

STUDY OF TRANSPORTATION NEEDS IN RURAL & SEMI URBAN AREAS

¹SUMAIYA,²J K MANJUNATH,³K. PAVAN KUMAR,⁴AVULA SHIVA KUMAR

^{1,2,3}Assistant Professor,⁴Student

Department Of Civil Engineering

Bheema Institute of Technology and Science, Adoni

ABSTRACT

The transportation needs of the rural population differ significantly from those of the urban population in many areas. Clear transportation demand management methodologies are either nonexistent or not advised in rural areas without first undertaking transportation research, with the exception of highly industrialized nations. Cooperative transportation policies for urban and rural populations have the effect of forcing financial losses on rural populations under the pretext of sustainability. These policies are found in both West Balkan and global countries. This outcome runs counter to the strategic goals of the majority of sustainable mobility initiatives, which center on reducing socioeconomic exclusion and the gaps between urban and rural areas. As a result, the management of transportation needs in rural regions needs to be predicated on the unique features of the rural environment and the actual transportation options that the rural populace has access to. To that end, pilot transportation research has been carried out in rural areas near a single small town in Central Serbia. These areas, based on numerous rurality characteristics, represent typical Serbian rural populations. The research's objectives were to identify factors influencing transportation demand as well as the unique characteristics of rural areas that should be taken into account when managing transportation demand. A specifically created household survey intended for rural areas was the means by which the data were gathered. The most significant elements influencing both farm and non-farm households have been identified as a result of the findings, and a generalized technique for managing the demand for rural transportation has been developed. A closer look at the overall findings reveals that, in order to prevent transportation from becoming a barrier to rather than a driver of rural economic and social development, sustainable transport policy should be founded on the unique needs of rural transportation. Therefore, transportation of underprivileged groups, including the old, young, and women, requires special care.

1.Introduction

In the last two decades rural areas in the world are facing with the growing depopulation (Pezzini 2000). The consequences of this phenomenon are wide and they are not the theme only for geographer and sociologist, but also for economists, health institutions and traffic experts. Because of depopulation many facilities in rural areas are closed (Hays et al. 1994; Weinert and Boik 1995; Farmer et al. 2001; ARTS 2002) and the traditional forms of public transport became unsustainable (Ellis 1996). This led to the difficult accessibility of rural residents to the necessary facilities (World Bank 2001; Social Exclusion Unit 2003; Halloran and Vera 2005; Farrington 2007) and a choice set of efficient transport alternatives is confined to individual cars.

Transportation demand of urban residents is well explored in the literature and it is known a lot about transportation planning procedures and about the impact of certain factors. Unlike

urban areas, rural areas have remained in the shadows. In most countries in the world rural transport demand is not specifically investigated. Transport policy, which is tailored to urban areas, is the result of this omission. However, rural areas are characterized by certain specific features that surely have an impact on the existence of differences between the transportation demand in rural and urban areas. Except in highly developed countries, transportation researches in rural areas are rarely being conducted. This is especially evident in underdeveloped countries and countries in transition, such as Serbia. This paper presents the specificities of rural areas in the world, their impact on the transportation demand management and the consequences of their negligence in the transportation demand management. Special attention has been given to Serbia and to the specific transportation demand research, conducted in rural areas of Central Serbia, which is the first study of this kind here.

2 Rural areas profile

Methodology to classify areas as urban or rural differs from country to country. Although there are some general criteria that are common to most countries, there is no single definition of rural areas to meet the needs of different experts. For example, there are three different definitions of rural areas in the United States (United States General Accounting Office 1993), while in the European Union countries the OECD methodology to classify settlements as urban or rural is used. Generally, it is provided a definition of urban areas and all that is not urban is considered rural. Table 1 presents the most common criteria that are used worldwide to determine whether the area is urban or rural.

Table 1. Criteria of the rurality

Criterion	Boundary value	Country
Population density	1000 residents/mile ²	United States
	500 residents/km ²	Japan
	150 residents/km ²	EU (OECD)
Population	2500 residents	United States
	2000 residents	French
	10000 residents	Northern Ireland
	500 residents	Finland
	200 residents	Sweden
	1000 residents	United Kingdom (England and Wales)
	3000 residents	United Kingdom (Scotland)
Distance from urban area	5000 residents	Australia
	Do or do not border an urban area	United States
	45 minutes of driving to settlement with more than 3000 residents	Sweden
Dominant function	30 minutes of driving to settlement with more than 10 000 residents	United Kingdom (Scotland)
	Agriculture	Greece, Netherland, Italy, Spain
Land use	80% non-build environment	Belgium
Settlement surface	20 hectares	United Kingdom

Sources: United States General Accounting Office 1993; Pizzoli and Xianoning 2000; VIRGIL 2000; Department for Communities and Local Government 2001; Northern Ireland Statistics and Research Agency 2005; Directorate-General for Agriculture and Rural Development 2006; Nutley 2003

It is difficult to draw a clear line between rural and urban areas because there are different perceptions of what is "rural" and which elements determine "rurality" (natural, economic, cultural etc.). Most often it is necessary to take into account several criteria simultaneously. It is usually combined the population or the percentage of the population in urbanized areas with population density, as in the case with the OECD methodology. However, there are logistic regression models in the literature (Department for Communities and Local Government 2001) in which the status is "calculated" based on a number of socio-economic characteristics: population density, the ratio of the economically active and non-active population, the percentage of residents who use public transport, the percentage of population engaged in agriculture, forestry or fishing, the percentage of the population employed in the energy sector (mining, energy, water) and the distribution of the population by race.

There is actually no definition of rural areas in Serbia (Rankovic and Jovic 2012). In the Censuses of 1953, 1961 and 1971 the distribution of settlements to urban, rural and mixed was performed on the basis of two criteria: the size of the settlement (population) and the percentage of the population engaged in agriculture. This approach was rejected and in the Censuses of 1981, 1991 and 2002 the settlements are classified into two categories: urban areas and other settlements, where the decision on the classification of a settlement in one of these two categories was made by municipalities for settlements on their territory (Efstratoglou et al. 2008). Statistical criteria are not taken into account.

3 Rural areas and sustainable transport policy

Sustainable transport policy in urban areas promotes the transition to an environmentally more suitable means of transport, such as non-motorized modes and public transport, as well as economic punishing of passenger cars use. In a number of countries in the world there is no separate transport policy for rural areas, but conjoint with urban transport policy. Therefore sustainability is questionable when applied to rural areas. Bearing in mind that rural areas are characterized by low population density, distance from city centres, spatial scarcity of facilities and underdeveloped of public transport network (or public transport does not exist), residents of rural areas are transport-deprived and dependent on passenger cars (VIRGIL 2000; Social Exclusion Unit 2003; Pucher and Renne 2005; Currie and al. 2009; Shergold and Parkhurst 2010). Although it requires a significant part of the household budget, this is the only mode of transportation which them provides space and time efficiency in such circumstances. Imposing a tax on car ownership, increasing registration fees and fuel prices further deprive rural residents and lead them to even greater transport deprivation (Dargay 2002; McDonagh 2006; McNamara and Caufield 2011; Delbosc and Currie 2011). Even in countries with high car ownership in rural areas (Unites States, Australia, Northern Ireland), the problems of accessibility and mobility still exist, particularly for vulnerable groups of people (elderly, young, households with no car, unemployed). High car ownership often masks social exclusion in mentioned social groups (Kamruzzaman and Hine 2011).

Therefore it is necessary to define specific transport policy for rural areas in order to prevent social exclusion and to provide social equity. Unfavourable demographic structure of today's rural areas (young people are leaving because of the difficult access to educational centres and workplaces) is an obstacle to the functioning of public transport (Pezzini 2000; Rostami 2005). On the other hand, due to the diversification of activities the synonymous with the rural character is no longer agriculture, although agriculture policy for many years considered

rural policy. It should take into account the needs of people who are structurally dependent on passenger car (do not have an acceptable transportation alternative), i.e. those people who cannot be considered consciously dependent when proposing rural transport policy measures.

In developed countries the role of transport in rural areas is more deeply understood in recent years. Although the social aspect has always been related to the transport, the transport policy is now considered part of social policy for the rural population (Grieco 2003). That says a lot about the importance of examination of transport demand of rural population and the magnitude of the consequences of their neglect.

In Serbia, which is a country in transition, there is no rural transport policy. All measures for rural areas are being proposed under the rural development policy, whose major focus is on agriculture. Although it is recognized that the rural transportation system is not in compliance with the transport demand of the economy and the population, there is no adopted measures for its improvement (Delevic-Djilas and al. 2005; Ministry of Agriculture, Forestry and Water Management of Republic of Serbia 2007; Cvejic and al. 2010; Republic Agency for Spatial Planning of Republic of Serbia 2010; Republic of Serbia Government 2011). Since Serbia in the EU accession process, this issue will have to be resolved in the near future, especially when one takes into account the importance of the concept of social exclusion and improving the quality of life in rural areas. For this purpose it is conducted a pilot study of transport demand of typical rural areas residents in Central Serbia. This study is the first of its kind in Serbia and should provide insight into the preliminary results in order to define future research directions.

4 Research The study was conducted in early 2011. in rural areas of one municipality in central Serbia. This municipality is rural by many criteria: population density is 70 inhabitants/km², the agriculture is dominant function in most rural settlements, public transport network is mainly undeveloped and most of the trips gravitate to the centre of nearby small town (about 6000 inhabitants, according to the Statistical Office of the Republic of Serbia 2012), where many facilities are located. Data were collected in the household survey, which was adapted to rural households. In addition to the classic questions about socio-economic characteristics of households and individuals, trips in one day, the attitudes of people towards certain transportation options and the conditions for their use were also examined.

In order to identify the impact of specific transport demand characteristics of certain rural areas, the analysis was performed separately for rural areas that are close to the city centre (hereinafter referred to as Type 1), rural areas that are distant from the centre of the city with poor levels of public transport service, i.e. small number of departures during the day (hereinafter referred to as Type 2) and for rural areas that are distant from the city centre with a better level of public transport service, i.e. more departures during the day (hereafter Type 3). Basic characteristics of the following types of rural areas are given in Table 2.

Table 2. Characteristics of researched settlements types

Settlement type	Population density (inhabitans per km ²)	Distance from town centre (km)	Percent of population of age 18-65 engaged in agriculture	Bus frequency (departures/day)	Average distance to bus stop (m)
Type 1	111	3.0	4%	7	594
Type 2	120	4.4	50%	5	1514
Type 3	46	5.8	20%	11	357

According to the experiences of other countries, the initial assumption in this paper too is that rural residents mostly rely on passenger car. Table 3 shows data on the car ownership in researched types of rural settlements. In addition to passenger cars, rural households have also duty vehicles and agricultural vehicles (in Table 3: other vehicles), which are also used as means of transportation, especially in rural areas where agriculture is the dominant occupation (Meier 1979). Therefore they cannot be neglected in the analysis of transportation demand.

Table 3. Car ownership in researched settlement types

Settlement type	Percent of household according to number of passenger car (PC)			Average number of other vehicles in household
	0 PC	1 PC	≥2 PC	
Type 1	13%	63%	25%	0.66
Type 2	22%	67%	11%	1.07
Type 3	20%	70%	10%	0.70

5 Results

The different influences on the characteristics of transport demand of rural residents and their attitudes towards certain transportation options were analysed during the data processing. In the following text the most important influences are selected and explained in detail.

5.1 Mobility

Mobility of rural residents is lower than the mobility of their urban counterparts (Table 4). It does not exceed 1.5 trips per resident per day in researched settlements. Almost half of all rural residents did not generate any trip during the day. Also, a small number of residents generate more than two trips per day. Here it should be noted that only those trips that are made on public road network are recorded during the data collection. Thus, the work trips of farmers are excluded. Specifically, in this part of Serbia agricultural land is located next to the resident area, so farmers' trips to work are not made on public roads. Future research should definitely consider the suitability of the general definition of mobility for use in rural conditions.

Table 4. Rural residents mobility (Source: Rankovic and Jovic 2012)

Settlement type	Daily number of trips			Average daily mobility
	0	2	≥2	
Type 1	44%	52%	4%	1.18
Type 2	45%	42%	13%	1.49
Type 3	46%	48%	6%	1.20

5.2 Driving licence owning impact on mode choice

Being a driving license owner has a significant impact on the choice of motorized transportation mode in all settlement types. Drivers generate on average much higher trip rate by individual vehicle, regardless of age and level of household income. The highest share of passenger car and duty car trips is made by residents aged 30-40 years from middle- and high-income households (Figure 1, Figure 2 and Figure 3). Among non-drivers, the share of passenger car and duty car trips is the highest in Type 2 residents, which household is more than 1500 m distanced from bus stop. Among drivers, the lowest share of passenger car and duty car trips is in the Type 1 residents, whose households are very close to the city centre and where the walking is competitive alternative to motorized modes. The large number of respondents in Type 3 rural area who did not make any trip during the observed day caused few trips data recorded. According to reported data, very few non-driver adults often travel by car as a result of relatively good quality of public transport service.

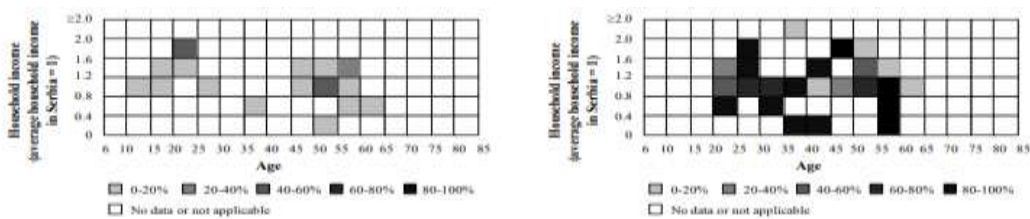


Figure 1. Percent of trips by passenger car and duty vehicle in Type 1 rural area: non-drivers (left) and drivers (right)

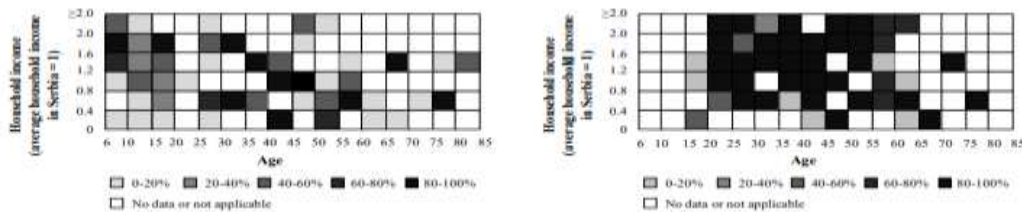


Figure 2. Percent of trips by passenger car and duty vehicle in Type 2 rural area: non-drivers (left) and drivers (right)

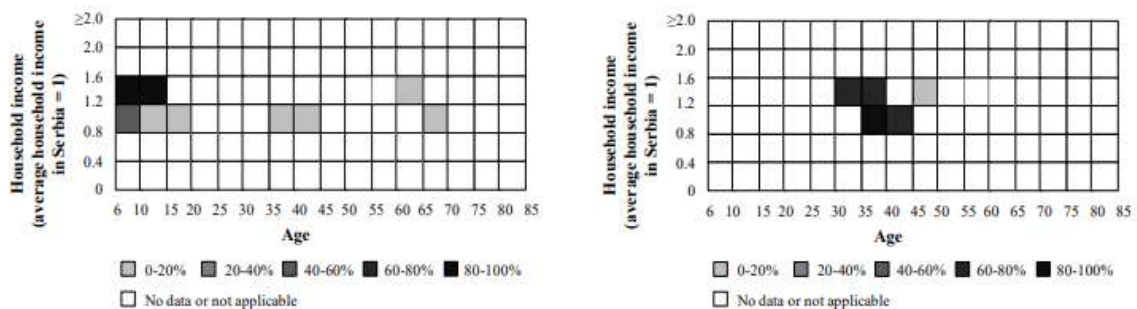


Figure 3. Percent of trips by passenger car and duty vehicle in Type 3 rural area: non-drivers (left) and drivers (right)

5.3 Attitudes towards public transport

Attitudes toward the bus as transportation alternative depends on acceptable bus stop distance. In Type 1 rural area 72% of households are no more than 500 m distanced from bus stop, 22% of households in Type 2 rural area and 90% of households in Type 3 rural area (Table 5). The share of bus in modal split is according to this: 11% of the population in Type 2 rural area and 30% in Type 3 rural area. In Type 1 rural area only 9% of the population (mostly older people without individual vehicle) use the bus, even though the distance from bus stop is not long. The reason is the proximity to the town, so walking and cycling offer better flexibility than low-frequency bus. The long bus stop distance Type 2 rural area is caused by the fact that the settlement is located outside the regional road on which intercity and local bus routes run. Hence, it was not taken into account to cover many passengers when locating the bus stop.

Table 5. Distribution of households and respondents according to real and acceptable bus stop distance

Bus stop distance	Real (% of households)			Acceptable (% of respondents)		
	Type 1	Type 2	Type 3	Type 1	Type 2	Type 3
No more than 200 m	22%	6%	70%	29%	43%	70%
201-500 m	50%	16%	20%	71%	49%	20%
501-1000 m	19%	14%	0%	0%	7%	0%
More than 1000 m	19%	64%	10%	0%	1%	10%

If one compares respondents' reported acceptable distance from bus stop with actual distance (Table 5), it could be noticed that there is a significant difference between desired and actual situation in Type 2 rural area - 64% of households are located at a distance longer than 1000 m from bus stop. According to the respondents' answer, in the case of a closer stop 35% of people would use the bus. However, more than a quarter of respondents does not use the bus and would not use it under any conditions (Figure 4). As the agriculture is dominant function in this type, this fact is a consequence of the farmers' way of life. Farmers do not have time to wait for the bus departure because of their nature of work, so they rely on their own vehicles. Because of the predisposition to walking and cycling because of uncompetitive bus transportation, one third of respondents in the Type 1 rural area would not use bus transportation under any circumstances.

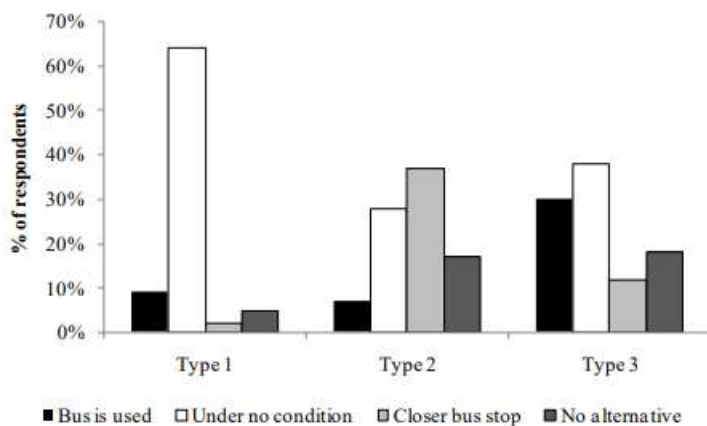


Figure 4. Bus using conditions reported by respondents

5.4 Attitudes towards the saving of travel time and costs

During the survey respondents were asked to rank the criteria of travel time, travel cost and travel distance according to their importance for mode choice. Travel time is the least important criterion to respondents from Type 1 rural area when choosing transportation mode. For travel distance criterion, which is least important to respondents from the Type 2 rural area, it turned out to be the most important to 54% and 44% respondents in Type 1 and Type 3 rural area, respectively. This result arises from the spatial proximity to the town and to major facilities, so travel time is less important for short distances. Travel time is the most important criterion to the majority of respondents (55%) from the Type 2 rural area and this is reflected in the higher share of motorized trips in modal split.

6 Discussion

Analysis of the results confirmed the initial assumption that rural residents rely heavily on passenger car. However, this assumption is not true for rural areas which are very close to the town, as it is the case in Type 1 rural area, where non-motorized transportation means are more popular than motorized. The design of build environment, i.e. pedestrian paths and facilities along the route to the town centre, contribute to this too. But the situation is different in rural residents engaged in agriculture. Their activities during the day are time-consuming and are related to farm, so travel time is very important criteria when travel to the town. Given the low level of public transport services, they are structurally dependent on private cars. Imposing a financial burden on the use of motorized modes, as a measure of sustainable transport policy, would have the contradictory effect on this type of rural settlement. This would lead to deeper material and transport deprivation. Instead, it is necessary to consider what form of public transport would be suitable for such areas because the traditional form is economically inefficient.

Transport deprivation may be one of the causes of the low mobility of rural residents. Public transport is essential for the social vulnerable groups, such as the elderly, young and those who cannot use private car (either they do not own it or they are not drivers), in order to access the necessary facilities. On the basis of the reported attitudes, it can be concluded that the reduction in the time required to access the public transport system would increase the number of public transport user. This can be easily seen in the population of Type 3 rural area.

7 Conclusions

In many countries of the world transport policy is a joint policy for rural and urban areas, where the measures recommended for rural areas are not separated from the urban or they are recommended without prior conducting of transportation studies in rural areas. The consequence of such policy is that rural residents, who are deprived of many transportation options, suffer significant financial losses under the excuse of sustainability, while at the same time they are unable to change their choice. The final result is that transport becomes rather limiting than stimulating factor in the development of rural areas and this affects the appearance of the social groups at risk of social exclusion. While in most developed countries there are special institutions responsible for solving transportation problems in rural area, in less developed countries, as well as in Serbia and the region, it is common that "rural" is identified with "agricultural" and rural development policy is focused on the improvement of

agriculture and economic development of the village, without considering the state of the transportation system and without proposing the measures for its development. Improvement of the transportation system is indirectly mentioned, without any concrete measures to improve its quality.

For the implementation of good-quality transportation researches in rural areas, which are becoming increasingly important segment of the transport policy, it is necessary to have appropriate definition of rural areas at a sufficiently disaggregated level to make possible to detect specific transportation needs and trip characteristics of rural population. A carefully chosen definition allows the formation of a systematic database and defining indicators. Based on the research conducted in Central Serbia, it is clear that transport planning and transport infrastructure, due to the specific economic and spatial characteristics of rural areas, differ from those in urban areas. Thus, mobility cannot be observed daily, as it is the case in urban areas, but in the long run. This is especially true for agricultural population, because they are characterized by a specific weekly rhythm in relation to the market days. Moreover, mobility cannot be analyzed at individual level, as it is the case in urban areas, but at the household level. Therefore, it is necessary to carry out specific transportation studies for rural areas, which will enable the making of adequate measures proposal for transport policy.

REFERENCES

- ARTS, 2002. Rural transport handbook. Available at:
<http://www.rural-transport.net/handbook.phtml?site=handbook> (accessed 11/05/13).
- Currie et al., 2009. Investigating links between transport disadvantage, social exclusion and well-being in Melbourne — preliminary results. *Transport policy*, Vol. 16, pp. 97-105.
- Cvejic, S., Babovic, M., Pudar, G., 2010. Human development study – Serbia 2010: sources and outcomes of social exclusion. Belgrade: UNDP Serbia. Available na: <http://www.secons.net/admin/app/webroot/files/publications/hdrbook.pdf> (accessed 11/05/13).
- Delbosch, A., Currie, G., 2011. The spatial context of transport disadvantage, social exclusion and well-being. *Journal of Transport Geography*, Vol. 19, pp. 1130–1137.
- Dargay, J. M., 2002. Determinants of car ownership in rural and urban areas: a pseudo-panel analysis. *Transportation Research Part E*, Vol. 38, pp. 351–366.
- Delevic-Djilas, M. et al., 2005. National strategy of Serbia for the Serbia and Montenegro's accession to the European Union. The Republic of Serbia Government: European Integration Office. Available at: http://www.seio.gov.rs/upload/documents/nacionalna_dokumenta/national_strategy-pdf.pdf (accessed 11/05/13).
- Department for Communities and Local Government, 2001. Urban and rural area definitions: a user guide. London. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/142430/urban_rural-user-guide.pdf (accessed 11/05/13).
- Directorate-General for Agriculture and Rural Development, 2006. Rural development in the European Union – Report 2006. European Commission. Available at: http://ec.europa.eu/agriculture/agrista/rurdev2006/RD_Report_2006.pdf (accessed 11/05/13).

- Efstratoglou, S., Bogdanov, N., Meredith, D., 2008. Defining rural areas in Serbia and their typology. *Economic Annals*, Vol. 53(177), pp. 7-29.
- Ellis, S.D., 1996. The economics of the provision of rural transport services in developing countries. PhD Dissertation. Bedfordshire, UK: Cranfield University.
- Farmer, J. C., Baird, A. G., Iversen, L., 2001. Rural deprivation: reflecting reality. *British Journal of General Practice*, Vol. 51, pp. 486-491.
- Farrington, J. H., 2007. The new narrative of accessibility: its potential contribution to discourses in (transport) geography. *Journal of Transport Geography*, Vol. 15, pp. 319–330.
- Grieco, M. S., 2003. Transport and social exclusion: new policy grounds, new policy options. *Proceedings of 10th International Conference on Travel Behaviour Research*. Lucerne, August 2003.
- Halloran, J., Vera, K.C., 2005. Basic social service in rural settlement – village and remote homestead community care-giving. European Commission DG Employment, Social Affairs, and Equal Opportunities. Available at: www.esn-eu.org (accessed 15/11/12).
- Hays, R. B., Craig, M. L., Wise, A. L. et al., 1994. A sampling framework for rural and remote doctors. *Aust J Public Health*, Vol. 18, pp. 273-276.
- Kamruzzaman, M., Hine, J., 2011. Participation index: a measure to identify rural transport disadvantage?. *Journal of Transport Geography*, Vol. 19(4), pp. 882-899.
- McDonagh, J., 2006. Transport policy instruments and transport-related social exclusion in Rural Republic of Ireland. *Journal of Transport Geography*, Vol. 14, pp.355–366.
- McNamara, D., Caulfield, B., 2011. Determining the welfare effects of introducing a cap-and-share scheme on rural commuters. *Transportation Research Part D*, Vol. 16, pp. 547–553.
- Meier, A., 1979. The broader consequences of improved rural transport: three-wheeled vehicles in Crete. No. CONF-790553-1, Lawrence Berkeley Laboratory. Available at: <http://akmeier.lbl.gov/pdf/3-wheeled-crete.pdf> (accessed 11/05/13).
- Ministry of Agriculture, Forestry and Water Management of Republic of Serbia, 2007. Serbia – rural development. Available at: <http://www.un.org/esa/agenda21/natlinfo/countr/serbia/ruralDevelopment.pdf> (accessed 11/05/13).
- Northern Ireland Statistics and Research Agency, 2005. Report of the inter-departmental urban-rural definition group statistical classification and delineation of settlements. Available at: http://www.ninis.nisra.gov.uk/mapxtreme_towns/Reports/ur_report.pdf (accessed 11/05/13).
- Nutley, S., 2003. Indicators of transport and accessibility problems in rural Australia. *Journal of Transport Geography*, Vol. 11(4), pp. 55-71.
- Pezzini, M., 2000. Rural policy lessons from OECD countries. *Proceedings of International Conference: European Rural Policy at the Crossroads*. University of Aberdeen, Aberdeen.

Pizzoli E., Xianoning G., 2000. How to best classify rural and urban?. Proceedings of Fourth International Conference on Agriculture Statistics (ICAS-4), China. Pucher, J., Renne, J. L., 2005.

Rural mobility and mode choice: evidence from the 2001 National Household Travel Survey. *Transportation*, Vol. 32, pp. 165-186. Rankovic, B., Jovic J., 2012. Characteristics of transportation needs of rural population. *Tehnika: Transport and Traffic Engineering*, Vol. 67(4), pp. 609-618.

Republic Agency for spatial planning, 2010. Spatial plan of Republic of Serbia 2010-2014-2021 (draft). Belgrade: Ministry of environment and spatial planning of Republic of Serbia. Available at: http://www.tvojglas.rs/upload/files/Nacrt_prostornog_plana_Srbije_2010-2021.pdf (accessed 11/05/13).

Republic of Serbia Government, 2011. National programme of rural development from 2011 to 2013. Official Gazzete of Republic of Serbia, Belgrade.

Rostami, S., 2005. Application of the transport needs concept to rural New South Wales : a GIS-based analysis. PhD Doctorate. Built Environment, Faculty of Built Environment, University of New South Wales.

Shergold, I., Parkhurst , G., 2010. Operationalising ‘sustainable mobility’: the case of transport policy for older citizens in rural areas. *Journal of Transport Geography*, Vol. 18, pp. 336–339. Social Exclusion Unit, 2003. Making the connections: final report on transport and social exclusion. Available at: <http://assets.dft.gov.uk/statistics/series/accessibility/making-the-connections.pdf> (accessed 11/05/13).