

UNDERSTANDING DISPARITIES IN SLOVENIAN RURAL AREAS: VARIOUS NEW INDICATORS

RAZUMIJEVANJE RAZLIKA U SLOVENSKIM RURALNIM PODRUČJIMA: BROJNI NOVI POKAZATELJI

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It has been widely accepted that regional development disparities are multi-faceted: on the one hand they hinder the development potentials of structurally weak rural areas, whilst on the other they stimulate faster development in distinctive, leading areas, thus re-creating old and generating new, more complex, regional differences. The paper focuses on quantitative ways of understanding the nature of rural disparities in Slovenia where the vast majority of national territory is defined as “rural” by OECD indicators. From the methodological perspective, single- and multi-level indicators were observed at the municipal level (LAU-2). Various indicators have been developed, with several looking at new generators of difference as well as indicators tailored to examine development disparities present in Slovenian rural areas. The results gained by extensive quantitative analysis could be used as scientific starting points that could inform rural policy decision makers in various rural regions. The focus on new indicators is particularly important as it highlights the challenges of such research whilst stressing the critical need for continued research into new generators and forms of disparities that may have negative consequences on rural areas, as well as possibly providing opportunities for previously problematic rural areas to address long-term development troubles.

Keywords: Slovenia; social and economic disparities; inequality; rural areas; municipalities; development indicators; development potentials

Introduction

The focus of the paper is highlighting the complex nature and extent of development disparities in Slovenia, particularly as they affect rural areas. This reflects the main goal of our research team, principally, the development of a broad range of new indicators in order to empirically identify and map a diverse range of disparities present in Slovenia. Rural areas were of particular interest to us given that development disparities often hinder the development of rural areas, whilst according to the OECD classifications the whole of Slovenia at the NUTS 3 level is regarded as “rural”. In order to provide a more nuanced perspective, our research focused on data for Slovenia’s 211 municipalities

(LAU-2). To provide some context to the issue of Slovenian development and disparities, we provide a brief overview of the history of development policy as well as of the development indicators that are already in use. The methods section then outlines the various indicators which we have developed, explaining in detail what variables they take into account. The section entitled ‘Traditional bipolar conditions?’ presents three of our research team’s composite indicators dealing with socio-economic and structural factors, with the findings of those indicators compared to hitherto studied, or otherwise traditional, understandings of development disparities in Slovenia. The paper then examines four separate issues which are particularly important for rural areas, and presents

indicators we have developed to measure various disparities associated with these issues. The four sections include: 1 - road network structure and municipal budgetary commitments; 2 - geographic dimensions of healthcare provision; 3 - fibre-optic broadband connectivity; and, 4 - wood fuelled biomass heating. In conclusion, we reflect on our research which highlights the multifaceted nature of development problems. Additionally, we also acknowledge the challenges we faced in measuring and evaluating development disparities.

Overview of Slovenian regional development and disparities

Less developed regions have been recognised in Slovenian policy since 1971, with the adoption of the Act for Measures to Promote the Development of Less Developed Areas. The Act led to almost one fifth of the territory being designated as less developed areas, namely Suha Krajina, Bela Krajina as well as the areas of north-eastern Slovenia (Kozjansko hills, Lower Drava region, Haloze hills, Slovenske Gorice, Prekija and Prekmurje). Then in 1975 a new law was adopted, the Act on the Promotion of Balanced Regional Development in the Socialist Republic of Slovenia. In the latter, three types of less developed areas were identified - less developed areas, less developed border areas and areas in transition. In addition to the areas covered by the previous law, Posotelje, Tolminsko, Brkini and the Upper Kolpa Valley were also categorised as less developed areas. In the following years the Law was amended a number of times (1980, 1985, 1988), with the principal outcome of a reduction in the share of the area considered to be less developed from 30% to 21%. In 1990, a new law was introduced which included reference to demographically endangered areas, with as much as 60% of Slovenia being defined as demographically endangered. Again the areas identified corresponded with areas defined by previous laws. Currently, the Promotion of Balanced Regional Development Act (*Zakon o spodbujanju skladnega regionalnega razvoja*) applies in Slovenia. Initially adopted in 1999, the Act was rewritten in 2005 and then again in 2011 with supplementary amendments adopted in 2012. The Act discerns three types of areas with specific development problems - economically weak areas with structural problems and high unemployment, developmentally restrictive border areas, and areas with special development factors. In total,

129 municipalities are identified as having a development problem, covering 57% of Slovenian territory and affecting 49% of the total population. Reviewing Slovenian development and its policy setting (KUŠAR, 2005), a number of clear features emerge: (1) developmental problems are very persistent; (2) development disparities in Slovenia are increasing; and, (3) accepted development policies and measures do not adequately address less developed (rural) areas. Rural areas are important living and economic spaces with their own characteristics and specific development potentials. So called coordinated national and regional development should be based on the harmonisation of rural and urban spatial dynamics (URL 15).

An official indicator for determining the development level of Slovenian municipalities has been calculated since 2011. The composite indicator incorporates ten variables which are divided into three groups (indicators of municipalities' development, municipal development risk indicators and indicators of municipalities' development opportunities). The input data are easily obtainable from databases of official institutions (SORS, Ministries, etc.). For consistency purposes, heterogeneous data is carefully selected for usage, whilst standardisation of individual variables and the final values is also undertaken (*Uredba o metodologiji za določitev razvitosti občin*, 2011).

A multifactor composite indicator approach to measuring well-being and development of Slovenian municipalities has also been used in the past. The indicator of Slovenian municipalities' well-being was developed using 49 diverse variables, divided into four categories, which relate to demographic, social, economic and environmental aspects of well-being. Though the data utilised in that case were obtained from difficult to access administrative sources (MALEŠIČ ET AL., 2009).

Methods

In devising indicators, we had many ideas regarding "innovative" indicator variables. However, we encountered problems particularly due to the fact that a lot of data was not readily available at the scale of our investigation (LAU-2, i.e. municipality level). The choice of variables incorporated into the composite indicators

was based on data availability as well as on the interaction between variables and the explanatory potential of the variables. The data for the indicators are mainly drawn from the database of the Statistical Office of the Republic of Slovenia (SORS) (URL 11, URL 14), as well as from the information released by the Ministry of Higher Education, Science and Technology. Data was also sourced from Amis' web application (URL 10) explaining potential broadband connectivity in detail, as well as from *bizi.si* (URL 2), an online database of Slovenian companies. For the preparation and the analysis of the indicators we used the most recent data available, mostly raw data for 2011 and the following years.

The **indicator of economic vitality** (Fig. 1) is a composite indicator incorporating four variables, namely, the degree of long-term unemployment, the labour migration index, the average monthly net salary and firm revenues. It should be noted that the level of long-term unemployment in some areas is not actually as high as the official statistics report as there are many non-registered workers employed in neighbouring countries (ZUPANČIČ, 2003), though accurate update figures on unofficial labour migration are unavailable.

The **indicator of structural weakness** (Fig. 2) was developed by using two groups of variables, covering economic and demographic factors. Economic variables include average monthly net earnings and long-term unemployment, whilst demographics are represented by the old-age dependency ratio.

The **indicator of development potentials** (Fig. 3) has been derived from six variables which presented municipalities economic and demographic potentials, while they have indirectly represented the potential of each area's future development. The variables fall into three categories, namely:

- Social and demographic capital (the number of associations per 1000 residents, the aging index).
- Financial and economic capital (average monthly net salary, the number of supplementary activities on farms per 1000 residents).
- Infrastructure and prospective indicator (number of primary schools and branch offices per 1000 residents, the number of sole trader enterprises per 1000 residents).

The intention behind the indicator of development potentials is to provide a comprehensive perspective on rural development,

which takes demographics, economics and agriculture, as well as, infrastructure, social capital and entrepreneurial spirit into account. Focusing on the indicator on rural areas, Slovenia's 11 city municipalities were excluded from the analysis in order to avoid methodological "noise" and results in a more detailed understanding of the situation in rural areas. Due to an integrated approach to the evaluation of rural potentials, a diverse set of variables, each exhibiting its own distinct features, has been incorporated into the composite indicator of development potentials. In order to obtain representative results of good quality, a skilful balancing of methodology and a careful selection of variables are needed. These kinds of challenges present the main problems of constructing composite indicators that would incorporate larger numbers of diverse variables, and the search for methodological solutions to these problems is ongoing.

The **indicator of public debt and investment** (Fig. 4) which focuses on fiscal implications of road network administrative responsibilities is based on data regarding the proportion of roads managed by municipalities as well as municipal road infrastructure investments and debt, calculated on a per capita basis.

For the health-care deserts indicator, we sought to examine the accessibility of health services in each municipality. Due to data inaccessibility, or otherwise, out of date and incomplete databases, this indicator proved somewhat problematic and a cartographic representation was not possible.

Two separate indicators were developed to examine broadband fibre-optic internet connectivity across Slovenia (Fig. 5). The construction of a fibre-optic broadband network is primarily carried out in so called "white spot areas" which means that the network coverage is not complete. Thus, the first indicator presents the proportion of settlements within a municipality which are equipped with broadband internet, whilst the second indicator shows and extent of connection of individual households to the fibre-optic network. Most of the data used is not kept in official statistical databases, which is why it was necessary to obtain the information from other sources and collate new data sets. The acquisition of such data proved challenging, and the quality of the data is unverified. Therefore, the obtained results cannot be considered to be a perfect and reliable perspective. This emphasizes the ever increasing demand and importance of such

data. Such database is currently being developed by the Directorate for the Information Society within the Ministry of Education, Science and Sport, together with the Surveying and Mapping Authority of the Republic of Slovenia (GURS) (URL 16). The database will offer a portfolio of some of the information, and will also provide spatial information about the network. However, a complete view of the existing broadband network will not be obtainable because the new database will not include information about the network constructed by commercial providers.

The **indicator of biomass heating self-sufficiency** (Fig. 6) was created as a response to the fact that the number of households using wood for heating has increased in recent years, especially in rural areas. Therefore, we wanted to examine differences between municipalities in terms of the proportion of households that are using biomass (wood) for heating.

Data was sourced from Statistical Office of the Republic of Slovenia, specifically from the 2002 census (URL 11) which provided details about households' sources of energy for heating. Census

data was not available for municipalities which were established after 2002. In these cases, the data was acquired from the Slovenian Forest Service, where such information is updated annually. We have also been interested in finding out which municipalities provide district heating fuelled by biomass (wood). This data was obtained directly from municipal administrations, through enquiring about whether the municipalities operated biomass district heating systems, and if so, what was the power capacity of such system. The survey was done via email and telephone, whilst information on municipal district heating systems was also obtained from municipalities' websites.

Traditional bipolar conditions?

For the purpose of the EU regional policy, Slovenia is divided into two cohesion regions (Western and Eastern Slovenia), based on the assumption that the two regions experience differing development dynamics at the NUTS 2 level. Through the use of two composite indicators,

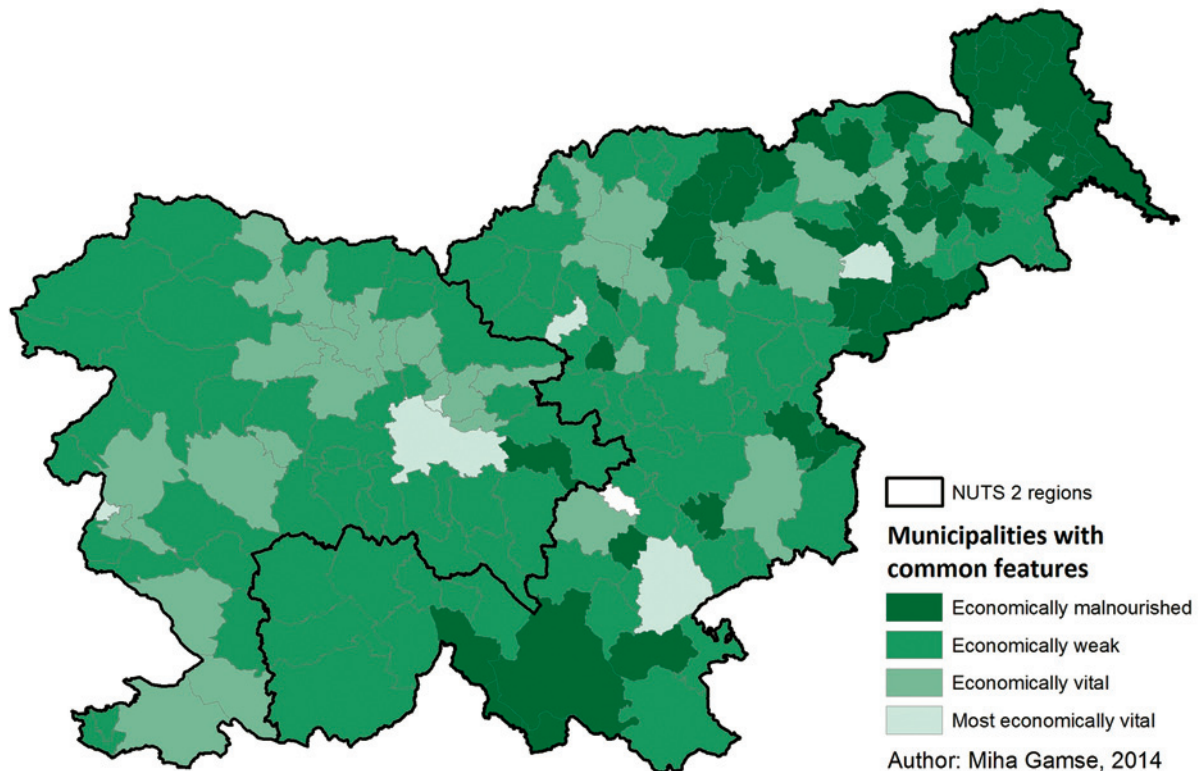


Figure 1 Indicator of economic vitality
Source: SORS

specifically those indicating economic vitality and structural weakness, we wanted to highlight positive and negative development tendencies that are statistically significant.

Both indicators clearly emphasize (see Fig. 1 and 2) the differences between the western and the eastern cohesion region. Both indicators have shown that the municipalities in western Slovenia generally have more positive results, whilst the opposite is true for municipalities in eastern Slovenia. There were a few exceptions regarding the municipalities that have shown worse results, which suggests that these municipalities are less economically viable and structurally weaker. A more detailed insight into the results of the eastern region showed both indicators suggesting that the municipalities with the most negative results were located in the southeast (Upper Kolpa Valley region and Bela Krajina) and the northeast (Podravska [Drava] and Pomurska [Mura] NUTS 3- statistical regions). Generally, both indicators have revealed similar groupings of municipalities with common characteristics. Also, both indicators have shown that the most prominent are the peripheral zones

of the country (Kolpa Valley region, Bela Krajina, Kozjansko hills and the Goričko region). They are characterised by their peripheral features, which means that they have poor road connections with the centre of the country and are relatively far from major employment centres. Amongst human geographic factors that have continually had the adverse effect on the development of these areas, historical dimensions stand out (such as the absence of rail connections and previous political decisions). The current structure of the local administration in Slovenia also appears to play a significant role in the development, with our indicators showing the worst results for small municipalities (especially for those in the northeast of the country). Similar findings were also discussed by Perpar, Kastelec and Udovč (2013), who found that smaller municipalities consume more resources per capita, while being less successful at raising revenue and thus are often dependent on state funding to finance operations. At the same time, natural geographic factors (topography, unfavourable soil, karst terrain, lack of natural resources, etc.) influence the characteristics and the dynamics of the areas.

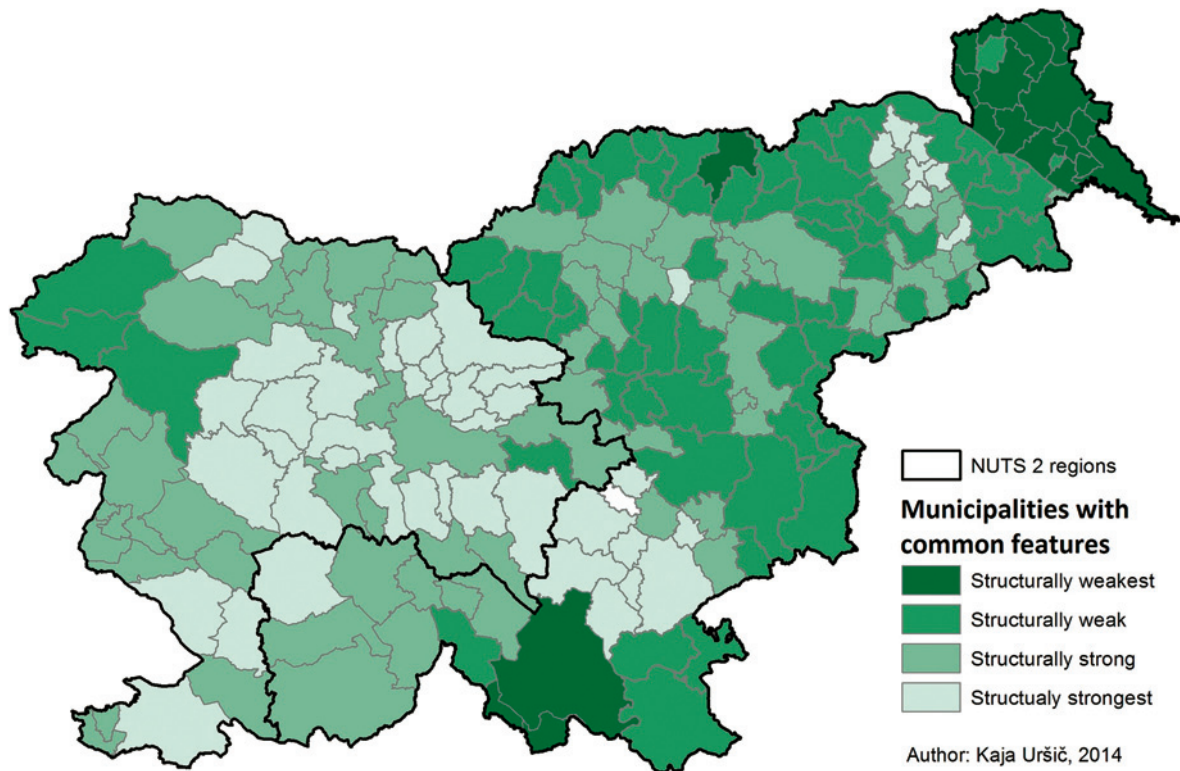


Figure 2 Indicator of structural weakness
Source: SORS

Among the municipalities with the best results it is difficult to see a particular pattern; the results show a more diffuse distribution of such municipalities. Slightly clearer results (clusters of positive results) may be observed with regards to the indicator of structural weakness, particularly when observing the cartographic presentation of the indicator which shows some larger clusters. Good results were achieved by the municipalities in the peri-urban areas around Ljubljana (Lukovica, Komenda, Dol pri Ljubljani and Cerklje na Gorenjskem), in Dolenjska municipalities (surrounding Novo Mesto) and in the lower Gorenjska region (surrounding the municipality of Škofja Loka), as well as by those in western Slovenske Gorice (Benedikt and Cerkvonjak). In addition to these, there are some more atomised examples of positively assessed municipalities such as in the Primorska region (for example the City Municipality of Koper). Regional patterns are less noticeable when considering the indicator of economic vitality. For this indicator the best results represent the most economically successful municipalities which are dispersed almost across the whole country. The most vital municipality by far is Trzin, which supports the conclusions of Nared (2002) that the mentioned municipality is the most economically developed in Slovenia. At the same time, the municipality's vicinity to Ljubljana also helps with maintaining favourable demographic conditions. Amongst the most economically vital municipalities, the dominant ones are those with the most successful companies. For example, the municipality of Nazarje is the base of *BSH Home Appliances*, Ljubljana is the base for 47 companies among the 100 most successful Slovenian companies, Novo Mesto has *Krka* and *Revoz*, while *Letrika* is located in Šempeter-Vrtojba (URL 1).

It should be noted that in some cases two indicators produce contrasting perspectives of certain municipalities. The typical examples are the group of municipalities in western Slovenske Gorice (with the exception of municipalities Benedict and Lenart) and the Haloze municipality. Whilst the indicator of structural weakness suggests that these areas are relatively more developed, the indicator of economic vitality ranks them as poor performers. The reason stems from the fact that these municipalities exhibit better demographic profiles, with the region being considered a part of the Maribor and Ptuj peri-urban hinterlands. The indicators of structural weakness and economic vitality have successfully demonstrated

developmental disparities typical for Slovenia. They expressed bipolarity - on one hand, the west is structurally strong and economically developed, and on the other, the east is structurally weak and less developed. Of course, there are certain exceptions, but they do not change the bigger picture. An interesting duality occurs in the Southeast Slovenia statistical region, as it is characterised by the presence of both structurally strong municipalities as well as the weak ones. Thus, in this region we have examples of economically successful municipalities such as Novo Mesto and the nearby municipalities (Šentrupert, Šmarješke Toplice and Dolenjske Toplice), as well as pronouncedly lagging municipalities which are demographically endangered and less economically developed such as Kostel, Osilnica, Loški Potok, Semič and Kočevje. A quality feature of both indicators is their ability to highlight development disparity tendencies. In addition to the two extremes (the economically and structurally strong centre and the weak border areas), there are also "intermediate" areas - neither strong nor weak. The "intermediate" areas have also responded differently to development impulses. The most successful among them have utilised the endogenous resources and public funds (EU and domestic) to successfully retain residents and provide a satisfactory standard of living (POTOČNIK SLAVIČ, 2010).

The index of development potentials (Fig 3) aims to comprehensively demonstrate disparities in the development potentials of Slovenian rural municipalities. The indicator of development potentials differs from the existing composite indicators as it incorporates variables that are particularly relevant for the development of rural areas. To make the indicator more useable, the variables are fewer and, more importantly, the data is easily accessible. This was only partially accomplished for the previously discussed indicator of Slovenian municipalities' well-being. Along with methodological coordination of individual variables, these conditions constitute a major challenge.

Figure 3 shows the results of the indicator of development potentials, which reveals spatial patterns similar to most of those exhibited by the other multifactor indicators examining structural issues presented in this paper.

Collectively, these indicators shed more light on the diversity of rural areas and disparities across Slovenia, and highlight previously discussed problems. Typical polarisation (Eastern

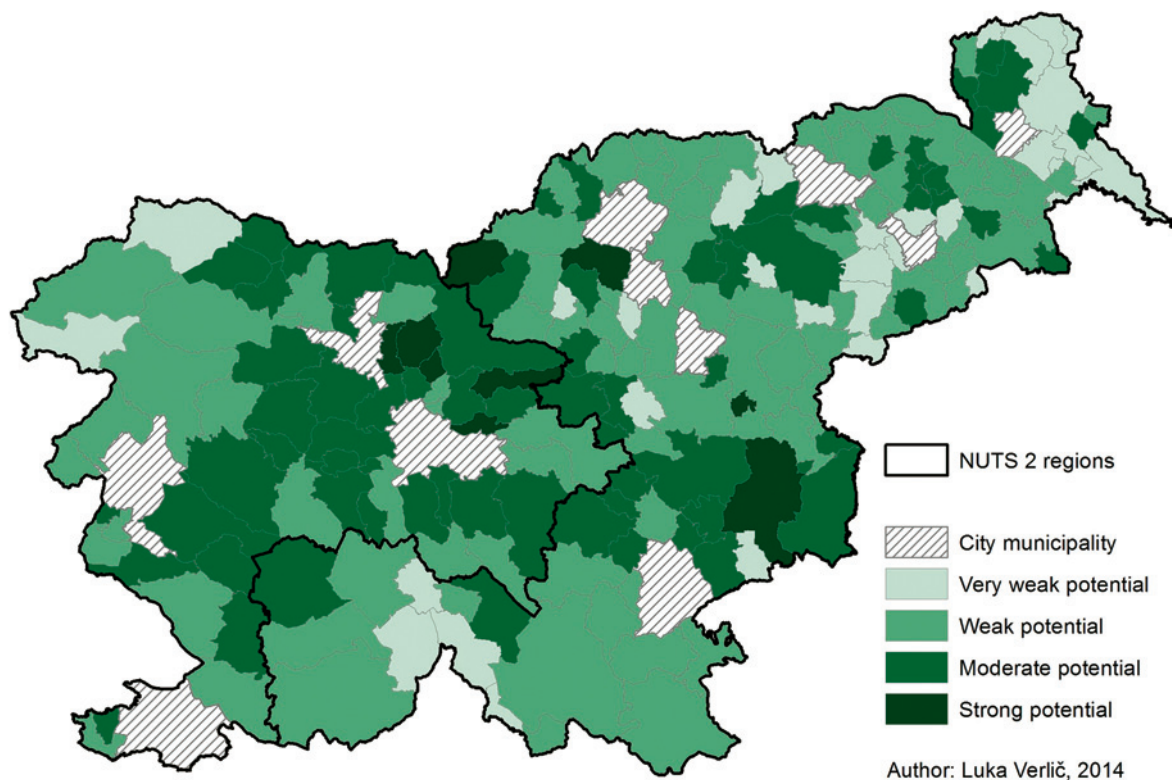


Figure 3 Indicator of development potentials of municipalities
Sources: SORS, MNZ

- Western Slovenia) is not a strong feature. In fact, the municipalities are grouped in a mosaic pattern, with each group featuring its own specific characteristics and narratives. The role of bordering municipalities has also shown to be noticeable in their development potential assessment. However, this is not the norm. In order to provide better explanations and more representative results, as well as to identify clear spatial patterns, the indicator requires further methodological improvements.

The municipal road system - an indicator of wealth or poverty?

The vitality of rural areas is largely dependent on budgets of municipalities because those with high expenditures and debt have fewer resources for the promotion of specific projects that affect rural development. This is the case especially in smaller municipalities with small population, which are often marginalised or in peripheral

border areas. Rural municipalities are tasked with a number of responsibilities under the Local Government Act 2007 (*Zakon o lokalni samoupravi uradno prečiščeno besedilo*) including, amongst other commitments, the provision of social services as well as the construction and maintenance of infrastructure which in case of rural municipalities also tends to include relatively dense road networks with municipally managed roads (i.e. under jurisdiction of municipalities) as a key part of such networks. Rural areas also have a typically smaller, dispersed population and demographically unfavourable profiles, which also means that the revenue raising potentials and opportunities for administrative efficiencies are limited. These conditions, along with the structural fiscal responsibilities, served as the motivation for developing an indicator of public investment and debt, so as to test our assumption that rural municipalities would have the highest investment and maintenance costs for road infrastructure as well as high public debt on a per capita basis. The indicator is based on data about the relative share of municipal roads, investments

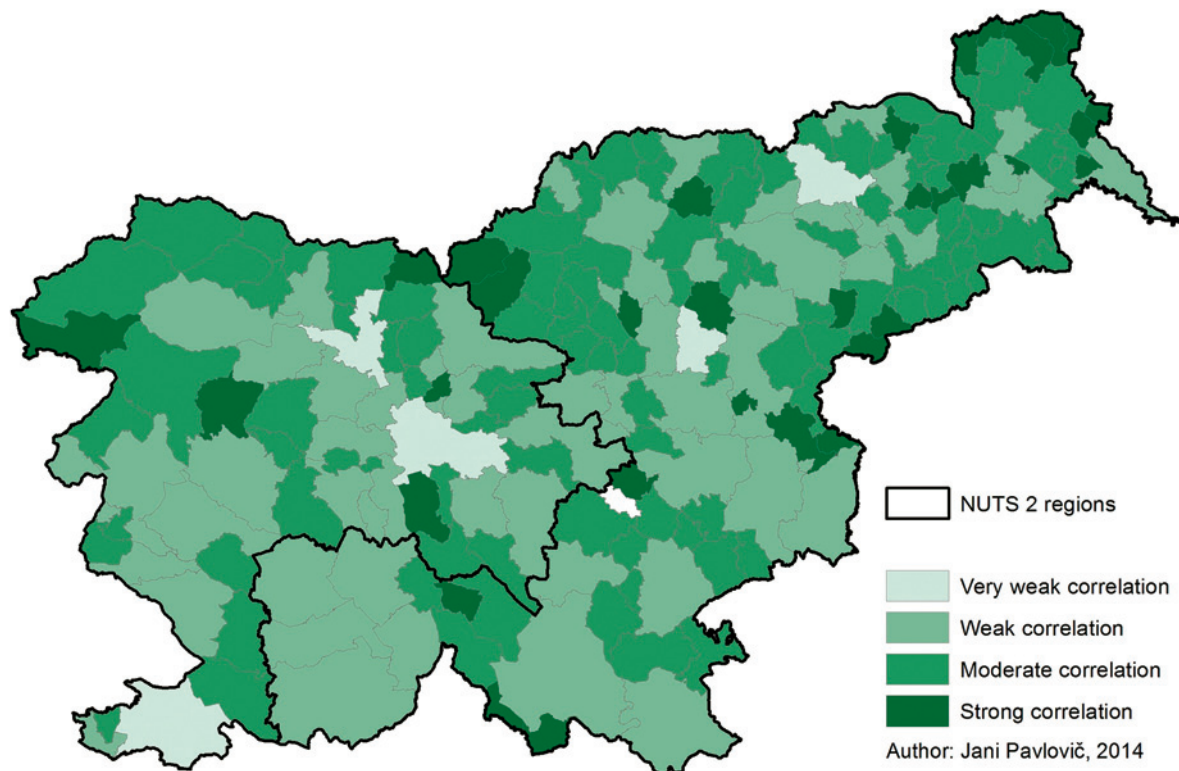


Figure 4 Correlation between Slovenian municipal debt, investment in road infrastructure and proportion of municipal roads
Source: SORS

in road infrastructure and public debt (all on a per capita basis).

The indicator shows (see Fig. 4) that there is a high correlation between the share of municipal roads, investment in road infrastructure and public debt per capita in rural areas, especially in borderland municipalities where there are relatively few significant national roads. These municipalities have dispersed road networks, consisting mainly of municipal roads. This means that a high share of the financial burden regarding the road network falls on municipal budgets. Thirty-three municipalities fell into the top quartile in terms of having strong correlations, among which seven municipalities (Dobje, Hodoš, Kobilje, Osilnica, Ribnica na Pohorju, Solčava and Trnovska vas) stand out with extremely strong correlations. Municipalities in the top quartile were characterised by road networks with a large share of municipal roads as well as by their high investment and high public debt. On the other

hand, the weakest correlations are observed in urban municipalities which have a greater share of national roads as well as larger, more concentrated populations. Municipality in the bottom quartile (with the weakest correlations) included the urban municipalities of Celje, Koper, Kranj, Ljubljana and Maribor. These municipalities are followed by rural municipalities in peri-urban areas and municipalities traversed by major national roads. These municipalities are characterised by relatively large populations living mainly in narrow bands along the main routes, with generally less reliance on municipal roads.

A positive aspect of this indicator is its utility in highlighting the most problematic cases of mainly rural municipalities, which have high expenditures for public infrastructure. It also indicates the need for a 3rd developmental axis.

Generating new development disparities: health deserts in rural Slovenia

An important aspect of quality of life in rural areas is an adequate provision of medical care, comparable to the one experienced across the country. In recent decades, much of rural Slovenia has undergone radical transformation, with depopulation and population aging in many areas. Both processes have worsened the challenges of providing quality, safe and effective healthcare for all rural residents. This has been especially the case in relatively distant, marginalised, border areas.

The key to reducing health disparities between regions is an appropriately designed network of primary public health services (general and family practitioners, paediatricians, school based medical specialists, occupational medicine specialists, gynaecologists and dentists). The design of the current system has been laid out in the Health Services Act in 2005 (*Zakon o zdravstveni dejavnosti*) which has also defined the responsibility of the municipalities. According to that act, secondary and tertiary level services are the responsibility of the national government. The public health network must be designed so as to provide optimal accessibility of health services. However, the system of health care in Slovenia has shown a shift towards a more centralised and two-tiered model which have caused quite the opposite. The problems are further exacerbated by the aging of doctors and the unpopularity of family medicine as a specialisation for new doctors. This reflects in the very small proportion of graduates who decide to work at the primary health care level, and only a few of them seek jobs in the health desert regions and municipalities (ČREŠNAR, OROŽ, 2014; URL 9). Poor wages and excessive workload in remote (rural) areas influence young people's decisions to pursue careers as general practitioners. Additional burdens are present due to a high amount of time required in outpatient emergency assistance while at the same time working in clinics. This also affects the quality of the physician's work with regular patients.

Ongoing and projected demographic changes, especially population aging, also constitute a major challenge for the public health system. The amount of medical assistance needed for a person aged over seventy-five years, is on average three times higher than for a person aged between seven and fifty (PETRIČ, ŽERDIN, 2013). A growing number of chronic patients, greater occurrence of diseases in elderly population as well as more demanding and

informed patients are just a few factors that show a need for urgent changes in terms of organisation, personnel and finances in the health system. Waiting time in the public health sector has greatly increased, often affecting patients' decisions to pay for primary health services in private facilities, especially in dentistry, where the public system is the weakest. Increasingly frequent recourse to private health services (according to the Slovenian Medical Association, there are 958 licensed private doctors and 178 unlicensed private doctors at the primary level) only moves Slovenia away from the goal of equitable access to public healthcare for all residents.

Observing the Slovenian health system as geographers, we found that accessibility and quality of health services in Slovenia are not uniform, with certain areas showing substantial disadvantage to the extent that they could be labelled as underserved or even health deserts. Demographic, economic and administrative conditions generally show that when it comes to quality public healthcare provision, it is once again rural areas and particularly border regions that have the most disadvantages. It was our intention to analyse this issue empirically and in detail and to develop a new indicator to map such health disparities. However, as we have already discussed, the changing and complex nature of the Slovenian health system along with the challenge of obtaining comprehensive data, means that we have so far been unable to successfully complete our investigations.

Digital (self)exclusion as an example of complex development disparities

For the harmonious development of the country it is becoming increasingly important to have good telecommunication connections in all the settlements. Good communication networks promote social, cultural and regional development; reduce the problem of remoteness and encourage the creation of new services which facilitate access to information and services for those connected. Quality and accessible information link rural and urban communities, and promote the integration of diverse social groups into the information society (*Strategija prostorskega razvoja Slovenije*, 2004). Good telecommunications in rural areas contribute to quality of life experienced by local residents, and at the same time also hold a strong appeal for residents from elsewhere. Consequently,

investments in rural communications infrastructure increase the liveability and reduce the decline of rural areas. In spite of this, commercial providers see remote rural areas with low population densities and aged population as relatively poor investment opportunities (RAJABIUN, MIDDLETON, 2013). However, the advantages of broadband are recognised by the EU, the national and the local institutions which have subsidised infrastructure development with the result of Slovenian rural areas being fairly well covered by the fibre-optic broadband network.

The importance of telecommunications infrastructure is also emphasized in the prepared strategies for the new programming period 2014-2020. Thus, the new Europe 2020 strategy establishes a European program for digital technologies - the European Digital Agenda. One of its objectives is the establishment of a good broadband network (URL 3; URL 15). The aim is to build a single digital market that would deliver sustainable economic and social benefits and enable the development of new services that would, in return, improve the rural populations' standard of living (e.g. E-government, online health services, etc.; URL 15). All this suggests that over the next seven years this document deserves special attention.

Developers of the broadband network in Slovenia can be divided into two groups - commercial telecommunication service providers and municipalities. The rollout of broadband infrastructure has also been encouraged by the public institutions through releasing the first open public tender for finances for construction of broadband internet infrastructure in 2007. The first project, GOŠO (construction of an open broadband network), was followed by the GOŠO 2 project with a total of 30 municipalities being selected to participate (URL 13). By subsidizing the construction of the broadband network, the authorities have also improved the quality of life in these areas.

We wanted to know how the network varies across Slovenia, especially when it comes to rural areas where the network coverage is "patchy".

We found that the fibre-optic network is rather densely distributed throughout Slovenian rural areas. The municipalities that have the largest number of equipped settlements are not those that are the most economically vital, but rather municipalities in rural areas. This largely reflects the strategic objective of the GOŠO projects, which

tended to address the needs of less populated municipalities that had not previously had good internet connections. When it comes to border municipalities, they are very poorly covered. Some of them had also entered submissions to the GOŠO projects, but were not accepted into the projects. These municipalities lack the financial resources to build the infrastructure by themselves, whilst commercial providers have shown little interest in investing in such areas, since there are too few people who might connect to the network to justify the initial investment. Although it appears that municipalities are relatively well equipped with fibre-optic internet accessible within settlements, for certain households located outside the "white spot" areas where the projects focused, accessibility remains a problem.

It is important to note that incomplete data have been used, due to a general data accessibility problems and the fact that no institution is obliged to collect them. Thus, the cartographic representation (see Fig. 5) for this indicator is included just for basic illustrative purpose and requires further work to attain better accuracy. Adequate data is not available at the Statistical Office of the Republic of Slovenia, nor in the municipalities. To move things forward, this type of data should be collected by the Directorate for the Information Society, Ministry of Education, Science and Sport (URL 7), together with the Surveying and Mapping Authority of the Republic of Slovenia (URL 16).

Compared to other municipalities, Ljubljana stands out with the largest number of households equipped with fibre-optic broadband internet. This information gives us a distorted picture because of the size of Ljubljana and its sheer number of households which greatly exceeds the number of households in other municipalities. Municipalities with a high share of their settlements connected are identified by this indicator with darker colours (Fig. 5) and the mapping also helps to identify certain problem areas. It can be confirmed that the border areas, especially in the south, north, east and northeast of the country, are the most poorly equipped with fibre-optic infrastructure. If the objective of balanced regional development is to be pursued, it is necessary to improve the infrastructure in these municipalities so that the residents in rural areas can achieve a better quality of life.

Also, it appears that in certain remote rural areas of Slovenia the level of connection to fibre-optic networks is even greater than in the major

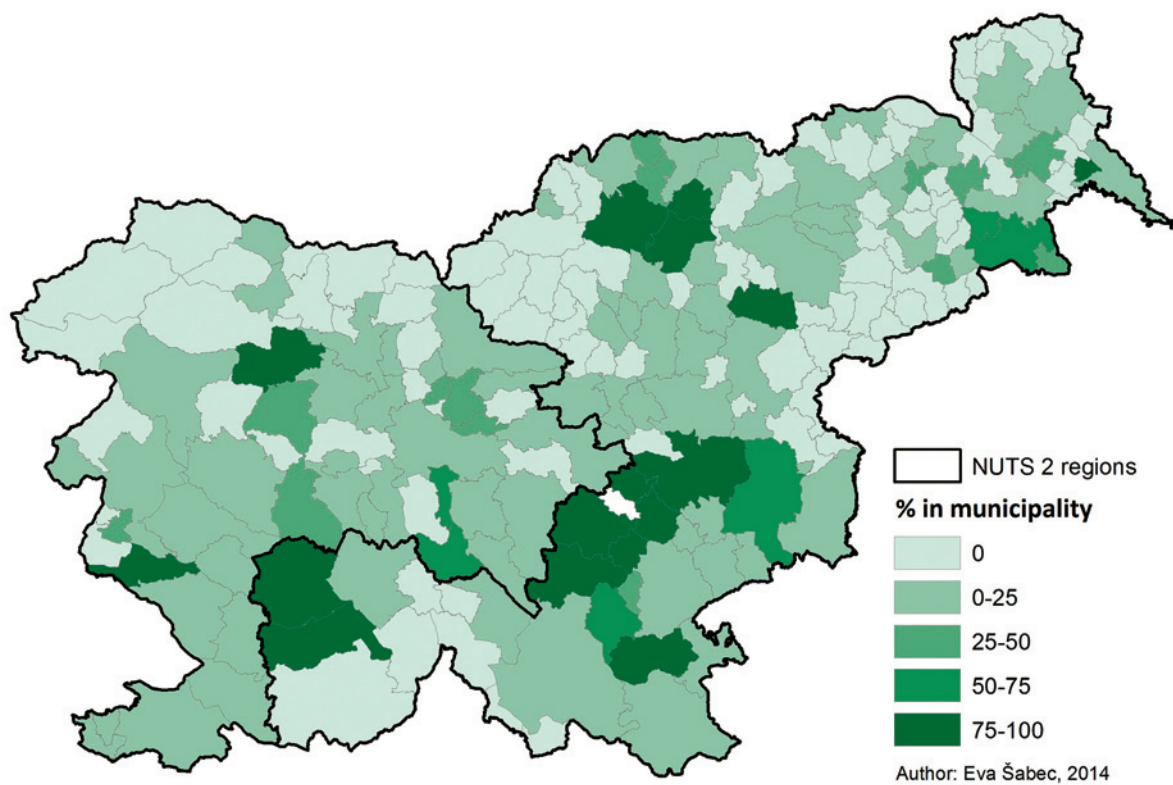


Figure 5 Percentage of settlements with access to fibre-optic broadband network
Sources: SORS, AMIS

cities. In selecting communities various indicators were taken into account - for example, the share of households in participating municipalities which would gain access to broadband located in the so called “white spot areas”; the share of private funding in the project; the proportion of households that are to be equipped with fibre-optic broadband access under the project, compared to all the households in Slovenia (URL 13).

The projects focused on specific priority areas that had no opportunities for accessing the internet. To this extent, construction of broadband infrastructure covered only parts of settlements that were located in white spots. Grey areas which were not on the priority list were those where residents theoretically already had better accessibility of internet, with expansions to the network in such areas put on hold. It is in these grey areas that local residents can face problems. The construction of infrastructure and improvement of the network is largely dependent on new government and EU incentives as local communities are not able to

cover the high financial commitments themselves. Although in the new programming period (2014-2020) a special attention will be paid to these issues, though the main focus will remain on the priority areas that have poor access to the internet or no access at all. This suggests that grey areas are to remain excluded and disadvantaged when it comes to accessing fast internet.

Despite the rollout of the broadband network, not all households have taken advantage of this innovation in rural areas to this date. In this context, one can talk about current residents' self-exclusion. In these cases it is not due to a systematic resistance to computerisation or an anti-modernisation movement in rural areas, but rather because of objective reasons. For instance, older residents do not know how to use such services. They are not interested in learning because they do not see them as useful. Poor uptake or other reasons for self-exclusion can also be partially attributed to the costs involved (i.e. network connection and usage fees), especially in times of economic crisis.

Households confronted with financial difficulties may put off modernisation despite recognising its utility value and necessity, because there are many more urgent demands and priorities in their members' everyday lives. At the same time, there is another type of exclusion. Due to modernisation and the overall tendencies of the information society, with public institutions and the media increasingly making use of web services, willingly or unwillingly, people who do not make use of modern technologies are being excluded from these networks. Thus, people without internet access are deprived of many public announcements, updates and news.

Energy self-sufficient rural areas

Slovenia is the third most afforested country in the EU, with more than 60% of its national territory covered by forests. Of Slovenia's 325 million m³ of forestry stock, the State owns 25%, whilst 75% is owned privately. Only about half of the 8 million m³ of the new annual growth is felled and processed (URL 12). This presents an opportunity for the Slovenian timber industry to increase production. Furthermore, timber offcuts could be used for energy purposes.

When it comes to the adoption of modern technology for collecting and using wood biomass, the situation in Slovenia is improving. In the past 10 years a number of district and micro-scale wood fuelled biomass systems have been constructed. In perspective, forest owners should also be actively involved, since a majority of forests are privately owned. It appears that many owners are not interested in low realisation of the maximum allowable cut, so in 2005 the amount of fell was under 50% of the potential. Part of the problem is the structure of industry with forest plots being highly fragmented, and forest management and disaster response hampered in Slovenia. In response, the government continues to support systematic measures aimed at the establishment of associations of forest owners with the view that collaboration within the sector strengthens the sector itself. This is being done in terms of raising awareness, educating owners and collective market activities (URL 6).

The need for more efficient management of Slovenian forests was thrown into sharp relief in 2014 when a natural disaster wreaked havoc and crippled the industry causing an estimated

430 million euros in damages. The consequence of the ice storms impact was that some 9 million m³ of timber needed to be cleared, exceeding the annual harvest by 2 million m³ (URL 18). By the 18th August 2014, only 26% of the timber mass damaged by ice storm has been cleared (URL 17). The disaster's impact on wood fuel market will probably also be significant, with the number of heating self-sufficiency of households (who own a large proportion of private forest) set to increase, and the inferior quality wood saturating the European market. According to Krajnc (2007, URL 6) from the Forestry Institute of Slovenia, the current wood fuel prices reflect the abundance of firewood and pellets built up over recent mild winters, with prices not yet reflecting the problems associated with the ice storm, since the price drop has been relatively small and could be attributed to the usual annual fluctuations (URL 8).

Timber biomass is a traditional source of energy for central and water heating in households. Among the renewable energy sources used for heating in Slovenia, timber biomass is the most important. More than 75% is used by households for heating residential spaces and for hot water systems.

Figure 6 displays the share of dwellings heated with wood in Slovenian municipalities, with yellow spots designating municipalities with biomass district heating. The map reveals disparities between urban and rural areas, with urban municipalities having the smallest share of dwellings heated with wood. Thus, urban areas stand out because they rely mainly on district heating systems powered by other fuels, with biomass consequently under-represented in the cities.

The map identifies five classes of biomass (wood) heating. In the lowest class - the least reliant on biomass - less than 15% of dwellings in the municipalities are heated with wood, whilst in the top class - areas most reliant on wood biomass - there are seven municipalities which have over 80% of their dwellings heated with wood. These municipalities include: Hodoš and Šalovci in the Goričko region; Žetale, Ribnica na Pohorju and Solčava in the Haloze region, and Loški Potok and Osilnica in the south. In these areas wood is used as a primary heating source, and the municipalities have several features in common. These are rural municipalities, distant from major cities and located in border areas (with the exception of Ribnica na Pohorju). These are also demographically weak areas with small populations (especially Hodoš and Osilnica with under 500 residents) and the

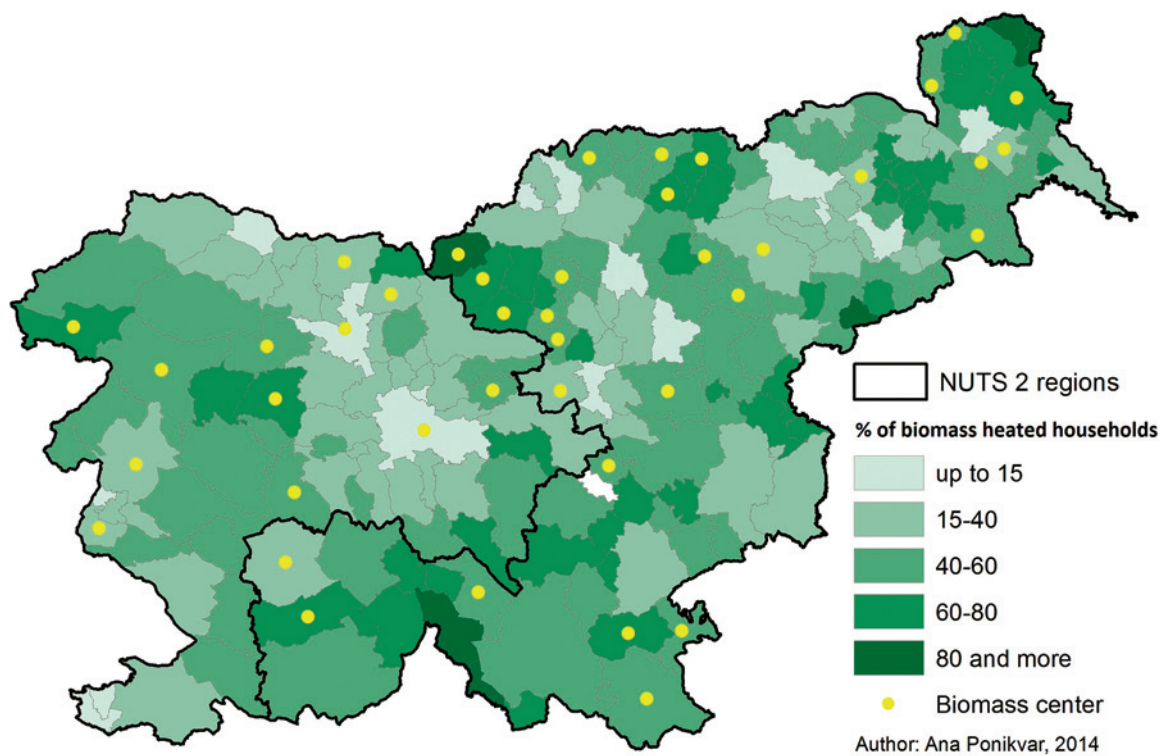


Figure 6 Share of dwellings heated using wood biomass
Sources: SORS, URL 4

largest forestry stocks per capita (as high as 15.6 ha per resident in Solčava, and over 5 ha per capita in Osilnica, Kostel and Loški Potok). Bovec is another municipality with a high ratio of forest area to population which is a reflection of its large size (it is the second largest municipality in Slovenia).

There is a visible pattern of concentric circles, with the use of wood as a source of energy increasing proportionally with the distance from cities. Such a pattern can be observed around the urban municipalities of Ljubljana, Kranj, Celje, Velenje, Ptuj and Maribor, where reliance on wood for heating is under 10%. The next ring consists of municipalities with a 15–40% share of heating with wood. These include municipalities in the peri-urban belt around the capital (Ig, Brezovica, Škofljica, Grosuplje, Horjul, Medvode, Vodice, Mengeš, Domžale and Litija), which have a share of heating below 40%. These are municipalities located south of Ljubljana and include marshlands; to the west they are a part of the Polhograjsko hills;

and, to the north they are a part of the Kranjsko-Sorško polje [fields]. In these municipalities the share of privately owned forests is the largest. The third ring includes the municipalities that have a share of biomass wood heating between 40–60%. Good examples of such municipalities are those surrounding Ljubljana that are actually smaller regional centres themselves (Cerkljica, Logatec and Ivančna Gorica). The fourth group includes rural municipalities visible on the map as clustered areas, namely, in the regions of Goričko, Slovenske Gorice, Pohorje, Kozjansko hills, Upper Savinja Valley, Cerkljica and a stretch of territory from Pivka across the Bloke plateau to the Suha Krajina region in the southern Slovenia.

District biomass heating systems have recently become more common as people are increasingly considering the energy-efficiency of heating systems and environmental concerns. Important advantages of district heating systems include lower costs of supplying energy, partially due to state contributions in the form of non-repayable

financial incentives for new investments in renewable energies, which amount to a subsidy of 30–50% on investment costs (URL 5). The State has used such subsidies to support a boom in construction of district biomass heating systems, but since these are just one-off cash injections, such developments often die down, which is an example of an unsustainable management of money. We discovered that a total of 46 municipalities in Slovenia had biomass district heating up until 2014. The first systems were set up as a pilot project in 2002 in Gornji Grad, Solčava, Nazarje and Preddvor - the last of these now being the most successful. The largest system operates in Kočevje, where the boiler power is 14.5 MW. There are 23 systems with boiler power of up to 1 MW and they are the most prevalent in Slovenia. Smaller systems are located in Podvelka (290 kW), Beltinci (260 kW), Luče (610 kW), Šentrupert (370 kW) and Kuzma (720 kW) which serves 23 buildings, including a primary school, a cultural hall, aged care facility, town hall, church and rectory, two blocks of flats and private dwellings. In the next stage, further 35 houses will be connected to the system (Biohica..., Project 310). In this way, the whole village can become energy self-sufficient.

In the future, much more should be done in terms of the promotion of micro-systems in small towns in rural areas, since such systems could be easily implemented throughout Slovenia, and thus reduce the costs of transportation of biomass. This makes sense in the rural areas of Slovenia where there is enough wood of inferior quality available within the vicinity of the settlements. Furthermore, such systems contribute to a more environmentally sustainable approach to heating. Timber businesses should be more actively involved in the firewood and biomass heating markets since it could be a new source of income for them (BABUDER, 2009). Heating sales are the only income source of district heating systems, so the price of heating energy is a key aspect in drawing up budgets. The price should be low enough that it is in consumers' interest to connect to the network, and high enough to cover all the costs of the district heating system. An important way to persuade consumers to connect to the district heating is to set the price of heating energy below that of the existing heating provision (HANŽIČ, 2011).

Timber is definitely one of the most important natural resources in Slovenia and good governance of forests, as well as proper treatment

and use of wood, can have a positive impact on the environment. It can also improve economic and employment structures, as well as the energetic self-sufficiency, particularly in rural areas.

Conclusion: Results and discussion

Reviewing the results of all these indicators, we can conclude that the Slovenian rural areas exhibit two types of disparities. The first type has been known about for a long time through the use of conventional indicators, whilst there have also been long-term attempts on the part of government to deal with them. These are long-standing disparities, visible mainly between the eastern and the western parts of the country. The main reasons for them are unsuccessful development policies or, alternatively, very complex conditions that have prevented the introduction of specific targeted policies to address them. The other type is visible only through the use of alternative, new indicators, with detection of these new disparities being hampered by the difficulties in accessing data, as well as short time series data. A feature of the new types of disparities is the influence of new factors and phenomena emerging in form of mosaic patterns. To support this point, several of our new indicators showed disparities that do not conform to traditional disparity patterns, highlighting the need for nuanced understandings. It is necessary to understand these disparities and develop measures to respond to them as soon as possible before the possible negative impacts are felt or alternatively in order to harness them as potential drivers of development. Our studies of fibre-optic connectivity provide a pertinent example of this point through revealing that, thanks to the GOŠO projects, telecommunications infrastructure in these areas is generally present and offers a widespread access to reliable fibre-optic internet connections, which also represent opportunities for remote employment. Such remote employment opportunities along with low land prices are the factor which could potentially lead to increased settlement and revitalisation of these areas. Thus, in terms of planning and responsibilities at the national level, there is a need to constantly try new approaches and be alert to detect disparities in one form or another, as well as to identify the areas experiencing common challenges. As this paper has shown, innovative indicators can reveal more diverse patterns of disparity. The foundations of such useful indicators lie in quality and accessible data for researchers like us to explore. It is critical

to note that a number of our indicators rely on data that is incomplete or otherwise not as up-to-date as we would have liked, whilst methodologically we are sure that improvements can be made. So we

encourage you to take our endeavours as a starting point and continue working for a better and more nuanced understanding of Slovenian disparities, as will we.

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