. In: Glick Schiller, N., Çaglar, A. (ed.). *Locating migration: Rescaling cities and migrants*. Ithaca, NY: Cornell University Press, pp. 5–24.
- Caponio, T., Jones-Correa, M., 2018. Theorising migration policy in multilevel states: The multilevel governance perspective. *Journal of Ethnic and Migration Studies*, 44, 12, pp. 1995–2010. DOI: 10.1080/1369183X.2017.1341705.
- Cândea, M., Cimpoeu, I., Bran, F., 2006. Organizarea, amenajarea și dezvoltarea durabilă a spațiului geografic [Organization, spatial planning and sustainable development of geographic space]. București: Editura Universitară.

- Constantin, V., 2011. Așezările din arealele miniere din Munții Apuseni: studiu de geografie aplicată [The settlements in the mining areas in the Apuseni Mountains: applied geography study]. Doctoral thesis. Cluj-Napoca: Babeș-Bolyai University of Cluj-Napoca, Faculty of Geography.
- Drăgan, M., 2011. Reziliența sistemului regional Munții Apuseni” [Resilience of the Apuseni Mountains regional system]. Doctoral thesis. Cluj-Napoca: Babeș-Bolyai University of Cluj-Napoca, Faculty of Geography.
- Esbenshade, J., 2007. Division and dislocation: Regulating Immigration through local housing ordinances. Washington, DC: American Immigration Law Foundation.
- Lung, M-S., 2019. The evolution of the school population in the Carpathian mountain space. Case study: urban and rural environment of Apuseni Mountains (Romania). *Geograficando*, 15, 1, e049. DOI: 10.24215/2346898Xe049.
- Lung, M-S., 2018. The natural dynamics of the rural population in Apuseni Mountains (2011 Census). *Romanian Review on Political Geography/Revista Română de Geografie Politică*, 20, 2, pp 41–48.
- Lung, M-S., Gligor, V., 2018. Demographic changes in the urban space of Apuseni Mountains. *Analele Universității din Oradea, seria Geografie*. 28, 2, pp 64–173.
- Morar, C., 2011. Several social impacts of mine closures in the disadvantaged areas of Bihor County, Romania. *Forum geografic. Studii și cercetări de geografie și protecția mediului*, 10, 2, pp 303–311.
- Motomura, H., 2010. Immigration outside the law. *Columbia Law Review*, 108, pp. 2037–2097.
- Mureșan, G. A., 2016. Regiuni critice [Critical regions]. Cluj-Napoca: Editura Risoprint.
- Mureșan, G-A., Boțan, C-N., 2015. The socio-occupational structure of the population in the Apuseni Mountains. Case study: the Land of the Moți. *Romanian Review of Regional Studies*, 11, 2, pp 49 –56.
- National Institute of Statistics, Tempo – Online. Dataset. URL: <http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table> (accessed 01.10.2018).
- Pop, G., 2000. Carpații și Subcarpații României [Carpathians and Sub-Carpathians of Romania]. Cluj-Napoca: Editura Presa Universitară Clujeană.
- Provine, D-M., Gabriella, S., 2011. Suspecting immigrants: Exploring links between racialised anxieties and expanded police powers in Arizona. *Policing and Society*, 21, 4, pp. 468–479.
- Scholten, P., 2011. Framing immigrant integration: Dutch research-policy dialogues in comparative perspective. Amsterdam: Amsterdam University Press.
- Ștefanko, O., 2004. Despre slovacii din România [About Slovaks in Romania]. Nadlak: Editura Vydavateľstvo Ivan Krasko.
- Stupariu, M. I., Herman, G. V., Grama, V., 2018. The structure of migration flows from Romania to Italy (2008–2016). *Romanian Review on Political Geography/Revista Română de Geografie Politică*, 20, 1, pp. 5–16.

Surd, V., Zotić, V., Puiu, V., Moldovan, S. C., 2007. Riscul demografic în Munții Apuseni [Demographic risk in the Apuseni Mountains]. Cluj-Napoca: Editura Presa Universitară Clujeană.

MIGRACIJSKA DINAMIKA PODEŽELSKEGA PREBIVALSTVA V GORSKI POKRAJINI APUSENI V POSTSOCIALISTIČNEM OBDOBJU

Povzetek

Izseljevanje lahko, tako kot na območju študije primera, vodi v zmanjšanje števila prebivalstva, kar lahko povzroči depopulacijo. Ker je večina izseljencev mladih oziroma mlajših odraslih, proces izseljevanja zelo vpliva tudi na starostno strukturo prebivalstva, saj se poveča delež starejših od 60 let, kar povzroča staranje prebivalstva območja. In ravno omenjena procesa, izseljevanje in staranje prebivalstva, imata zelo velik vpliv na podeželska naselja gorskega območja Apuseni v Romuniji.

Z vidika migracijske dinamike so podeželska območja v gorstvu Apuseni zelo ranljiva. Leta 1992 je bilo število izseljenega prebivalstva večje od priseljenega, zato so v večini podeželskih naselij zabeležili negativni selitveni prirast. V naslednjih letih pa je gospodarska preobrazba območja izselitvene procese še pospešila. Rudarske občine so zaradi odpuščanja delavcev pričele izgubljati prebivalstvo, saj so bili odpuščeni delavci prisiljeni poiskati si zaposlitev drugje, da bi lahko preživeli svoje družine. Leta 2011 je bila migracijska dinamika nekoliko boljša. Prebivalstvo se tega leta ni tako intenzivno izseljevalo; a to predvsem zaradi dejstva, da se je leta 1992 odselila večina mladega prebivalstva, medtem ko je starejše prebivalstvo, ki ni bilo nagnjeno k izseljevanju, ostalo. Starejše prebivalstvo je sprejelo tamkajšnji način življenja in preživljanja s kmetovanjem (vzrejo živine oziroma pridelavo poljščin). Za leto 2011 smo tako zabeležili rahlo pozitivno stopnjo selitev (0–10 ‰).

Migracijska dinamika v podeželskih naseljih gorstva Apuseni vpliva na nizko rodnost ter s tem tudi na šolsko populacijo. Po padcu komunizma se je število šolske populacije na teh območjih stalno zmanjševalo. Največji upad šolajoče se populacije je bilo zaznati v 13 upravno-teritorialnih enotah: Blăjeni, Bucium, Ceru-Băcăinți, Ciucea, Întregalde, Livezile, Mogoș, Moneasa, Ocoliș, Râmreț, Râșca, Șinteu in Tomești.

Demografska dinamika je v podeželskih naseljih gorskega območja Apuseni še danes zelo občutljiva, saj s strani različnih deležnikov odločanja primanjkuje učinkovitih ukrepov.

(Prevedla Mojca Ilc Klun)

NAVODILA AVTORJEM ZA PRIPRAVO PRISPEVKOV V ZNANSTVENI REVII DELA

1. Znanstvena revija DELA je periodična publikacija Oddelka za geografijo Filozofske fakultete Univerze v Ljubljani. Izhaja od leta 1985. Namenjena je predstavitvi znanstvenih in strokovnih dosežkov z vseh področij geografije in sorodnih strok. Od leta 2000 izhaja dvakrat letno v tiskani in elektronski obliki (<http://revije.ff.uni-lj.si/Dela>). Revija je uvrščena v mednarodne baze (Scopus, CGP – Current Geographical Publications, DOAJ, ERIH PLUS, GEOBASE, Central and Eastern European Academic Source, GeoRef, Russian Academy of Sciences Bibliographies, dLib.si, International Bibliography of the Social Sciences) in ima mednarodni uredniški odbor.

2. V prvem delu so objavljeni znanstveni (1.01 in 1.02 po kategorizaciji COBISS) in strokovni članki (1.04). V drugem delu se objavljajo informativni prispevki v rubriki POROČILA, in sicer biografski prispevki (obletnice, nekrologi), predstavitve geografskih monografij in revij, pomembnejše geografske prireditve in drugi dogodki idr.

3. Znanstveni in strokovni članki so lahko objavljeni v treh jezikovnih različicah: dvojezično slovensko-angleško, samo v slovenskem jeziku, samo v angleškem jeziku. Prispevki morajo imeti naslednje sestavine:

- naslov članka;
- ime in priimek avtorja/avtorjev;
- avtorjev poštni naslov (npr. Oddelek za geografijo Filozofske fakultete Univerze v Ljubljani, Aškerčeva cesta 2, SI-1000 Ljubljana);
- avtorjev elektronski naslov;
- izvleček (skupaj s presledki do 500 znakov);
- ključne besede (do 8 besed);
- besedilo članka (skupaj s presledki do 30.000 znakov; v primeru daljših prispevkov naj se avtor predhodno posvetuje z urednikom);
- v primeru enojezičnih člankov tudi povzetek/summary v drugem jeziku (skupaj s presledki od 5000 do 8000 znakov) ter prevod izvlečka in ključnih besed v drugi jezik;
- ime prevajalca.

4. Članek naj ima naslove poglavij in naslove podpoglavij, označene z arabskimi številkami v obliki desetiške klasifikacije (npr. 1 Uvod, 2 Metode, 3 Rezultati in razprava, 4 Sklep, Literatura in viri ipd.). Razdelitev članka na poglavja je obvezna, podpoglavja naj avtor uporabi le izjemoma.

5. Avtorji naj prispevke pošljejo v digitalni obliki v formatih *.doc, *.docx ali *.odt. Digitalni zapis besedila naj bo povsem enostaven, brez slogov in drugega zapletenega oblikovanja, brez deljenja besed, podčrtavanja in podobnega. Avtorji naj označijo le krepki in ležeči tisk. Besedilo naj bo v celoti izpisano z malimi tiskanimi črkami (velja tudi za naslove in podnaslove, razen velikih začetnic), brez nepotrebnih krajšav, okrajšav in kratic.

6. Zemljevidi, grafične priloge in fotografije morajo upoštevati največjo velikost v objavljenem delu, to je 125 x 180 mm. Rastrski formati (*.tiff ali *.jpg) morajo biti oddani v digitalni obliki z ločljivostjo najmanj 300 pik na palec (dpi). Zemljevidi in druge grafične priloge v vektorski obliki (*.ai, *.pdf, *.cdr) morajo vsebovati fonte, večje od 6 pt. Grafikoni morajo biti izdelani s programom Excel ali sorodnim programom (avtorji jih oddajo skupaj s podatki v izvorni datoteki, npr. Excelovi preglednici). Če avtorji ne morejo oddati prispevkov in grafičnih prilog v navedenih oblikah, naj se predhodno posvetujejo z urednikom. Za grafične priloge, za katere avtorji nimajo avtorskih pravic, morajo priložiti fotokopijo dovoljenja za objavo, ki so ga pridobili od lastnika avtorskih pravic.

7. Avtorji so dolžni upoštevati način citiranja v članku ter oblikovanje seznama virov in literature, preglednic in ostalega grafičnega gradiva, kot je to navedeno v podrobnejših navodilih za pripravo člankov na povezavi <http://revije.ff.uni-lj.si/Dela/about/submissions#authorGuidelines>. Za dela, ki jih je avtor uporabil v elektronski obliki, naj poleg bibliografskih podatkov navede še elektronski naslov, na katerem je delo dostopno bralcem, in datum citiranja. Za znanstvene članke s številko DOI avtorji navedejo DOI številko.

8. Znanstveni in strokovni članki bodo recenzirani. Recenzentski postopek je praviloma anonimen, opravita ga dva kompetentna recenzenta. Recenzenta prejmeta članek brez navedbe avtorja članka, avtor članka pa prejme recenzentove pripombe brez navedbe recenzentovega imena. Če recenziji ne zahtevata popravka ali dopolnitve članka, se avtorju članka recenzij ne pošlje. Uredniški odbor lahko na predlog recenzentov zavrne objavo prispevka.

9. Avtorji, ki želijo, da se njihov članek objavi v reviji, se strinjajo z naslednjimi pogoji:

- Pisci besedila z imenom in priimkom avtorstva potrjujejo, da so avtorji oddanega članka, ki bo predvidoma izšel v reviji DELA v okviru Znanstvene založbe Filozofske fakultete Univerze v Ljubljani (Univerza v Ljubljani, Filozofska fakulteta, Aškerčeva 2, 1000 Ljubljana). O likovno-grafični in tehnični opremlitvi dela ter o pogojih njegovega trženja odloča založnik.
- Avtorji jamčijo, da je delo njihova avtorska stvaritev, da na njem ne obstajajo pravice tretjih oseb in da z njim niso kršene kakšne druge pravice. V primeru zahtevkov tretjih oseb se avtorji zavezujejo, da bodo varovali interese založnika ter mu povrnili škodo in stroške.

- Avtorji obdržijo materialne avtorske pravice ter založniku priznajo pravico do prve izdaje članka z licenco Creative Commons Attribution-ShareAlike 4.0 International License (priznanje avtorstva in deljenje pod istimi pogoji). To pomeni, da se lahko besedilo, slike, grafi in druge sestavine dela prosto distribuirajo, reproducirajo, uporabljajo, priobčujejo javnosti in predelujejo, pod pogojem, da se jasno in vidno navede avtorja in naslov tega dela in da se v primeru spremembe, preoblikovanja ali uporabe tega dela v svojem delu, lahko predelava distribuira le pod licenco, ki je enaka tej.
- Avtorji lahko sklenejo dodatne ločene pogodbene dogovore za neizključno distribucijo različice dela, objavljene v reviji (npr. oddaja v institucionalni repozitorij ali objava v knjigi), z navedbo, da je bilo delo prvič objavljeno v tej reviji.
- Pred postopkom pošiljanja ali med njim lahko avtorji delo objavijo na spletu (npr. v institucionalnih repozitorijih ali na svojih spletnih straneh), k čemur jih tudi spodbujamo, saj lahko to prispeva k plodnim izmenjavam ter hitrejšemu in obsežnejšemu navajanju objavljenega dela.

10. Avtor sam poskrbi za jezikovno ustreznost svojega besedila in prevoda (vključno z izvlečkom, ključnimi besedami in povzetkom članka). Če je besedilo jezikovno neustrezno, ga uredništvo vrne avtorju, ki mora poskrbeti za lektorski pregled besedila. Če obseg avtorskega dela ni v skladu z navodili za objavo, avtor dovoljuje izdajatelju, da ga po svoji presoji ustrezno prilagodi.

11. Izdajatelj poskrbi, da bodo vsi prispevki s pozitivno recenzijo objavljeni, če bo imel zagotovljena sredstva za tisk. O razporeditvi prispevkov odloča uredniški odbor. Vsakemu avtorju pripada en brezplačen tiskan izvod publikacije.

12. Avtorji naj prispevke pošljejo na elektronski naslov *dela_geo@ff.uni-lj.si*.

INSTRUCTIONS FOR AUTHORS PREPARING ARTICLES FOR THE SCIENTIFIC JOURNAL – DELA

1. The scientific journal DELA is a periodical publication of the Department of Geography, Faculty of Arts, University of Ljubljana. It has been published since 1985. It is dedicated to presenting scientific and technical achievements in all fields of geography and related disciplines. Since 2000 it has been published twice yearly in print and electronic form (<http://revije.ff.uni-lj.si/Dela>). The magazine is included in the international databases (Scopus, CGP – Current Geographical Publications, DOAJ, ERIH PLUS, GEOBASE, Central and Eastern European Academic Source, GeoRef, Russian Academy of Sciences Bibliographies, dLib.si, International Bibliography of the Social Sciences) and has an international Editorial Board.

2. Published in the first part are scientific articles (1.01 and 1.02 by COBISS categorisation) and professional articles (1.04). Published in the second part are informative articles categorised as REPORTS as well as biographical contributions (anniversaries, obituaries), reviews of geographical monographs and journals, major events in the field of geography and other events, etc.

3. Scientific and professional articles may be published in one of three language configurations: bilingual Slovene-English, entirely in Slovene or entirely in English

Articles must have the following components:

- Article title;
- Name and surname of author/authors;
- Author's address (eg. Department of Geography, Faculty of Arts, University of Ljubljana, Aškerčeva cesta 2, 1000 Ljubljana, Slovenia);
- Author's email;
- Abstract (up to 500 characters with spaces);
- Keywords (up to eight);
- Article text (up to 30,000 characters with spaces; for longer articles authors should consult with the editor before submitting);
- In cases of articles written in one language, these must also include a summary in the other language (between 5,000 and 8,000 characters with spaces) and translations of the abstract and keywords;
- Name of translator.

4. The article should have chapter headings and subheadings identified with Arabic numerals in the form of decimal classification (e.g. 1 Introduction, 2 Methods, 3 Results and discussion, 4 Conclusion, References etc.). Structuring the article in chapters is mandatory, authors may use sub-chapters only in exceptional cases.

5. Authors should submit their articles as digital copies – format may be *.doc, *.docx or *.odt. The digital version of the text should be completely clean, without styles and other sophisticated design, without line break hyphenation nor underlining, and so forth. Authors may mark using only bold and italic text. The text should be written entirely in lowercase (including in the title and subtitle, with the exception of capitalised words) without unnecessary contractions, acronyms and abbreviations.

6. Maps and other graphic materials must conform to the format of the journal. Full-page figures need to be sized 125 x 170 mm, while smaller figures are restricted to a maximum width of 125 mm. Font size must be at least 6pt. All graphic materials must be submitted as individual files (i.e. not as part of the file with the text). Graphics (maps, etc.) should be in AI, CDR, PDF, TIFF or JPG file formats. Those in raster formats (e.g. *.tiff or *.jpg) must have a resolution of at least 300 dots per inch (dpi). Charts must be prepared in Excel or a similar programme (authors should submit them together with the data in the source file, e.g. Excel spreadsheet). If authors are unable to submit articles and graphic materials in the mentioned forms, they should consult with the editor. If an author is not the copyright holder of graphic materials then they must attach a photocopy of the approval for publication, which they have obtained from the copyright owner.

7. In articles authors are obliged to comply with the citation style and produce a reference list, tables and other graphic materials, as outlined in the detailed guidelines for the preparation of articles – available at <http://revije.ff.uni-lj.si/Dela/about/Submissions#authorGuidelines>. In instances where the author used electronic resources, in addition to the bibliographic details they should also provide a URL where readers can access the resources, and note the date it was accessed. For scientific articles with a DOI number, authors should provide the DOI number.

8. Scientific and professional articles will be peer reviewed. The peer-review process is anonymous, carried out by two competent reviewers. Reviewers receive an article without the author's name being revealed, the author of the article receives the reviewer's comments, without being given any reviewers' names. If reviewers do not demand corrections or amendments be made to the article, the reviewers do not send the author the reviewed article. Based on recommendations from the reviewers the Editorial Board may refuse to publish the article.

9. Authors wishing to have their article published in the journal agree to the following conditions:

- Listed authors (name and surname) confirm that they are the authors of the submitted article, intended for publication in the journal DELA, a publication of the Ljubljana University Press, Faculty of Arts [Znanstvena založba Filozofske fakultete Univerze v Ljubljani] (University of Ljubljana, Faculty of Arts, Aškerčeva 2,

1000 Ljubljana). Decisions concerning graphic design and technical production of the work and the conditions of its marketing are at the discretion of the publisher.

- Authors guarantee that the work is their own original composition, that no third parties have rights to the work, and that the article does not violate any other rights. In the case of third-party claims authors undertake to protect the interests of the publisher and cover the publisher's damages and costs.
- Authors retain copyright and recognise the publisher's right of first publication; the article will be licensed under a Creative Commons Attribution-ShareAlike 4.0 International License (attribution of authorship and shared authorship are covered by the same conditions). This means that text, pictures, graphs and other components of the work can be freely distributed, reproduced, used, communicated to the public and processed, provided that author's name and the article title are clearly and prominently indicated, and that in cases where changes or modifications are made or the work is used in other work, it can be distributed only under a license identical to this one.
- Authors may enter into additional separate contractual arrangements for non-exclusive distribution of the version of the work, published in the journal (e.g. submit it to an institutional repository or publish it in a book), with an acknowledgement that the work was first published in this journal.
- Before the submission process or during it authors can publish work on the internet (e.g. in institutional repositories or on their own websites), which we also encourage, as this can contribute to a fruitful exchange as well as rapid and widespread referencing of the published work.

10. Authors themselves ensure that the language used in their text is appropriate and that acceptable translations are provided (including of the abstract, keywords and summary of the article). If the language is inappropriate the Editorial Board will return it to the author, who must arrange for a professional proofreader to review the text. If the author's work is not in accordance with the instructions for publication, the author allows the publisher at their discretion to make appropriate adjustments.

11. The publisher shall ensure that all articles that are positively reviewed are published, provided it has funds available for printing. The sequence of articles is decided by the Editorial Board. Each author is entitled to one free copy of the printed publication.

12. Authors should send articles to e-mail address *dela_geo@ff.uni-lj.si*.

DELA 53

Oddelek za geografijo, Filozofska fakulteta Univerze v Ljubljani
Department of Geography, Faculty of Arts, University of Ljubljana

Založnik – Published by
Znanstvena založba Filozofske fakultete Univerze v Ljubljani

Izdajatelj — Issued by
Oddelek za geografijo, Filozofska fakulteta Univerze v Ljubljani

Za založbo — For the Publisher
Roman Kuhar, dekan Filozofske fakultete

Upravnik — Editorial Secretary
Nejc Bobovnik

Naročila – Orders
Oddelek za geografijo, Filozofska fakulteta
Aškerčeva 2, p.p. 580, SI-1001 Ljubljana, Slovenija
e-mail: nejc.bobovnik@ff.uni-lj.si

Cena — Price
15 €

Fotografija na naslovnici/Cover photo:
Reliktne vršaje kontaktnega kraka pri Slopah v Podgrajskem podolju
(foto: U. Stepišnik).
Relict contact karst alluvial fan near Slope, Podgrajsko Podolje
(photo: U. Stepišnik).