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## The use of the Analytic Network Process in the assessment of the functioning of migration areas on the example of the Eastern Carpathians

**Abstract:** The article presents the results of the research on the migration processes on the peripheral areas of the Eastern Carpathians. The significance of managing migration areas was presented and the need for an in-depth analysis of the consequences of the migration processes in the context of the activities of the public administration was indicated. Thanks to the application of the multi-criteria method of the Analytic Network Process, it was possible to indicate the principal consequences of the migration in three main areas: economic, agricultural-environmental and social. There was also an indication of a possible implementation of the research results in managing local government units in the Eastern Carpathians thanks to the application of the four main models - benefits, costs, opportunities and threats, so as to define the importance of the weight assigned to particular factors (sub-criteria) in the overall perspective of the migration phenomenon<sup>2</sup>.

**Keywords:** migration areas, mountain regions, Analytic Network Process, ANP, management of problem areas

### The essence of the process of managing migration areas

Contemporary migration of the population, characterised by its mass and lasting nature, encourage the reflection on the effects of this phenomenon with regard to the affected regions. In the literature on the subject we can more and more often encounter the notions related to migration management and migration area management, related to the need for a separate recognition of and active measures in the regions that experience rapid changes in their demographic structure. Diversification of the reasons, changeable course and often unpredictable consequences of migration mean that in the case of contemporary migration, we face an immensely complex phenomenon, which is often difficult to assess in unambiguous terms. Mass migrations of the population may contribute to the increase of ethnic and culture differences, which in turn creates a serious challenge for the structures of the host country, but on the other hand, may also be a source of labour and a factor that boosts economic and social life. Loss of a significant

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percentage of the population in a country – and it is usually the most active part of population, ready to face new challenges related to the total change of environment – may be a serious disadvantage for the development of the emigrants' home country, but the transfer of funds that usually accompanies migrations can be a substantial supply of money, which tends to stabilize the internal situation and constitute a specific compensation for the expenditures made<sup>3</sup>.

The literature on the subject treats the notion of migration policy in various ways. Many theoreticians identify this phenomenon with the activity of decision-makers in the area of managing the processes related to the inflow of migrants from abroad. Such a perspective means that the migration policy is understood as "a set of rules and actions taken by the public authorities with regard to the foreigners arriving in the country and living there, most of all with relations to the arrival (and departure) control, access to the job market and integration with the society"<sup>4</sup>.

However, the specific situation of Ukraine indicates the need for broader understanding of the migration policy. It assumes that the actions taken by the state must not be limited only to immigration-related issues, but should also be reflected in the areas connected with emigration<sup>5</sup>. The characteristics that perfectly reflects such standpoint of the migration policy is the definition developed by P. Duszczuk, which treats it as a "set of instruments guided and managed by the state or its components, including both passive and active forms of immigration and emigration management"<sup>6</sup>.

Speaking of the need for effective migration management- from the international, national and regional perspective – it is worth emphasizing that a condition essential for each organizational process is having complete, reliable, solid and currently updated data on the subject of management. From the point of view of managing migration processes on the level of the so called migration regions, it is essential to obtain information related to the current migration situation in the region, legal solutions and currently performed actions related to migration management as well as the perception of the issues that migration entails, especially from the viewpoint of the local authorities<sup>7</sup>. Having information related to the abovementioned areas is an introduction to rational actions aimed at reducing adverse effects of population migration from a given area, at the same time emphasizing the benefits and opportunities that such a phenomenon entails – with particular consideration of potential return migration.

## Outline of the Analytic Network Process method

Although there are many methods for diagnosing and solving multi-criteria problems, the quantification level they present is not always satisfying. One of the

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<sup>3</sup> Cymanow P. 2011: Migracje zarobkowe mieszkańców obszarów wiejskich Małopolski i Podkarpacia na tle światowych tendencji migracyjnych. *Roczniki Naukowe SERiA*, no 3, vol. 13, p. 58.

<sup>4</sup> Matkowska M., 2013: Polska polityka migracyjna – zarys problemu. *Studia i Prace Wydziału Nauk Ekonomicznych i Zarządzania*, number 33, Uniwersytet Szczeciński, pp. 77-79.

<sup>5</sup> Założenia polityki ludnościowej Polski 2006, raport Rządowej Rady Ludnościowej, [www.ipiss.com.pl](http://www.ipiss.com.pl), p. 3.

<sup>6</sup> Kaczmarczyk P., Okólski M. 2008: Polityka migracyjna jako instrument promocji zatrudnienia i ograniczania bezrobocia, Ośrodek Badań nad Migracjami, WNE UW, Warsaw, p. 12.

<sup>7</sup> Szaban J., 2010: Wspieranie aktywności zawodowej poprzez zarządzanie zjawiskiem migracji – analiza w województwie śląskim, Otawa Group, Katowice, p. 15.

problems with the measurement and assessment of complex phenomena is the choice of a relevant set of indicators, which would allow to diagnose the status and to determine existing dependencies. Creating such type of indicators is not easy, though, because the outcome of the conducted analysis depends on the selection and application method of such measures, which are always a product of available data and the arbitrary decision of the researcher<sup>8</sup>. This situation therefore conditions the partial approach to the researched subject, which does not always make it possible to achieve an effective solution. The existing enormous demand for the methods that enable a complex recognition of a given research problem seems to be significantly satisfied by a group of new decision making techniques, including the Analytic Hierarchy Process – AHP and the Analytic Network Process - ANP.

AHP/ANP are among the fastest developing and widely recognized mathematical methods in the world, which have revolutionised the way of solving complex decision issues. The originator of such methods is Professor Thomas L. Saaty from the University of Pittsburgh (USA), who received many prestigious rewards for developing the Analytic Hierarchic Process, for many years of work on the method and for immense impact of his scientific work on numerous disciplines of science. That most recent distinction was i.a. the title of an Honorary Doctor by the Jagiellonian University (2011).

The application of the above-mentioned methods includes a broad scope of decision issues, which brings benefits to the practice of social life and international relations. These methods are used i.a. in solving international conflicts, in the process of disarmament and controlling the trade in weapons, developing effective methods for fighting terrorism and feasibility studies for the projects performed by international production corporations, as well as in such areas as medicine, agriculture, mining and many other spheres of life. These methods (especially AHP) were used by many renowned organization in the world (including the US government agencies and companies from the Fortune 500 list). Among them we can mention i.a. NASA, US Navy, US Army, USDA Rural Development, JIEDDO, Nuclear Regulatory Commission, National Institutes of Health (NIH), IBM, HP, Shell, Boeing, Xerox, Johnson&Johnson, ebay, National Football League (NFL).

AHP combines some concepts from mathematics and psychology. It is based on three axioms: (1) reversal of the scores, (2) homogeneity and (3) independence of the elements from a given hierarchy level of the elements placed lower. The Analytic Network Process (ANP), on the other hand, is an extension of the Analytic Hierarchy Process (AHP). AHP occupies a special place in the ANP method. This is why in the literature on the subject we may often see references to the AHP/ANP method. The ANP method makes it possible to observe the complexity of the analysed problem and to perform comprehensive assessment of various links and interdependencies as well as to assign importance to quantitative and qualitative factors in this respect: benefits, costs, opportunities and risk.

The use of multi-criteria decision making techniques with regard to the problem of migration in peripheral areas will make it possible to offer an answer to the question: the elements (sub-criteria) of which main criterion: economic, agricultural-

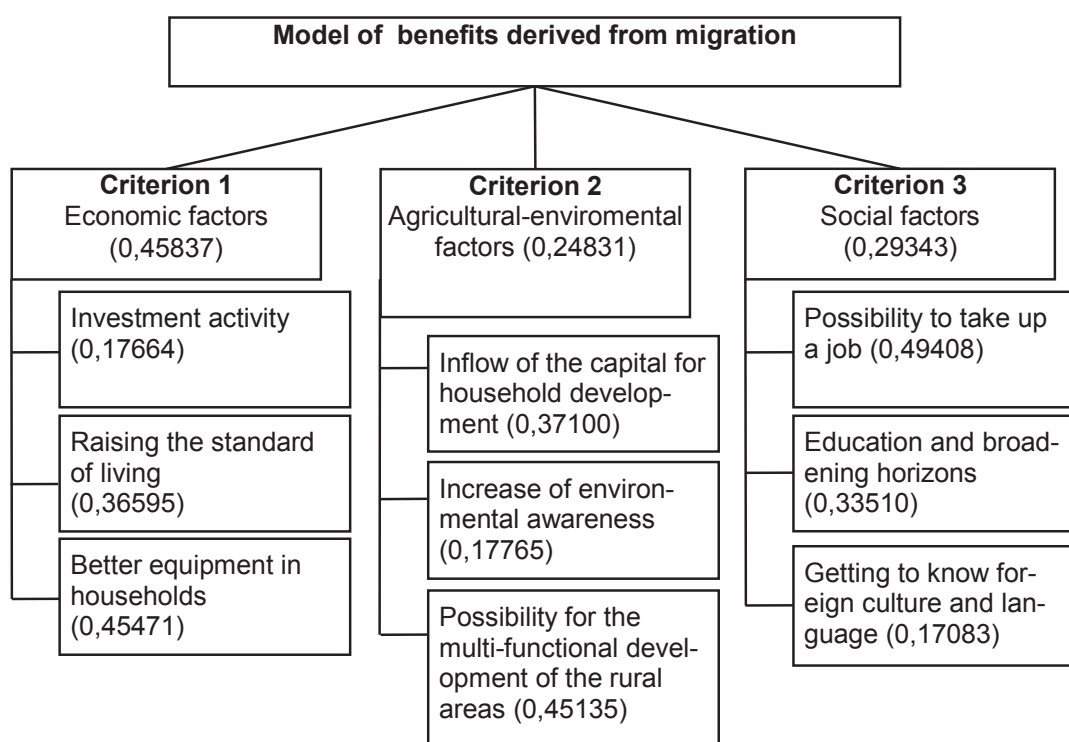
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<sup>8</sup> Paluch Ł., 2013: Problemy pomiaru i oceny zrównoważonego rozwoju (sustainable development). *EPISTEME - czasopismo naukowo-kulturalne*. Wydawnictwo Stowarzyszenia Twórców Nauki i Kultury Episteme. Vol. 18. T. I. Krakow, pp. 417-427.

environmental or social, have a substantial impact on the configuration of the factors in the model of benefits, costs, opportunities and threats following from migrations of people from peripheral areas of the Eastern Carpathians. The research was conducted in Q4 of 2013 on the sample of 10 mountain communes in the south-western Ukraine. The direct interview was conducted with the representatives of the local government and with the participation of the researcher. The respondents were asked to define the factors that determine migration from the communes they manage, using the main criteria and sub-criteria. The results obtained in comparison matrices were processed in the SuperDecision programme and presented in graphic and descriptive form.

### Model of benefits following from migration

In the literature on the subject one can encounter a series of references to the benefits related to the migration processes. The authors often refer to the positive aspects of this phenomenon that impact households; they also often emphasize important issues related to the improvement of the balance of payments in the migrants' home country, boost in consumption or limiting unemployment on the local job market. Within the conducted research, 9 key factors were selected using the expert method, as regards the benefits of the consequences of migration from mountain communes. These factors were presented in the model in fig. 1.



**Fig. 1. The framework of the model of benefits derived from migration with the assigned weight of the main criteria and sub-criteria**

Source: Own work on the basis of survey research.

It follows from the presented data that among the benefits within the main criteria assessment, economic aspects prevail, before social and agricultural-

-environmental ones. According to the respondents, the main positive aspect related to migration is the possibility to modernize household equipment and – as a natural consequence of this - raising the general standard of living. Among the factors in the social area, the dominant one is the element of activating the unemployed, as well as educational and cognitive benefits from migration. In the agricultural-environmental group of factors in the discussed model, the dominant view refers to the significant positive impact of work-related migration on the possibility of multi-functional development of the rural areas – which is related to the opportunities for accumulating capital and creating new jobs not directly related to agriculture.

It should be pointed out here that equity capital is a significant factor that enables the commencement of non-agricultural economic activity. What is more, the accumulated capital constitutes one's own contribution in the planned enterprise, which is essential when applying for structural funds – without it, obtaining external financing is impossible<sup>9</sup>.

### **Model of costs incurred as a result of migration**

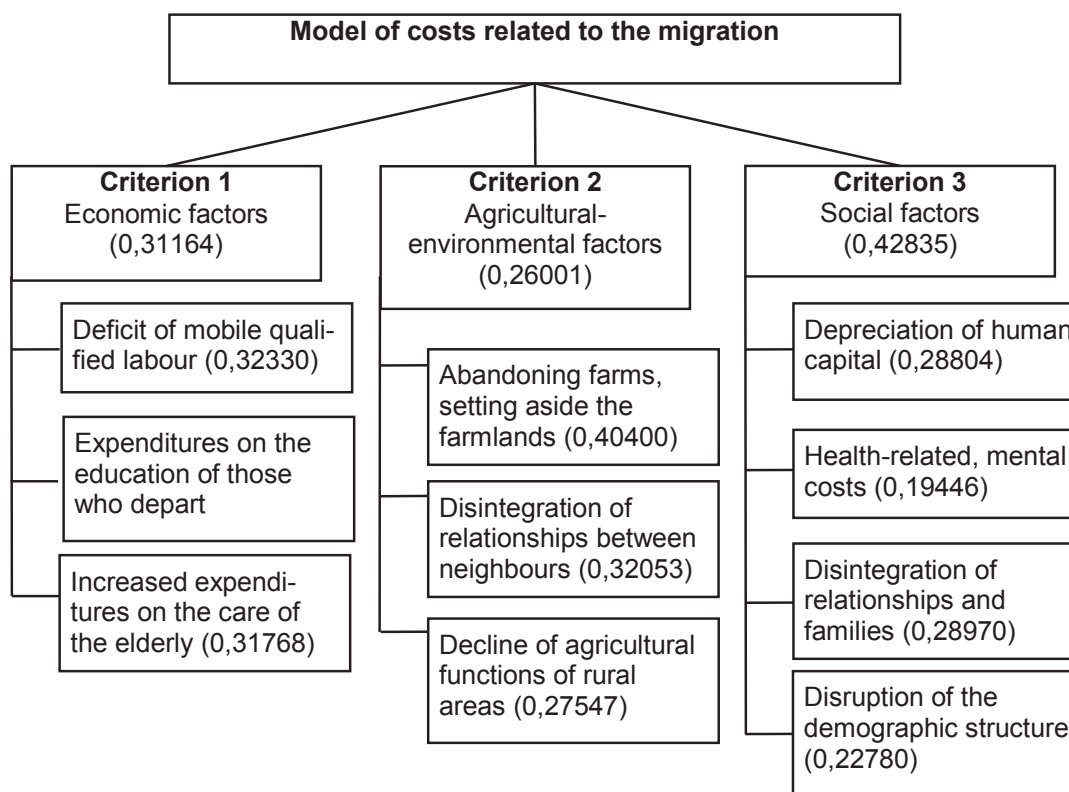
It is obvious that in the case of all phenomena of an economic and social nature, a series of benefits derived as a result of the interaction of numerous variables must be at least partially balanced with the scale of costs that must be incurred in order to gain the above-mentioned profits. This is also the case with population migration, with regard to which considerable social costs resulting from migration are often emphasized. A detailed list of factors (within 10 sub-criteria) in the category of costs is presented in fig. 2.

Among all the analysed categories of factors, the above-mentioned social elements were definitely dominant – the focus was primarily on the consequences related to the depreciation of the human capital – which follows from taking up jobs below one's professional qualifications, breakdown of families and relationships (the so called “Euro-orphans” problem), as well as significant disruptions in the demographic structure of the mountain regions. Among the economic costs of migration, classified lower in the ranking, we could mention the expenditures related to education that the society incurs in order to educate those who migrate. Considerable importance was also attached to the deficit of qualified labour. A significant phenomenon resulting from the migration was abandoning farmlands, which means that the ground was set-aside and in the future it will be necessary to spend substantial funds on restoring the proper farming capacity of the land.

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<sup>9</sup> Satola Ł., 2009: Przestrzenne zróżnicowanie absorpcji funduszy strukturalnych przeznaczonych na rozwój pozarolniczej działalności na obszarach wiejskich, Zeszyty Naukowe SGGW, series: Problemy rolnictwa światowego, t. 7(XXII), p. 141.





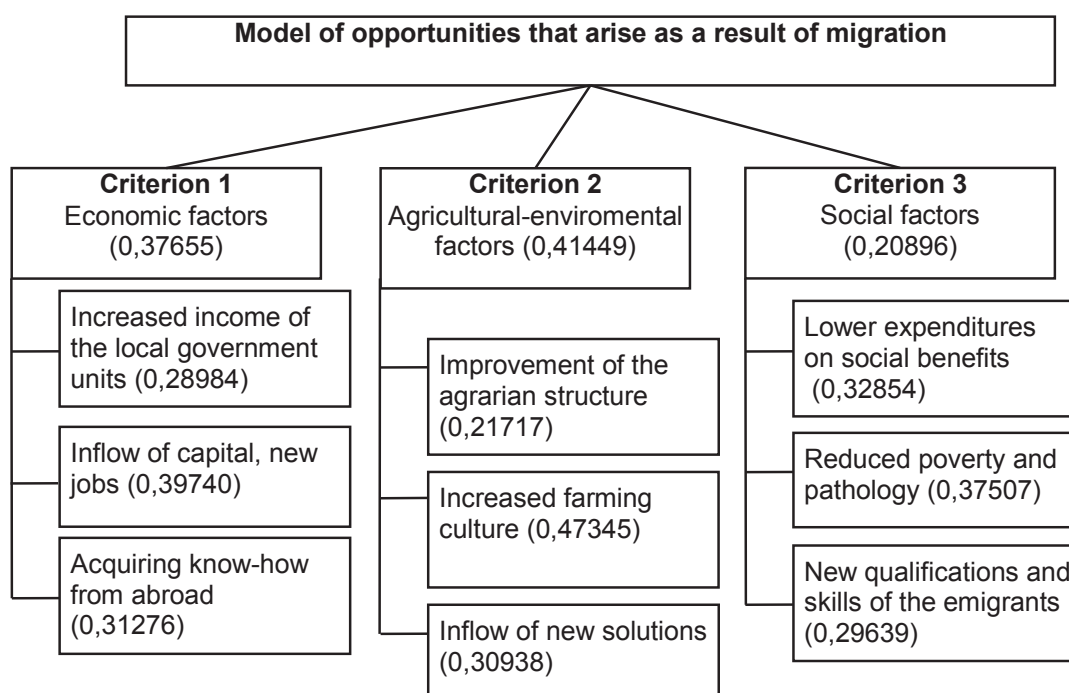
**Fig. 2. The framework of the model of costs resulting from migration with the assigned weight of the main criteria and sub-criteria**

Source: Own work on the basis of survey research.

## Model of opportunities related to the migration

The overall analysis of the changes resulting from the migration in the mountain regions must also refer to potential (future) benefits for the analysed area. Fig. 3 presents a list of the main opportunities identified with migration processes.

According to the majority of the decision makers in the local authorities asked to express their opinion, the most significant opportunities related to the migration processes can be noticed in the agricultural-environmental area. What was emphasized on this occasion was particularly the possibility of increasing the farming culture, which is mainly related to the arrival of new solutions from abroad. In the area of opportunities related to the migration, economic factors also ranked high as far as the main criterion and the sub-criteria are concerned. A visible analogy to the previously discussed category can be seen in this case – the authorities of the mountain regions indicate the possibility of the arrival of capital from abroad and the consequent creation of new jobs along with the acquisition of the know-how, which entails, consequently, a series of new hopes in the social aspect – as regards the reduction of poverty and pathology, and, in turn, the opportunity to reduce the expenditures of the local authorities on social benefits related to these phenomena.



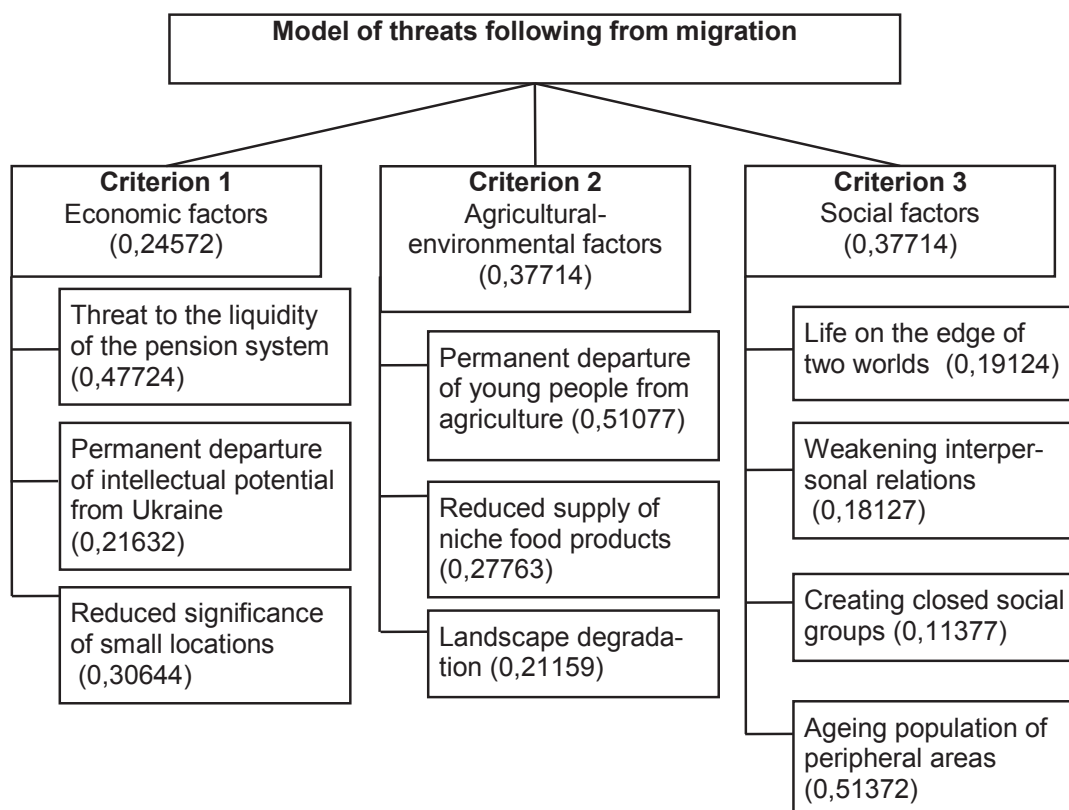
**Fig. 3. The framework of the opportunities created as a result of the migration with the assigned weight of the main criteria and sub-criteria**

Source: Own work on the basis of survey research.

### Model of threats resulting from the migration

Among many costs incurred at the moment by the communities in the regions affected by migration, large portion of them may become significant obstacles as regards the security and development of these regions, as a result of the lack of appropriate actions on the part of the local authorities and higher levels of public administration. Among the risk factors, we should mention the following categories of phenomena (fig. 4).

The analysis of the risk factors shows the equal status of social and agricultural-environmental aspects. In the context of the first main criterion, the main identified threats are related to the ageing society (specific deformation of the demographic profile, related to the depopulation of the mountain regions), whereas in the environmental aspect, the main problem seems to be a permanent departure of young people from agriculture - which suggests there is a larger generation gap in this professional group. In the group of economic risk factors, the top priority was assigned to the threat to the liquidity of the pension system, which is linked to the previous sub-criteria and determined mainly by demographic factors.



**Fig. 4. The framework of the model of threats related to the migration with the assigned weight of the main criteria and sub-criteria**

Source: Own work on the basis of survey research.

## Summary and conclusions

The above analysis proves that problems related to migration management in peripheral areas have multi-criteria character. An attempt to create a model based on three main criteria indicates the need for constant monitoring of migration processes as regards many areas of activity of the inhabitants of the discussed administration units. The specific nature of mountain regions makes the task of the local authorities much more difficult, because the changeable nature of the general phenomena (national or supranational) affects the local reality of these regions often with greater strength, whereas the consequences of these processes are far less predictable than in less diverse regions.

It seems that it is not fully possible to decide upon the scale and dimension of benefits and losses resulting from the migration from the point of view of the whole state. The migration process depends on such phenomena as the economic situation (national and global), development cycles or demographic phases. Many authors, however, believe that large scale migration definitely plays a negative role in the perception of the demographic situation of a given country, thus leading to permanent changes, very difficult to reverse<sup>10</sup>. This is why the activity of decision

<sup>10</sup> Polityka migracyjna Polski – stan obecny i postulowane działania, Ministerstwo Spraw Wewnętrznych i Administracji, Departament Polityki Migracyjnej, 2011, Warsaw, p. 12-13.



makers – especially as regards the areas affected or threatened with depopulation, and mountain regions may be regarded as such – should be directed towards minimizing the adverse impact of the migration processes, at the same time taking advantage of the opportunities offered by return migration.

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