THE PROBLEMS OF SUSTAINABILITY OF REGIONAL SETTLEMENT SPACE IN NORTH-EASTERN POLAND

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1. Introduction

In the 50's, 60's and 70's, Poland showed the highest increase in population among the European countries. A high birth rate was accompanied by the strong internal migrations (especially from villages to towns and to cities). Consequently the rural population in Poland has dropped from 66 percent in 1946 to about 30 percent at present. This illustrates the strength of demographic processes which shaped the spatial and economic situation in Poland. The long-lasting strong migrations from villages to towns and especially to cities were previously a typical and common feature in socialist countries. These processes were initially balanced by a high birth rate but they have led to a depopulation of rural areas and they have caused serious deformation in demographic and social structures in age and sex structures, for example.

The distribution and dynamics of rural population in Poland is a problem itself, but it also forces rapid changes in economics, infrastructure, culture and architectural space, especially on some peripheral territories. These problems are also common to other post-socialist countries [1]. The strongest decline of rural population can be observed in North-Eastern Poland. This paper deals with its dynamics and consequences in relation to sustainability issues.

2. Demographic Context

About 19.400.000 people (60,6% of population) lived in rural territories in Poland in 1939. After the 2nd World War in 1946 a rural population was about 16.000.000 (70% of post-war population) [2]. Finally, 14.753.000 people lived in rural territories in 2000. It was 5,4% less than in 1946, but during this period the population of cities in Poland increased by 65% [3]. Similar trends have been observed in other post-socialist countries. For example, the rural population in Russia decreased by 1% over the decade 1979-1989 while the urban population increased by 15% although significant differences existed between the European and Asian republics [4]. Rural population trends in Central Eastern Europe (in Estonia, Latvia, Lithuania, the Kaliningrad District, Belarus, Ukraine, Poland, Czechoslovakia, Hungary, Rumania, Moldavia, Bulgaria and Yugoslavia) during the 20th century have been investigated by Piotr Eberhardt [1][5]. His analyses revealed moderate depopulation of rural areas in most of these countries and extreme depopulation of Byelorussian rural territories. This means that depopulation processes can act not only on a local level, but they influence wider territories. They can be regarded as inter-regional or even international problems.

In the 80's and 90's a few researchers in Poland (Andrzej Stasiak, Ryszard Horodenski, Wlodzimierz Mirowski, Miroslaw Serwin, Izaslaw Frenkel, Andrzej Rosner, Piotr Eberhardt and others) investigated demographic phenomena in relation to spatial development and rural and urban planning. Their research resulted in describing the rural depopulation dynamics in Poland based on census data (1965, 1970, 1978 and 1988 censuses). The researchers have also studied the consequences of depopulation. Here are their findings [6][7]:

- despite the general increase of population in Poland in the early post-war period, the whole post-war period in Poland was characterized by the stabilization of rural areas and a small decrease in rural population could be observed periodically
- moderate rural depopulation have been common since 60's, accelerating in the 70's. Consequently rural population is declining while population in urban areas continues to grow
- depopulation processes occurred on even bigger rural territories and increased in Sudety Mountains (S-W Poland) and Bialystok region (N-E Poland)
- depopulation has destabilised the rural settlement system on many peripheral territories
- depopulation processes have lowered the population potential in peripheral rural areas and
- fertility/mortality rate has been playing secondary role recently and the main causes of a depopulation were selective migrations, implying serious deformation in demographic structures: ageing of rural population, imbalances between the sexes (loss of women of marriageable age), population stagnation and weakening of the intellectual pool

Spatial heterogeneity of demographic trends in Poland made researchers to focus on territories with highest dynamics of a depopulation [8]. Bialystok region (part of Podlaskie Voivodeship in N-E Poland) was found to be the most influenced by rural depopulation [9][10]:

- average population density in Poland is about 122 people / sq km, but it is only about 61 people / sq km in Podlaskie Province (and it decreases to 10 people /sq km locally)
- rural population in Bialystok region reached its maximum in the 17th century, then it decreased rapidly and before the 1st World War it reached its peak. It has been depopulating continuously since the turn of the 60's and 70's. On the other hand, population of towns and cities decreased during the 2nd World War then it has been increasing rapidly in the 70's. For example, Bialystok had 40.000 inhabitants in 1944 and it has 280.000 at present.

– rural population at peripheral territories of Bialystok region (especially in the very southern part of Podlaskie Voivodeship) declined rapidly after 1970 (*the demographic crash*)

– the long-lasted, continuous flow of inhabitants from the surrounded villages to a few cities in Eastern Poland resulted in a very fast growth of these cities, especially Bialystok (N-E) and Lublin (S-E Poland) multiplied their population during the period 1950-1990.

Three factors characterise methodology of these investigations in the past. First, the subject matter was analysed in relation to the socio-economical phenomena, missing the demography impact on architectural space. Second, the main attention was paid rather to geographical patterns of rural population distribution, resulting in comparison populations by voivodeships (provinces) or communes rather than by villages. So this granularity of their investigations was insufficient to reveal many important aspects of demographic processes. Third, the problem of how depopulation stimulates interrelations between the city and the region, was analysed rather sparsely (except of more detailed analyses of people's motivations for migrations from villages to cities, undertaken by W. Mirowski).

For these reasons, spatial consequences of depopulation of rural areas in north-eastern Poland were re-investigated at Studio of Rural Architecture, the Department of Urban Planning, Faculty of Architecture, Bialystok Polytechnic) in 2000-2003. This research was supported by rector's grants #W/WA/4/00 and then dean's grant #S/WA/2/01. The following were used: the population in 1970 and 1978 (census data in Bialystok Provincial Archive), the population in 1988 (census data, according to Bialystok Provincial Census Bureau), the population at present (according to local authorities).

3. The Analysis of Depopulation Dynamics in Bialystok Region

The accessible data allowed to compare the population of 1500 villages separately in 1970, 1978, 1988 and 2002 in order to get the geographically dispersed dynamics of depopulation processes in Podlaskie Voivodeship. As a result the detailed maps of depopulation magnitudes during the periods 1970-88, 1978-88 and 1978-2002 have been generated (*Fig.1* and *Fig.2*). The maps allowed to analyse the depopulation processes in Podlaskie Voivodeship in Poland with emphasis on how they affect the spatial development of rural areas.

The following facts have been revealed: over 300 villages wasted more than 25% of their population during the decade 1978-88. More than two hundreds villages wasted over 50% of their population between 1970 and 1988; 390 villages wasted over 50% of their population between 1978 and 2002. A depopulation between 1970 and 2002 has not been found because of data incompatibility. The tight territory with the strongest depopulation could be highlighted: it was a wide strip spreading across the province from north to south (generally in S-E directions from Bialystok, towards and along the Byelorussian border). Generally, the depopulation intensity increases horizontally towards the eastern direction, producing a 'demographic vacuum' at some rural territories in communes Michalowo [11][12] and Krynki [13].

Finally, the correlation between the size of villages and their depopulation, have been found. Namely, the 1232 villages and towns (i.e. the ones for which the full demographical information was provided) were classified into nine categories according to their population, as shown on *Table 1*. It reveals that the strength of depopulation processes depends on the size of villages/towns: the smallest units have been wasting their inhabitants very fast during the period 1978-2002. On the other hand, the largest units (towns) have arisen, attracting population from surrounding villages. This observed correlation between the size of villages and their depopulation confirms similar results obtained by other researchers [10].

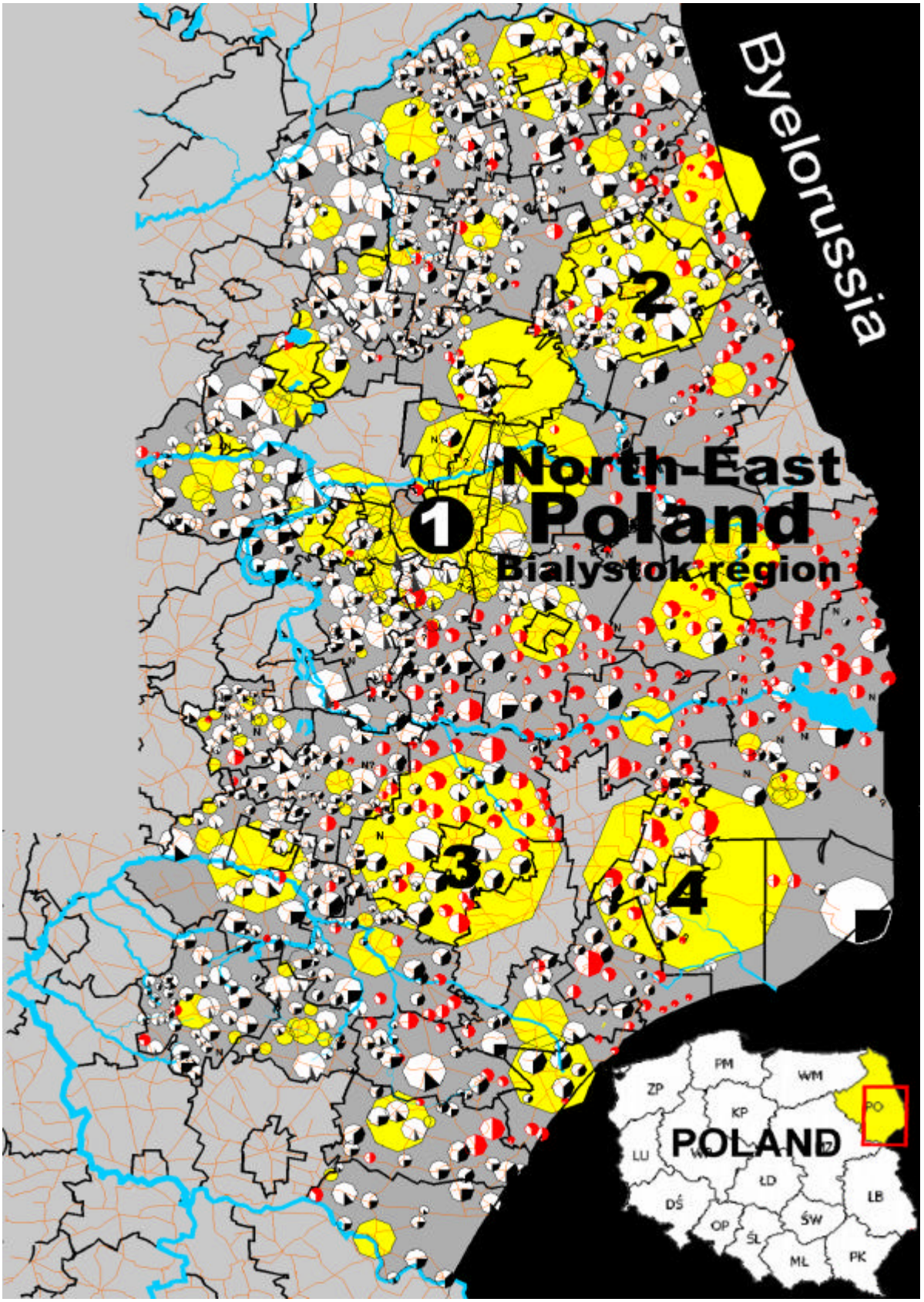

Figure 1. The map is showing the dynamics of depopulation of rural areas in Bialystok region between 1978 and 2002. Settlement units (villages, towns, cities) are represented by various circular symbols dependently of their number of inhabitants and depopulation. Black parts of symbols represent the rate of a depopulation. The largest units arose and the smallest were vanishing. Source: J.Szewczyk

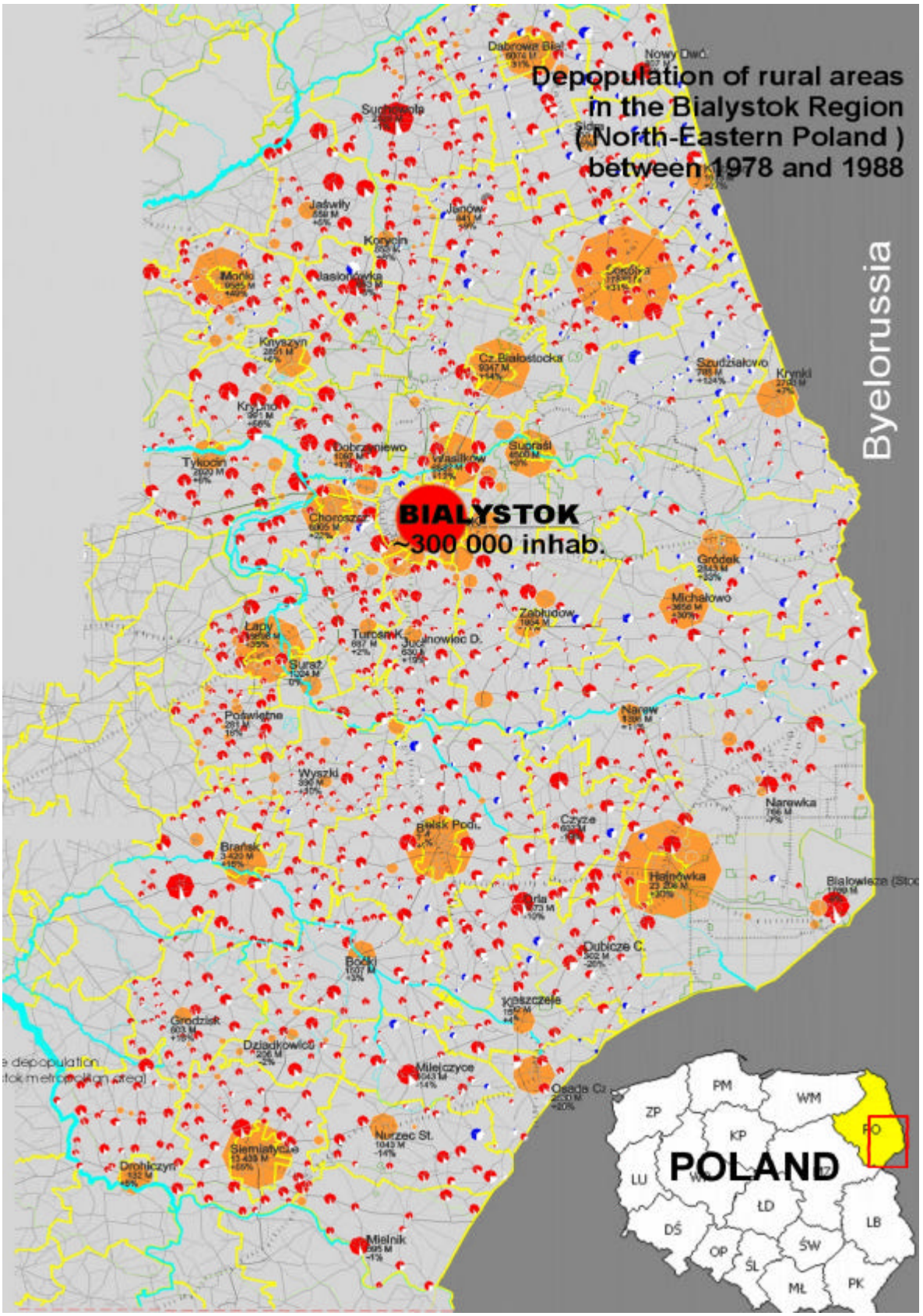

Figure 2. The map is showing the dynamics of depopulation of rural areas in Bialystok region between 1978 and 1988. Settlement units (villages, towns, cities) are represented by various circular symbols dependently of their number of inhabitants and depopulation. Black parts of symbols represent the rate of a depopulation. The largest units arose and the smallest were vanishing. Source: J.Szewczyk

Table 1. The correlation between the size of villages and their depopulation

Population of a village or a town in 2002 [inhabitants]	Number of villages or towns in each group	The average increase or depopulation between 1978 and 2002 [%]
0 — 50	208	— 42,35 (*a depopulation*)
51 — 100	377	— 26,66 (*a depopulation*)
101 — 200	358	— 19,70 (*a depopulation*)
201 — 300	139	— 15,25 (*a depopulation*)
301 — 400	65	— 2,67 (*a depopulation*)
401 — 600	32	+ 1,32 (*an increase*)
601 — 1 000	25	+ 4,41 (*an increase*)
1 001 — 5 000	23	+ 26,44 (*an increase*)
5 001 — 30 000	5	+ 50,55 (*an increase*)
Bialystok = 40.000 inhabitants in 1944; 280.000 in 2002		+ 33 % (+ 600% *since 1944*)

We expected that suburbs and villages which belong to the urban metropolitan system had considerably higher growth rates than peripheral rural areas. But, in fact, a territory of urbanization around the city was surprisingly tight. Bialystok (which has about 300 000 inhabitants) influenced directly an area up to 10 km from the city. Otherwise the city did not prevent from depopulation and degradation of a settlement structure, especially in remote territories. We hardly found a small transition zone around the city and we could observe rather polarisation of villages instead. Suburb villages either gained or wasted their population, i.e. surprisingly, there were not 'stable' and only a small number of moderately decreasing ones.

4. Depopulation, Theories and "Poland B" Factors

In 60's, 70's and early 80's, Michal Chilczuk, Tadeusz Kachniarz and few other researchers in Poland tried to apply social and demographic knowledge to urban and rural planning. In their works [14], [15] they refer to the earlier socio-economical theories, such as the Central Place Theory by Christaller and Lösch (based on a hierarchical arrangement of settlements). It had been stated that Christaller's theory could be a very good approximation of structure of settlement units in socialist Poland, so it was then utilised in spatial planning. Unfortunately the application of this theory presumed two unattainable determinants:

– the stability of spatial arrangements of settlement structure and
– an existence of a dense spatial arrangement of hierarchical settlement units.

But firstly, the settlement structure were really characterised by a quite high dynamics. Secondly, this spatial arrangement had not been appropriate enough even before and, in fact, its dense structure started to decline in peripheral regions because of depopulation of rural areas. In spite of these shortcomings, the Central Place Theory by Christaller and Lösch, was an important theoretical background for urban, rural and regional planning in Poland in 70's and 80's. A few detailed, working theories were based upon it. But in late 80's and 90's, researchers focused their attention on so called "problem territories" that were defined in order to recognise the increasing socio-demographic and spatial problems [16]. The Central Place Theory was not directly applicable for these areas. Some territories have been called "problem" mostly because of the demographic situation (*demographic crash*) on rural areas and because of their economic underdevelopment. Podlaskie Voivodeship was among them. But also all Eastern Poland territory (including Podlaskie Voivodeship) was in some sense a problem area. It was often pejoratively called *sciana wschodnia* ("the Eastern periphery" or exactly "the Eastern wall") or "Poland B" because of the following factors [17]:

– its peripheral location
– its cultural, ethnic and religious differentiation (which potentially can generate conflicts)
– low education and low cultural infrastructure
– low social infrastructure and poor economy
– low population density and very low urbanisation
– the specific settlement structure of a metropolitan type, i.e. with one big city (Bialystok in N-E, and Lublin in S-E Poland) surrounded by very small towns and villages
– various social consequences of depopulation of rural areas

In Bialystok region the above factors feature extremely intensively. For example, the biggest city Bialystok has more than 280.000 inhabitants (350.000 with its satellites), and on the other hand, the average number of inhabitants in surrounded peripheral rural areas differs locally from 150 to 200. Almost 50% of villages (i.e. 585 of the 1232 villages analysed in detail by the authors) have less than 100 inhabitants, 18% (i.e. 217 ones) have up to 50 inhabitants. The population density is small and it is 10 people / sq km locally on peripheral rural territories. This very specific feature of a settlement structure, which is typical to the whole Polish territory, was commented by M. Andor [18] as follows: 'Polish settlement patterns in particular do not correspond to the image conjured up by the term 'village'. Nucleated villages coexist with tiny hamlets of two of three households and 'street villages' with no discernible centre.'

The dynamics of negative demographic, social and spatial processes at the *Podlasie problem territory* disables the prospects of an appliance of old *static theories* in rural spatial planning. New contemporary concepts of development of rural areas seem to be too general and too optimistic. They utilise concepts of *multi-functionality* [19], *eco-* and *agrotourism* [20], which are magic keywords rather than real solutions. At present, some foreign experiences in rural revival, such as Irish or Scandinavian ones [21], are focusing researchers' attention in Poland.

Effective revitalisation concepts that meet the demands of demographic problems are still to be discovered. But, in our opinion, a precise analyses of consequences of a depopulation should be performed first in order to direct revitalisation activities correctly.

5. Disintegrative Consequences of a Depopulation

In Bialystok region, the most intensive depopulation affects the most valuable territories for their multi-cultural heritage, with the unique vernacular architecture and old, historic, spatial and settlement structure, for example, villages near the towns Bielsk Podlaski and Hajnowka. In other words, depopulation directly disintegrates spaces that are the most valuable architecturally, culturally and socially and indirectly leads to the total destruction of its social, cultural and architectural heritage. For example, a few communes (districts) were composed of 20-30 villages around the small central town in the past, but in the near future they are going to be composed of one central town only in a 'demographic vacuum' (examples are Krynki, Szudzialowo and Michalowo). Many of these vanishing villages have their unique architecture which falls into ruins gradually. Examples are a Tartar village Kruszyniany in Krynki commune, hundreds of Byelorussian villages such as Janowo and Waski in Narew commune, a number of Ukrainian villages on the west borderland of Bialowieza forests.

Demographic processes also affect society and environment. It is evident in abandoned fields and forgotten sites, in ruined huts and gentrified 'second homes' indirectly it sometimes stimulates the return of forests and increases biodiversity. In north-eastern Poland, the growing depopulation started to affect space, economy, landscape and even culture at 60's, and since 70's until now it has been influencing disruptively on the spatial development processes. The following disintegrative results of a depopulation can be noticed [22][23] (see *Table 2*):

Table 2. The typology of a disintegrative impacts of a depopulation into the space and society

THE DIRECT IMPACT ON A SETTLEMENT STRUCTURE	
transformation of settlement cells: – fall of villages in general – a decline of small villages (about 100 to 200 villages is going to disappear) – transformation of significance and roles that settlement units play (for example transformation of farming villages towards tourist colonies)	**destabilisation of settlement systems:** – disintegration of settlement units hierarchy – isolation resulting in disintegration of reciprocal dependencies between small settlement units **other problems** (social, architectural) concerning the co-existence of formally interrelating settlement units, that become isolated
THE IMPACT ON A BUILDING AND ARCHITECTURE	
the neglect: – abandoned heritage-significant vernacular building – degradation of farm building, abandoned or owned by retired old people – degradation of other building, especially those being not in usage	
THE IMPACT ON AN ECONOMY	
– a recession at rural territories – decreasing productivity – asset deflation – fall of farming and abandoned farmland	– impact on real estate market – decline of agriculture related activities – the closure of shops and other services
THE IMPACT ON AN INFRASTRUCTURE	
degradation of infrastructure: – low social infrastructure – weakness of transportation systems – weakness of infrastructure media	**lack of new investments** **difficult access** to shops, services, education and to sophisticated entertainment
THE IMPACT ON A SOCIETY	
migrations are selective, so that they imply serious deformations in age and sex distribution and in other demographic structures: – ageing of the rural population – strong imbalances between the sexes: loss of women of marriageable age (the rate of men/women up to 100:141 locally in Bialystok region) – low average educational status and deficiency of well educated and qualified people	**transformations of job structures:** – a rapid deterioration of a job structure, in relation to local needs – an extinction of local crafts – an observed deterioration or retaining of low educational status of the farm work force **lack of a proper support for the elderly** **social isolation**
THE IMPACT ON A CULTURE	
an extinction of traditional culture: – degradation and disappearance of artefacts and places that create local identity and values – vanishing of village public life, resulting in a decline of people's spiritual culture – discontinuity of traditional jobs, crafts, ways of life, habits and folk art – lack of heritage-based cultural significance of space and lack of aesthetical values **discontinuity of the natural development**	

6. Rural Depopulation and Urban Growth

Towns and especially cities attracted people from peripheries. Migrations from villages to towns and then to cities caused the growth of cities in Eastern Poland in the past and supplied some peripheral ones (such as Bialystok) with a great number of new inhabitants. Rural depopulation has slowed down this process. Cities and towns that were integrally bound with their surroundings and empowered by a vanishing net of villages and other towns, are going to waste the power of their "demographic background". As a result the previous rapid spatial development of Bialystok and local towns is going to be retarded.

But in fact, even this model of reciprocal interrelations between cities and rural areas is excessively simplified, if based on direct migrations only. Konrad and Szelenyi [24] defined one of the shortcomings related to the urban and economy space in socialist countries and called it *underurbanisatio*n. This term defines the theory with a main thesis that "low levels of urbanisation [in socialist countries] depend on the system's failure to provide an urban infrastructure that is sufficient to support the industrial output necessary to fulfil the requirements of the five-year economic plan" [25]. According to Murray and Szelényi [26], socialist cities tended to develop rings of proletarian, "pre-urban", suburban villages around them, the inhabitants of which commuted to work every day. The inhabitants of these suburbs have never abandoned agriculture and they "could be classified as worker-peasants" [18, p.4].

A kind of locally-specific *underurbanisation* of Bialystok agglomeration could be observed. It manifested itself spatially as a phenomenon of "worker-peasants" (both inhabitants of satellite villages who work in Bialystok, and inhabitants of Bialystok who still have their farms in villages) and in "sleepy towns" (towns-satellites, such as Suprasl, Choroszcz and Wasilkow, which inhabitants commute to work to Bialystok everyday). It still manifests in the spatial structure of cities, with broad areas of old and destroyed, *rural-like* residential housing even at the very city centre. Surprisingly, rural-urban migrations enlarged *underurbanisation* in the past, and the resulted demographic situation solidify *underurbanisation* now.

The further investigation into how depopulation affects urban growth, show two different models of migration phenomena. The traditional, past model of migrations, is as follows: The city attracts country folks. Country acts as a source of migrants. Towns act as buffers. The other, more actual model of migrations can be described as follows: Generally, the city entices people, but especially **suburb areas** attract people that migrate from outer territories. Towns distribute migrants but depopulated peripheral villages (inhabited mostly by older people) cannot serve as a source of migrants. For this model "suburb area" is highlighted on basis of a demographic criterion. It is defined here as a continuous area with growing population that surrounds the city and is surrounded by depopulating peripheral country areas. Surprisingly, but fortunately for the investigation process, we could observe a very clear sharp border limiting city-like suburban areas and isolating them from outer depopulating territories. As a result we could observe the rapid growth of suburban villages accompanying by the lightning depopulation of outer village even if very neighbouring to the suburban territory.

Both these models imply other, non-demographical problems (social, architectural) concerning the co-existence of interrelating settlement units. Many problems touch sustainability and heritage preservation issues, especially in relation to suburb territories, because the suburbs are usually being shaped regardless to their heritage roots. The main "suburb problems" are: (a) discontinuity of the sustainable natural development; (b) lack of heritage-based cultural importance of space (often enlarged by lack of aesthetical values); (c) unsolved collisions with natural spatial barriers and with existing infrastructure, resulting with general spatial chaos. For example, residential building zones surround the city, grow and generate conflicts with city infrastructure and with industrial and agricultural areas; (d) reverting of social hierarchies that were formerly based on the ties of kinship or on neighbourhood ties; (e) sometimes, an isolation of suburban zones.

In general, rural population decline, *underurbanisation* and urban sprawl (which has not been very extreme yet) around the Bialystok, can act against sustainable development of the region.

7. Conclusions

The following conclusions can be drawn from the above given facts:

1. Recent demographic phenomena influence population distribution patterns and human living space. These processes play especially significant role at some peripheral territories. Bialystok region is the most typical example in Poland. Other post-socialist European countries are also affected by these problems. The phenomena reflects the general trend of increasing concentration of the population in *(sub)urban* areas.
2. The migration processes disturb traditional spatial, social and economical interrelations in the hierarchy of settlement units. As compared to the previous long-term historic development of these areas, these processes at suburban and rural territories are relatively new. Thus we are facing some new, unknown problems and challenges, especially related to the territories overlapped by the most intensive migration processes.
3. Depopulation of rural areas directly disintegrates the most valuable architectural, cultural and social spaces and indirectly leads to the destruction of its social and architectural heritage. As a result village life, people's spiritual culture, folk art and customs vanish, and the neglect, degradation and disappearance of artefacts that carry local identity and cultural values takes place.
4. Depopulation on rural areas indirectly leads to the destruction of social and architectural heritage of towns and suburban surroundings of cities
5. We have no appropriate methods for a regional and urban governance relevant to the new demographic challenges. The traditional methods have been well evaluated for a long time but they are ineffective now. On the other hand, the new challenges result in new "on demand" but untested methods for a regional and urban governance. New approaches rely on sociological, commercial and governmental predictions.
6. The following are the challenges for the urban planning and design (with regard to suburbanization and depopulation of peripheral rural areas):
    A. Preservation (neutralization of degradation and disappearance) of artefacts and places that create and maintain local identity and cultural values
    B. Preservation of traditional model of social life through shaping urban space hierarchically according to the natural social hierarchies
    C. Preservation of continuity of space and avoiding collisions
    D. Enriching the heritage-based cultural importance of space in relation to local aesthetical and cultural values and
    E. Preventing the isolation of suburban zones.
7. These models of the demographic interrelations between the city and the region, imply other, non-demographical problems (social, architectural) concerning the co-existence of interrelating settlement units.
8. These reciprocal economic, environmental, social and population effects should be monitored and for this reason we still need to do further integrative investigation into the range of depopulation processes and their consequences on the larger scale.

Keywords

Depopulation, Migrations, Settlement processes, Settlement landscape, Regional development, Rural planning, Rural architecture,

Acknowledgements

The authors gratefully acknowledge the support of the Dean of the Faculty of Architecture of the Bialystok Polytechnic Grant # S/WA/2/01.

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