

## THE DYNAMICS OF HUMAN RESOURCE BY ETHNICITY IN THE LANDS AND AREAS OF CRIȘANA REGION IN THE PERSPECTIVE OF SUSTAINABLE DEVELOPMENT

**Luminița Anca DEAC\*** 

University of Oradea, Faculty of Geography, Tourism and Sport, Department of Geography,  
Tourism and Territorial Planning, Oradea, Romania, e-mail: anca\_deac@yahoo.com

**Maria GOZNER** 

University of Oradea, Faculty of Geography, Tourism and Sport, Department of Geography,  
Tourism and Territorial Planning, Oradea, Romania, e-mail: mariagozner@yahoo.com

**Grigore Vasile HERMAN** 

University of Oradea, Faculty of Geography, Tourism and Sport, Department of Geography,  
Tourism and Territorial Planning, Oradea, Romania, e-mail: grigoreherman@yahoo.com

---

**Citation:** Deac, L.A., Gozner, M., & Herman, G.V. (2023). THE DYNAMICS OF HUMAN RESOURCE BY ETHNICITY IN THE LANDS AND AREAS OF CRIȘANA REGION IN THE PERSPECTIVE OF SUSTAINABLE DEVELOPMENT. *GeoJournal of Tourism and Geosites*, 46(1), 194–199. <https://doi.org/10.30892/gtg.46121-1015>

---

**Abstract:** This study presents the population dynamics by ethnicity in the lands of Crișana Region, Romania, based on a population forecast for the year 2030. The aim of the study is to provide short term population dynamics information by comparison between the six lands and area of the region. Crisana is a heterogeneous area from ethnic point of view and migration has been intense in the past three decades, but some ethnicities have been more affected by this phenomenon than others, therefore this forecast is made by ethnicity and the results show different trends. The population of each Land and area is characterized by the studied ethnicities, but the numbers differ considerably. Also the lands and areas show different trends regarding the ethnic populations. The method used for population forecast is a quantitative method based on statistical data obtained from successive censuses. The reference years taken into study are 1900, 1030, 1992, 2002 and 2011. Despite the fact that by 2011 the trend was decreasing, because from 1900 to 1992, the number of population increased, the trend for 2030 is also of increase for most ethnicities.

**Key words:** population dynamics, ethnicity, population projection, sustainable development

\* \* \* \* \*

### INTRODUCTION

Sustainable development is a concept dating back in 1987 when it was mentioned in the Brundtland Report as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (United Nations, 1987), but concerns were pointed out in relation to population growth, industrialization and economic impact, long before that time (Mfungahema and Kitamura, 1997; Mensah and Casadevall, 2019; Takashi, 2017).

Crișana is a region in the North-West part of Romania (Figure 1), characterized by relief diversity and richness. Its limits are represented by the interfluvium between Crasna and Someș rivers in the North, Meseș, Bihor-Vlădeasa Mountains in the East, the interfluvium between Mureș and Crișul Alb rivers and Zărand Mountains in the South and the Hungarian border line in the West (Godea, 1996; Ilieș, 1998). The Apuseni Mountains integrate Crisana with its western and central subunits.

The lands (Cocean, 1997; Cocean, 2011; Cocean and Filimon, 2013) and areas which are part of Crișana Region (Figure 1) and for which the analysis was made are: Ier and Barcău Valley, which is characterized by low land forms (Stașac, 2005) (Careiului Plain, Ierului Plain) and some small hills; Silvania Land, which resembles a gulf surrounded by Meseș Mountains in the East, Plopiș Mountains in the South and Șimleu Hummock in the North, North-West (Josan, 2009). The third one is Crișul Repede Valley, with varied forms of relief: plains – Bihariei, Miersigului – hills and some mountain formations, rich in natural resources (Olău et al., 2019). Beiuș Land, situated on Crișul Negru Valley, is surrounded by Bihorului Mountains, Pădurea Craiului Mountains and Codru-Moma Mountains (Berindei et al., 1977; Filimon, 2012; Boc et al., 2022). Crișurilor Plain is formed mainly of low plains, as the name itself shows, and is situated in the Western part of the Western Hills (Godea, 1981). Last, but not least, Zarand Land is surrounded by mountains such as Codrului Mountains in the North, Metaliferi Mountains and Zărandului Mountains in the South – South-West (Dudaș, 1981).

The new paradigms which function in the authentic lands are those related to heritage capitalization, sustainable development, well-being, economic competitiveness, economy of knowledge and, eventually, participative debate. The lands, as tourist destinations, are developing based on their defining elements: islands of conservation of an idealized, traditional, rural lifestyle, which responds to the tourist and cultural needs of a society which faces globalization and an identity crisis (Ilieș et al., 2014; Stupariu, 2017; Stupariu and Morar, 2018; Tatar et al., 2018; Craiut et al., 2022).

---

\* Corresponding author

Another important characteristic of Crişana Region is the presence of multiple ethnicities, each of them contributing to the economic and social development of the region (Deac et al., 2019; Iliş et al., 2010, 2011; Linc et al., 2019; Morar et al., 2019). The following ethnicities were taken into account: Romanian, Hungarian, Roma, German, Slovakian, Ukrainian and others (population which cannot be incorporated in any of the previous categories). The population of each Land and area is characterized by the studied ethnicities, but the numbers differ considerably.



Figure 1. Lands and areas of Crişana Region and localization of Crişana Region within Romania

## MATERIALS AND METHODS

Population is the main beneficiary of turning ecosystems and natural resources to profit, but, at the same time, it is the main disruptive factor for the integrity or balance of these ecosystems and natural resources. Human intelligence becomes thus a factor of economic and social development. In its turn, the community from the rural and urban environment will respond promptly to the desire of recovery in the midst of an unpolluted, balanced and healthy natural background (Bungau et al., 2022). The novelty of the tourist product in rural and urban environment, the current conditions, the culture and purity of people and places, together with specific hospitality, will all impose and contribute to sustainable and responsible development. Tourism, as economic activity, should adhere to the concept of sustainable development, since it is an industry which depends on natural resources and the cultural heritage of each society, which actually sells these resources. Thus, all tourist activities should be compatible with the tourist loading capacity, providing sustainable economic and ecological functioning at all levels (Herman et al., 2020; Caciora, 2021; Iliş et al., 2020, 2021; Morar et al., 2021).



Population extrapolation into the future is a projection technique (Smith et al., 2002) which uses aggregated data from the past to project into the future. The projection can be linear, geometrical or exponential. Population projection or forecasting has been intensely used in developing conservation strategies, taking management actions and it is also very useful in elaborating sustainable management strategies. The focus must be on population welfare, as well as on sustainable development of the region. Most population projections are based on birth, mortality and migration rates (Wheldon et al., 2013; Takashi, 2017; Kim and Kim, 2020) over yearly periods of time.

Our study utilizes a quantitative method of analysis (Rich, 1980) and it is based on past data obtained from the censuses conducted by the National Institute of Statistics from Romania and it refers to population by ethnicity in the six lands and distinct areas of the region.

The method that we used in forecasting the population for each ethnicity for the year 2030 is the linear extrapolation equation (Smith et al., 2013), based on the censuses taken in 1900, 1930, 1992, 2002 and 2011:

$$P_{t+n} = P_t + b(n) \tag{1}$$

Where:

$P_{t+n}$  is the population at a future date in time. In our case is the year 2030;

$P_t$  is the population at the last census – 2011 is the last census that we referred to;

$P_{t-1}$  is the census taking prior to the last one taken into consideration;

$n$  is the number of units of time taken into consideration for the projection;

$b$  is the average growth increment per unit of time.

The first step was gathering statistical data from the above-mentioned censuses for each territorial administrative unit (TAU) and then, grouping them by land. The time intervals considered in this study are a total of 4 and the unit of time between is variable, thus unit one is of 30 years, unit two comprises 62 years, unit 3 has 20 years and unit 4 has 9 years. The ethnicity taken into study here are Romanian, Hungarian, Roma, German, Slovakian, Ukrainian and the last category comprises other ethnicities, which were not taken into calculus because of very poor representation or people for whom the ethnicity could not be established.

### RESULTS AND DISCUSSIONS

Some of the lands and areas of Crișana are heterogenic from ethnicity point of view, others are more homogenous and that fact has influenced the population dynamics over time (Ilieș, 1998). The major ethnicity in Crișana is the Romanian one and, though this one was also prone to migration, the other ethnicities recorded higher migration rates.

Figure 1 is a graph which shows the population dynamics, starting with the year 1900, up to the 2011 census by ethnicity, and also, based on these data, it shows the population projection for the year 2030 for Ier and Barcău Valley area. It can be seen that the general trend for the total population of the area is of increase or relative stability until 1992 when, because of the social and political changes which occurred in Romania in 1989, the emigration phenomenon increased considerably, the birth rate decreased (Ilieș, 1998), thus the trend was descendent until 2011, the year of the last census taken into consideration. The only exception was the Roma ethnic population which recorded a continuous increase.

The population projection for the year 2030 in Ier and Barcău Valley (Figure 2) shows a slight increase, with the exception of the Hungarian and Ukrainian ethnicities which present a small decrease.

Silvania Land is a heterogenic area from ethnic population viewpoint and Figure 2 shows considerable increase for the total population and the Romanian one until 1992, then a constant decrease until 2011. The other ethnicities also show increase until 1992, but less dramatic. The Roma population continued the increasing trend after 1992 as well. The projection for 2030 in Silvania Land (Figure 3) shows a

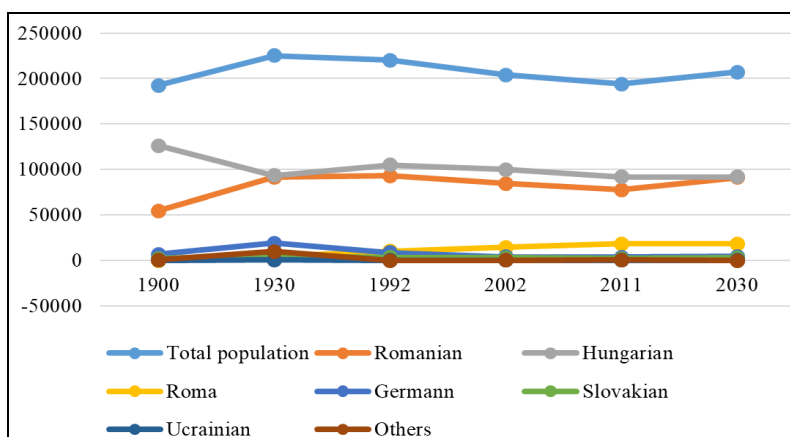


Figure 2. Population forecast and dynamics by ethnicity for Ier and Barcău Valley (Source of data: <http://www.kia.hu/konyvtar/erdely/erd>)

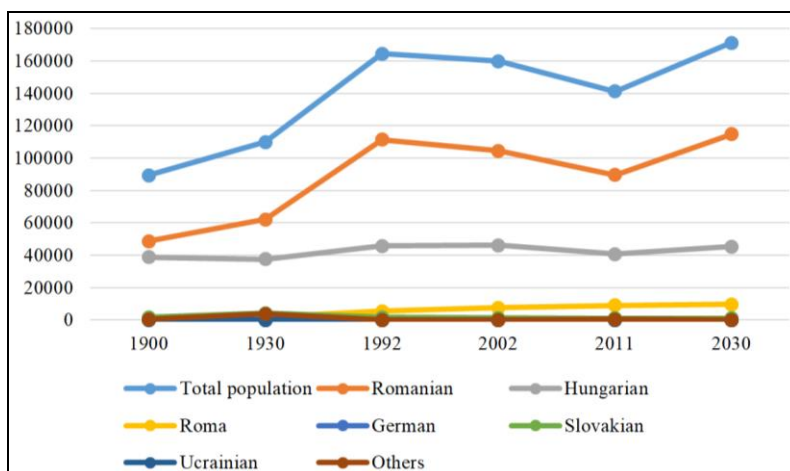


Figure 3. Population forecast and dynamics by ethnicity for (Silvania Land Source of data: <http://www.kia.hu/konyvtar/erdely/erd>)

considerable increase for the total population and the Romanian ethnicity. The population forecast for the other ethnicities also shows an increase, except for the German and Slovakian ethnicities which recorded a slight decrease.

Crişul Repede Valley is a homogenous area from ethnicity point of view, fact which is reflected in the reduced dynamics, compared to other lands and areas from Crişana Region. The predominant ethnicity is the Romanian one and a considerable increase was recorded since 1900 until 1930 (Figure 4), just like in the case of the entire population of the region, then a constant period followed until 1992. Since 1992 until 2011, the trend was descending, especially after 2002. The Roma and Ukrainians are the only ones that showed increase between 2002 and 2011. Regarding the forecast for 2030, the number of the total population, of Romanians and Roma increased, while the number of all the other ethnicities decreased, the number of German people reaching the negative (-8.4) division.

Beiuş Land is another homogenous area of Crişna Region, with absolute predominance of the Romanian ethnicity during the entire studied period (Figure 5). From 1900 to 1930, the Romanian population increased, but from 1930 until 2011, it was on a decreasing trend. The Roma population is the only one which increased in number during all periods, until 2011. The number of Ukrainians changed from one period to another, sometimes increasing, sometimes decreasing. All the other ethnicities were on a decreasing trend until 2011. The forecast for 2030 shows an increase in the case of Romanians, Roma and Ukrainians. The other ethnicities decreased and the number for the Germans and Slovaks got below zero.

Crişurilor Plain is more heterogeneous, as both the Romanian and Hungarian ethnicity are predominant ethnicities here. The number of Romanians increased since 1900 until 1992, then decreased until 2011 (Figure 6). The Hungarian population decreased at first (by 1930), then increased slightly (until 1992), but after that, it was on a decreasing trend until 2011, just as it was the number of the total population. The Roma increased in number since 1900 up to 2011, while the Germans and Slovaks followed the decreasing trend until 2011.

The Ukrainians were the only ones who went through alternating trends between the periods: increasing (1900-1930), decreasing (1930-1992), increasing (1992-2002) and decreasing again (2002-2011). The population projection for 2030 shows slight increase for all ethnicities, except the Slovaks whose decreasing trend is forecasted for 2030 as well.

A particularity of Zărand Land from population dynamics point of view is that it is a homogenous area, the predominant ethnicity is the Romanian one, and the general trend for most ethnicity was of decrease (Figure 7). Thus, the Hungarians and Slovaks decreased in number through all the studied periods, since 1900 to 2011. The other ethnicities increased in number,

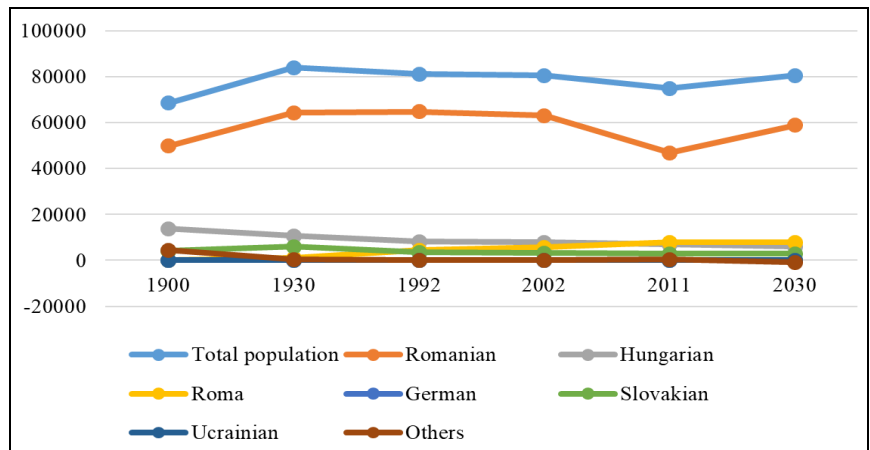


Figure 4. Population forecast and dynamics by ethnicity for Crişul Repede Valley (Source of data: <http://www.kia.hu/konyvtar/erdely/erd>)

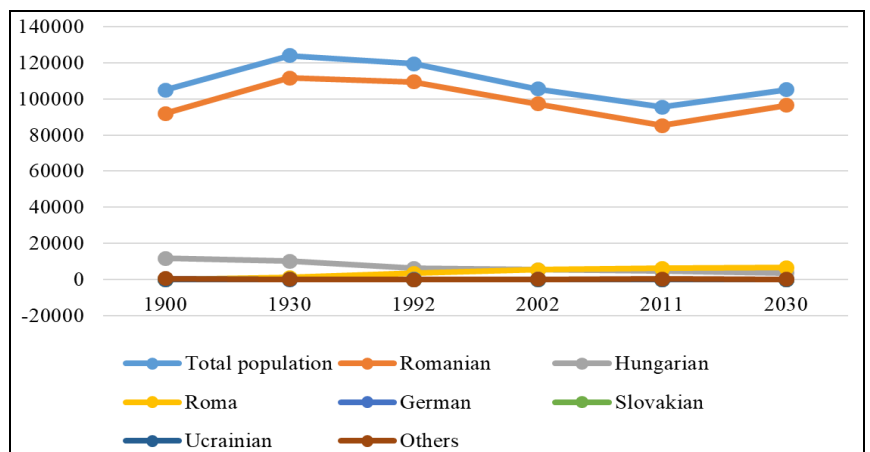


Figure 5. Population forecast and dynamics by ethnicity for Beiuş Land (Source of data: <http://www.kia.hu/konyvtar/erdely/erd>)

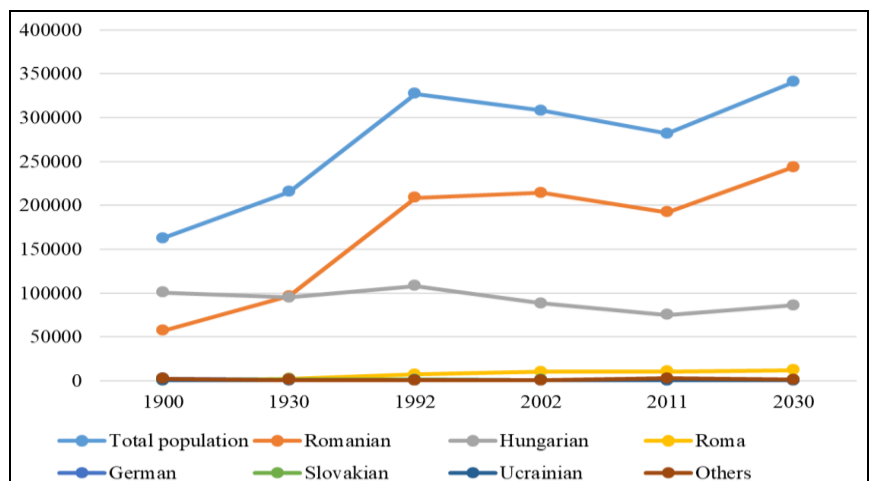


Figure 6. Population forecast and dynamics by ethnicity for Crişurilor Plain (Source of data: <http://www.kia.hu/konyvtar/erdely/erd>)

but only since 1900 till 1930. From 1930 until 2011, almost all decreased. The only exception is represented by the Ukrainians who showed an increase until 2002, then a drop in number until 2011. A considerable difference is noticed in the prediction for 2030 as well, compared to the other lands and areas. The Romanians, Roma and Ukrainians showed a slight increase in number since 2011 to 2030, while the Hungarians, Germans and Slovaks decreased in number.

## CONCLUSIONS

Following the analysis of population dynamics and forecast for the year 2030, by ethnicity, for each land and area of Crișana Region, it can be noticed that from ethnic point of view, Ier and Barcău Valley, Silvania Land and Crișurilor Plain are heterogeneous areas, while Crișul Repede Valley, Beiuș Land and Zărandului Land are more homogenous. The forecast for the year 2030 showed increase of the Romanian population in all areas, the most significant increase being recorded in Crișurilor Plain and Silvania Land, both heterogeneous areas.

The forecast for the Roma ethnicity is also, of increase in all areas, but the other ethnicities, even in some lands there was minor increase, the general trend is of decrease. The sustainable development dynamics depends on the human resource as well, analyzed both as potential resource in the perspective of tourist development and from tourist flow perspective, the population in the area being the main component of tourist flow at microscale level. Besides the positive effects, there are some negative ones as well, such as the depopulation process in certain areas, unless it is considered a sustainable development and programming of tourism. The impact of tourism upon the social and economic factors is, obviously, major and of maximum importance, even in the national and international economy dynamics, through the involvement and extension of the material and natural potential, as well as of the human potential. Thus, in the geo-demographic analysis of this research, reference was made to the communities within Crișana region and the analyzed indicators were in relation to the entire system of localities so as the analysis would be as complex and suggestive as possible. Finally, we express our hope that this research will positively influence the local actors in their endeavour to design and elaborate future strategies of sustainable development and evolution in the region.

## REFERENCES

- Berindei, I.O., Pop, G., Măhăra, G., & Posea, A. (1977). *Câmpia Crișurilor, Crișul Repede, Țara Beiușului*, Editura Științifică și Enciclopedică, București.
- Boc, E., Filimon, A.L., Mancia, M.S., Manciu, C.A., Josan, I., Herman, M.L., & Herman, G. V. (2022). Tourism and Cultural Heritage in Beiuș Land, Romania. *Heritage*, 5(3), 1734-1751. <https://doi.org/10.3390/heritage5030090>
- Bungau, C.C., Bungau, T., Prada, I.F., & Prada, M.F. (2022). Green Buildings as a Necessity for Sustainable Environment Development: Dilemmas and Challenges. *Sustainability*, 14, 13121. <https://doi.org/10.3390/su142013121>
- Caciora, T., Herman, G.V., & Baias, S. (2021). Computer analysis of a heritage item - The traditional sheepskin waistcoat in Beiuș Area. *Revista de Etnografie și Folclor [Journal of Ethnography and Folklore]*, 1-2, 195-209.
- Cocean, P. (1997). "Țara (The Land)" – a typical geographical region of Romania, *Revue Roumaine de géographie*, 41, București.
- Cocean, P. (2011). "Țările" Regiuni geografice și spații mentale, Presa universitară clujeană, Cluj-Napoca.
- Cocean, P., & Filimon, L. (2013). „Țările” din România ca teritorii de proiect, Presa universitară clujeană, Cluj-Napoca.
- Craiuț, L., Bungau, C., Bungau, T., Grava, C., Otrisal, P., & Radu, A.F. (2022). Technology Transfer, Sustainability, and Development, Worldwide and in Romania. *Sustainability*, 14, 15728. <https://doi.org/10.3390/su142315728>
- Deac, L.A., Gozner, M., & Sambou, A. (2019). Ethnographic museums in the rural areas of Crișana Region, Romania – Keepers of local heritage, tradition and lifestyle. *GeoJournal of Tourism and Geosites*, 27(4), 1251–1260. <https://doi.org/10.30892/gtg.27411-430>
- Dudaș, F. (1981). *Zărandul, chipuri și fapte din trecut*, Editura Albatros, București.
- Filimon, L. (2012). *Țara Beiușului. Studiu de geografie regională*. Presa universitară clujeană, Cluj-Napoca
- Godea, I. (1996). *Biserici de lemn din România*, Editura Meridiane, București.
- Godea, I. (1981). *Zona etnografică Beiuș*, Editura Sport-Turism, București.
- Herman, G.V., Biriș, M.S., Ilieș, D.C., Caciora, T., Ilieș, A., Wendt, J., & Sopotă, D. (2020). The perception of geography in school and society. *Baltic Journal of Health and Physical Activity*, 12(1), 112-119. <https://doi.org/10.29359/BJHPA.12.Spec.Iss1.13>
- Ilieș, A. (1998). *Etnie, profesiune și comportament electoral în Crișana și Maramureș (Sfârșitul sec. IX și sec. XX)*. Studiu geografic, Editura Dacia, Cluj-Napoca.
- Ilieș, A., Baias, S., Baias, I., Blaga, L., Buhaș, S., Chiriac, A., Ciocan, J., Dăncuș, M., Deac A., Dragoș, P., Dumitrescu, G., Gaceu, O., Godea, I., Gozner, M., Grama, V., Herman, G., Hodor, N., Hurley, P., Ilieș, D.C., Ilieș, G., Ilieș, M., Josan, I., Leșe, G., Măduța, F., Mojiolic, Diana, Morar, C., Olaru, M., Stașac, M., Stupariu, I.M., Sturza, A., Ștefănescu, B., Tătar, C., Vârnav, R., Vlaicu, M., & Wendt, J. (2014). *Crișana-Maramureș. Atlas geografic al patrimoniului turistic [Geographical atlas of tourism heritage]*, 302 p., (română/engleză), Editura Universității din Oradea, ISBN 978-606-10-1298-5.

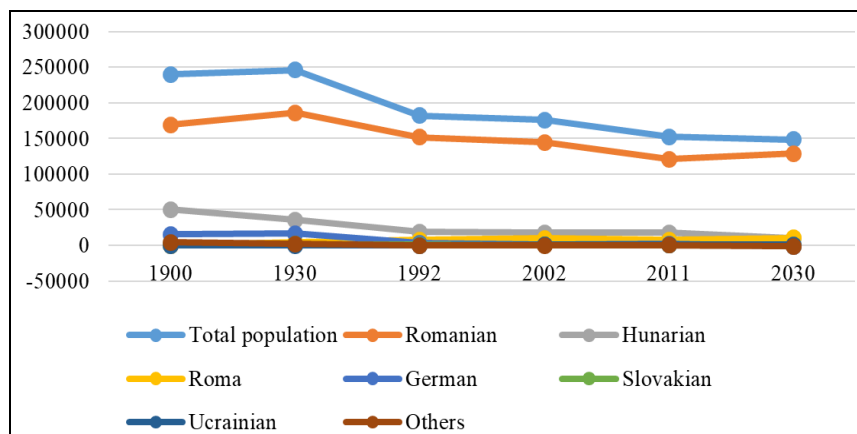


Figure 7. Population forecast and dynamics by ethnicity for Zărand Land (Source of data: <http://www.kia.hu/konyvtar/erdely/erd>)

- Ilieș, D.C., Blaga, L., Baias, S., Morar, C., & Herman, G. (2010). Cross Border Natural Parks, Support for Regional Development. Case study of the Northern and Western Romanian Border. *Revista română de geografie politică*, 12(1), 126-139.
- Ilieș, D.C., Ilieș, A.I., Herman, G., Baias, S., & Morar, C. (2011). Geotourist map of the Băile Felix –Băile 1 Mai-Betfia Area (Bihar County, Romania). *GeoJournal of Tourism and Geosites*, 8(2), 219-226.
- Ilieș, D.C., Caciora, T., Herman, G.V., Ilieș, A., Ropa, M., & Baias, Ș. (2020). Geohazards affecting cultural heritage monuments. A complex case study from Romania. *GeoJournal of Tourism and Geosites*, 31(3), 1103–1112. <https://doi.org/10.30892/gtg.31323-546>
- Ilieș, D.C., Lite, M.C., Indrie, L., Marcu, F., Moș, C., Ropa, M., Sturzu, B., Costea, M., Albu, A.V., Szabo-Alexi, P., Sambou, A., Herman, G.V., Caciora, T., & Hodor, N. (2021). Research for the conservation of cultural heritage in the context of the circular economy. *Industria Textila*, 72(1), 50-54. <https://doi.org/10.35530/it.072.01.1807>
- Josan, I. (2009). *Țara Silvaniei, Studiu de geografie regională*, Editura Universității din Oradea.
- Kim, K.W., & Kim, O.S. (2020). *Super Aging in South Korea Unstoppable but Mitigatable: A Sub-National Scale Population Projection for Best Policy Planning*. *Spat Demogr* 8, 155–173. <https://doi.org/10.1007/s40980-020-00061-8>
- Mensah, J., & Ricart Casadevall, S. (2019). *Sustainable development: Meaning, history, principles, pillars, and implications for human action: Literature review*, *Cogent Social Sciences*, 5(1). <https://doi.org/10.1080/23311886.2019.1653531>
- Mfungahema, R., & Kitamura, T. (1997). *The significance of population potential at the local level and in rural areas: A case of Okayama and Tottori prefectures in Japan*. *Journal of Rural Planning Association*, 16(3), 251–262.
- Linc, R., Dincă, I., Nistor, S., Tătar, C.F., Bucur, L., Stașac, M.S., & Stupariu, M.I., (2019). The Environmental Asset of the Rural From Oradea Metropolitan Area (Romania). *Analele Universității din Oradea, Seria Geografie*, 29(2): 01-17. <http://istgeorelint.uoradea.ro/Reviste/Anale/Art/2019-2/auog.292101-816.pdf>. <https://doi.org/10.30892/auog.292101-816>
- Morar, C., Nagy, G., Dulca, M., Boros, L., & Sehida, K. (2019). Aspects Regarding the Military Cultural-Historical Heritage in the City of Oradea, Romania. *ANNALES – Annals for Istrian and Mediterranean Studies – Series Historia et Sociologia*, 19(2), 303-322. Indexing: Web of Science: Arts & Humanities Citation Index (AHCI). <https://zjdp.si/en/p/annalesshs/page/2/>. <https://doi.org/10.19233/ASHS.2019.21>
- Morar, C., Nagy, G., Boros, L., Gozner, M., Niemets, L., & Sehida, K. (2021). Heritage, Culture and Regeneration of the former Military Areas in the city of Oradea (Romania), *Arhitektúra & urbanizmus*, 55 (1-2), 76-87. Indexing: Web of Science: Arts & Humanities Citation Index (AHCI). <https://www.architektura-urbanizmus.sk/2021/07/02/heritage-culture-and-regeneration-of-the-former-military-areas-in-the-city-of-oradea-romania/>. <https://doi.org/10.31577/archandurb.2021.55.1-2.6>
- Olău, V.M., Mihincău (Mihele), D.M., Herman (Lacatoș), L.M., Furdul, S., & Gozner, M. (2019). Tourism and local development in the Crișul Repede Valley, Bihar County, Romania. *Analele Universității din Oradea, Seria Geografie*. <http://istgeorelint.uoradea.ro/Reviste/Anale/Art/2019-2/auog.292113-830.pdf>
- Rich, D.C. (1980), *Potential models in human geography: Concepts and techniques in modern geography, volume 26 of concepts and techniques in modern geography* (Study Group in Quantitative Methods). Institute of British Geographers, University of East Anglia, Norwich, GeoBooks.
- Smith, S.K., Tayman, J., & Swanson, D.A. (2002). *State and local population projections: Methodology and analysis*. New York: Kluwer;
- Smith, S.K., Tayman, J., & Swanson, D.A. (2013). *A practitioner's guide to state and local population projections*. Dordrecht: Springer;
- Stașac, M. (2005). *Reconstituirea mediului rural în Câmpia Crișurilor*, Editura Universității din Oradea.
- Takashi, I. (2017). *The Frontiers of Applied Demography*, Chapter: *A New Method for Estimating Small Area Demographics and Its Application to Long-Term Population Projection*, 9, ISBN: 978-3-319-43327-1
- Wheldon, M.C., Raftery, A.E., Clark, S.J., & Gerland, P. (2013). Estimating demographic parameters with uncertainty from fragmentary data. *Journal of the American Statistical Association*, 108, 96-110.
- Stupariu, M.I. (2017). Study on Structural Dimensions of Establishment of Touristic Reception with Functions of Touristic Accommodation in Countries of European Union. *Folia Geographica*, 2017, 59/2, 60-77, Presov.
- Stupariu, M.I., & Morar, C. (2018). Tourism Seasonality in the Spas of Romania. *GeoJournal of Tourism and Geosites*, 22(2), 573–584. <http://gtg.webhost.uoradea.ro/PDF/GTG-2-2018/gtg.22225-312.pdf>. <https://doi.org/10.30892/gtg.22225-312>
- Tătar, C.F., Linc, R., Dincă, I., Stupariu, M.I., Bucur, L., Stașac, M.S., & Nistor, S. (2018). Nature-Based Suburban Leisure Opportunities Within the Oradea Metropolitan Area. *Analele Universității din Oradea, Seria Geografie*, ISSN 1221-1273, E-ISSN 2065-3409. [http://istgeorelint.uoradea.ro/Reviste/Anale/Art/2018-2/12.AUOG\\_795\\_Tatar.pdf](http://istgeorelint.uoradea.ro/Reviste/Anale/Art/2018-2/12.AUOG_795_Tatar.pdf)
- <http://www.kia.hu/konyvtar/erdely/erd>, accessed on 06.10.2022
- <http://statistici.insse.ro>; accessed on 06.10.2022